



SAN DIEGO AREA

**REGIONAL
STANDARD
DRAWINGS**

STANDARD DRAWINGS FOR AGENCIES IN THE SAN DIEGO REGION

Recommended by the Regional Standards Committee
Maintained and Published by the County of San Diego
Department of Public Works
August 2009
www.regional-stds.com



Regional Standards Committee

Web Site: <http://www.regional-stds.com>

Mission Statement: Cost effective government through regional construction standards for San Diego area agencies.

FORWARD

These 2009 San Diego Area Regional Standard Drawings have been prepared and adopted by the San Diego Regional Standards Committee (RSC) for use in San Diego County Region by local agencies in concert with the Public Works Standards, Inc "Greenbook" Standard Specifications for Public Works Construction, 2009 Edition and the "2009 Regional Supplements to the Greenbook 2009". The San Diego County Region is defined as the geographical area within the boundaries of the County of San Diego.

The San Diego Area Regional Standard Drawings are published every three years however updates are posted on the Web Site <http://www.regional-stds.com> as changes are adopted by the RSC. The website also contains Information about membership, operating procedures, meeting schedules, agenda and minutes, standard drawings and specifications, and a form for submitting proposed revisions. Users of the San Diego Area Regional Standard Drawings are encouraged to submit proposed changes to the Regional Standards Committee (RSC) at:

County of San Diego
Department of Public Works
Attention: Kamilah James, P.E., RSC Coordinator
5555 Overland Avenue, MS 0340
San Diego, CA 92123
858-495-5288
Kamilah.james@sdcount.ca.gov

A new addition of the Regional Standard Drawings that incorporates approved changes will be posted in its entirety each year on the website for easy downloading. The original 2009 release will remain on the website as well.

The following are subcommittee chairs and the County of San Diego Coordinator who over the last three years have made this publication possible by integrating the input from all agencies in the County:

Kamilah James	County of San Diego Coordinator	County of San Diego
Mark Caro*	Landscaping Committee Chair	City of Chula Vista
Mohsen Maali**	Traffic/Lighting Committee Chair	City of San Diego
Dirk Epperson	Streets/Roads Committee Chair	City of La Mesa
Tim Regello	Drainage/NPDES Committee Chair	City of Vista
Tim Shell	Americans with Disabilities Act Chair	City of Vista
Jim Tomasulo***	Wet Utilities Committee Chair	Helix Water District
Dennis Buss	Dry Utilities and Misc Chair	Sempre Energy

* Currently Chair is vacant

** Current Chair is Zoubir A Quadah, City of Poway

*** Current Chair is Luis Valdez, Helix Water District



The “Greenbook” was first published in 1967 and the Regional Standards Committee was established under San Diego County Board of Supervisors Policy I-50 in 1973. The Regional Standards Committee membership is open to the City Engineers, Directors of Public Works, District Engineers and Heads of Engineering, or their designees, from the County of San Diego, cities within the County of San Diego, all water and sewer districts, utility companies, construction associations, consultant associations, and various private industry organizations. The County Department of Public Works provides coordination and staff support for the Regional Standards Committee. The RSC Chair is selected by the committee members and serves a three-year term.

In 2003 the RSC decided to provide the Regional Supplements to the “Greenbook” and the Regional Standard Drawings in the dual unit format to be consistent with the “Greenbook” and the national plan to migrate to metric. The RSC elected to use “hard conversion” from English imperial units to metric units in the supplements and standard drawings. Hard conversion is defined as calculating the actual value in metric units from English imperial units and then rounding up for 5 and above. The “Greenbook” uses soft and hard conversions. The 2009 “Greenbook” has elected to continue the use of dual units but is placing metric in parenthesis instead of English imperial units in parenthesis. The Regional Standards Drawings continue to use dual units but use the English imperial units in parenthesis whereas these Regional Supplements to the “Greenbook” are using the “Greenbook” format of metric in parenthesis. Either way both units are available.

Timothy N. Stanton, P.E.

Ramona Municipal Water District

Chair, Regional Standards Committee

PROPOSED REVISION TO THE REGIONAL STANDARDS

Draft No.

☐ Specification☐ Drawing

Date

REASON FOR REVISION:

SUBMITTED BY:

NAME: _____ PHONE: _____

AGENCY: _____ ADDRESS: _____

Subcommittee: _____

Date: _____

☐ RECOMMENDED ☐ AS MODIFIED ☐ REJECTED

Regional Standards Committee

Date: _____

☐ RECOMMENDED ☐ AS MODIFIED ☐ REJECTED

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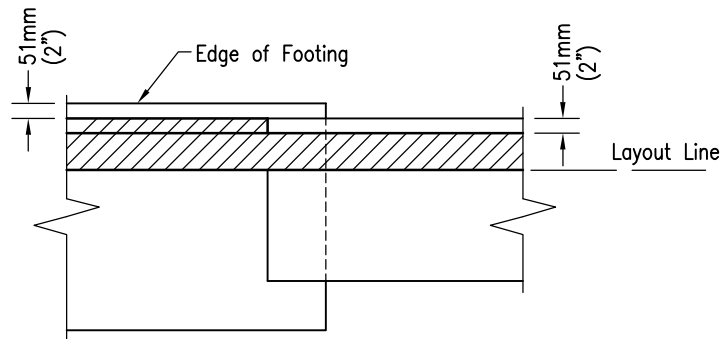
APPENDIX A

Traffic Control Plans

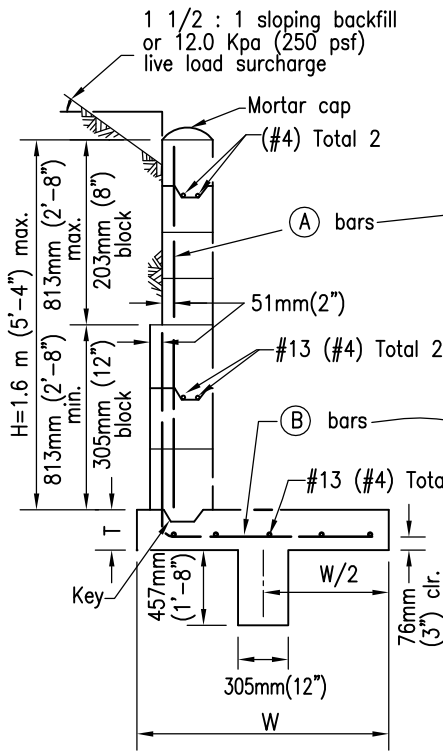
CONCRETE STRUCTURES

C

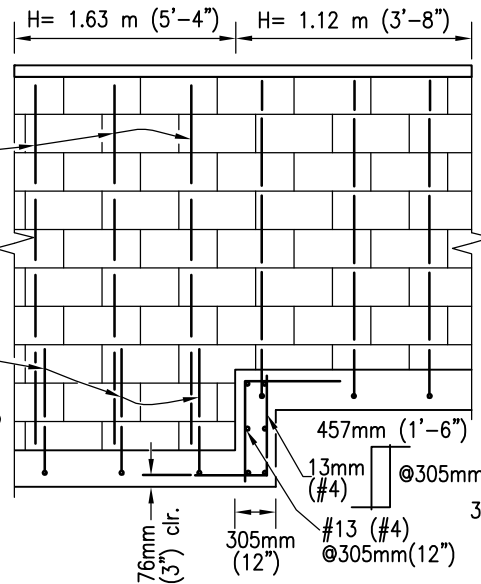
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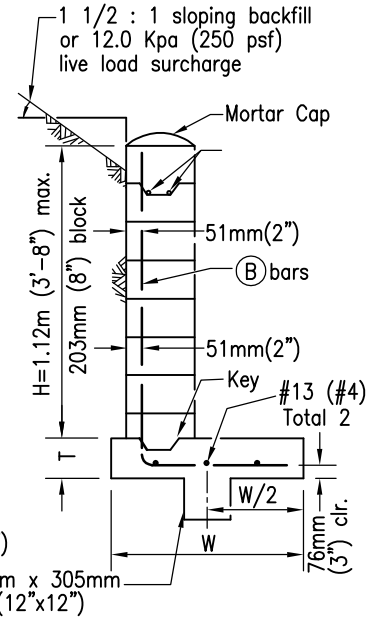
PLAN



TYPICAL SECTION
over 1.12m (3'-8")



ELEVATION
Horizontal reinf. not shown



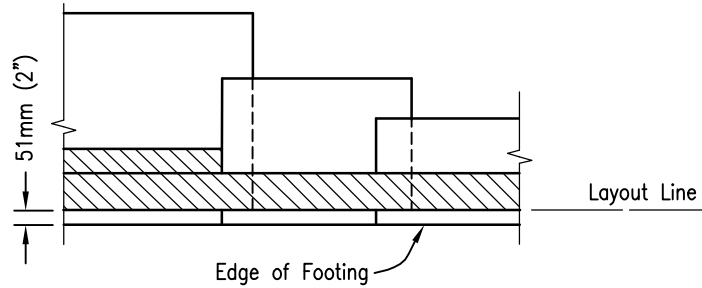
TYPICAL SECTION
1.12 m (3'-8") max.

DIMENSIONS AND REINFORCING STEEL		
H (max.)	1.63m (5'-4")	1.12m (3'-8")
T (min.)	254mm (0'-10")	254mm (0'-10")
W (min.)	1.52m (5'-0")	1.14m (3'-9")
(A) Bars	#13@406mm (#4@16")	—
(B) Bars	#19@406mm (#6@16")	#13@406mm (#4@16")
max. soil press.	33.5 Kpa (700psf)	26.3 Kpa (550psf)

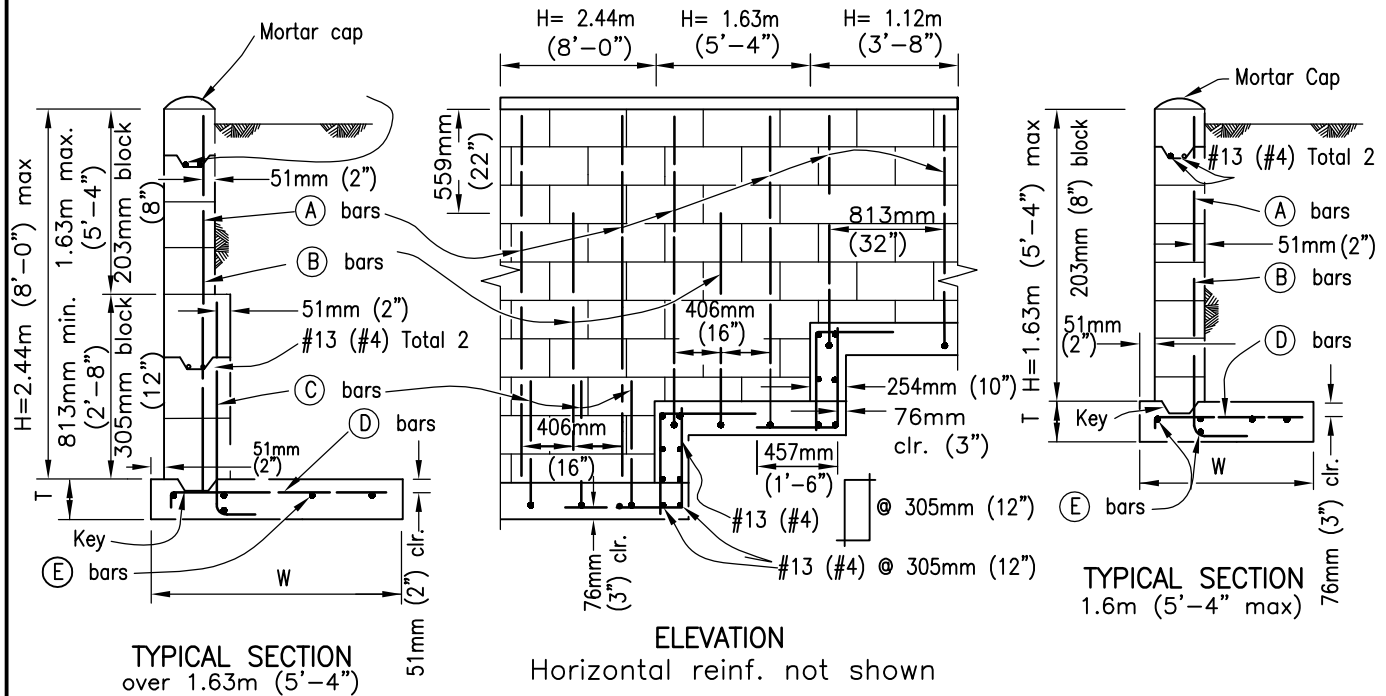
NOTES:

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			<i>R. Stanton</i> 3/01/2003	
Add Metric		T. Stanton	03/03	MANSONRY RETAINING WALL TYPE 2 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)		Chairperson R.C.E. 19246 Date	
						DRAWING NUMBER C-2	



PLAN

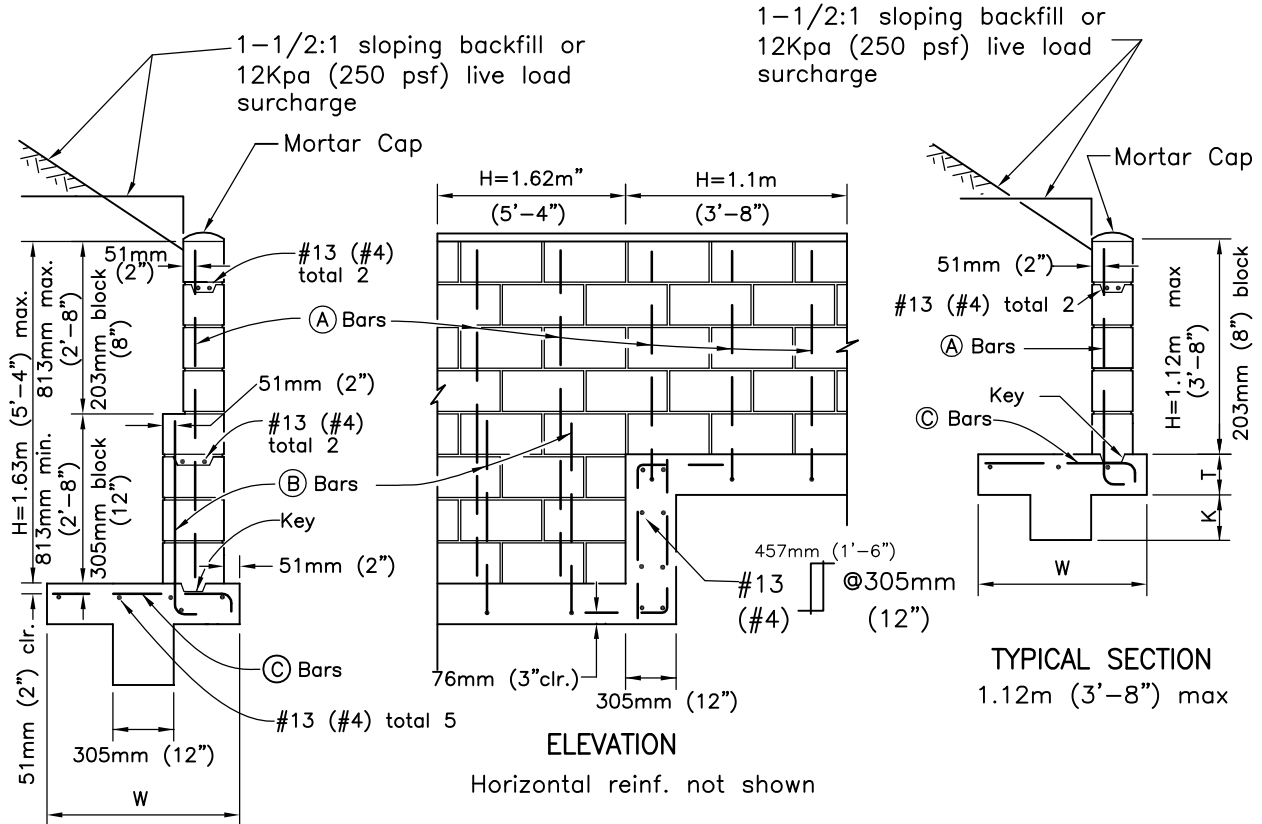


DIMENSIONS AND REINFORCING STEEL			
H (max)	1.12 m (3'-8")	1.63 m (5'-4")	2.44m (8'-0")
T (min)	203 mm (0'-8")	254 mm (0'-10")	305mm (1'-0")
W (min)	762 mm (2'-4")	965mm (3'-2")	1.45m (4'-9")
(A) Bars	#13@813mm (#4@32")	#13@813mm (#4@32")	13mm@813mm (#4@32")
(B) Bars	—	#13@813mm (#4@32")	13mm@813mm (#4@32")
(C) Bars	—	—	406mm (#6@16")
(D) Bars	#13@813mm (#4@32")	#13@406mm (#4@16")	406mm (#6@16")
(E) Bars	#13 (#4) total 4	#13 (#4) total 5	13mm (#4) total 6
max soil press. (psf)	7.6 MPa (1100psi)	11.0 MPa (1600psi)	15.2 MPa (2200psi)

- NOTES: 1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			<i>[Signature]</i> 3/01/2003	
Add Metric		T. Stanton	03/03	MASONRY RETAINING WALL TYPE 3 (LEVEL BACKFILL)		Chairperson R.C.E. 19246 Date	
						DRAWING NUMBER C-3	

PLAN



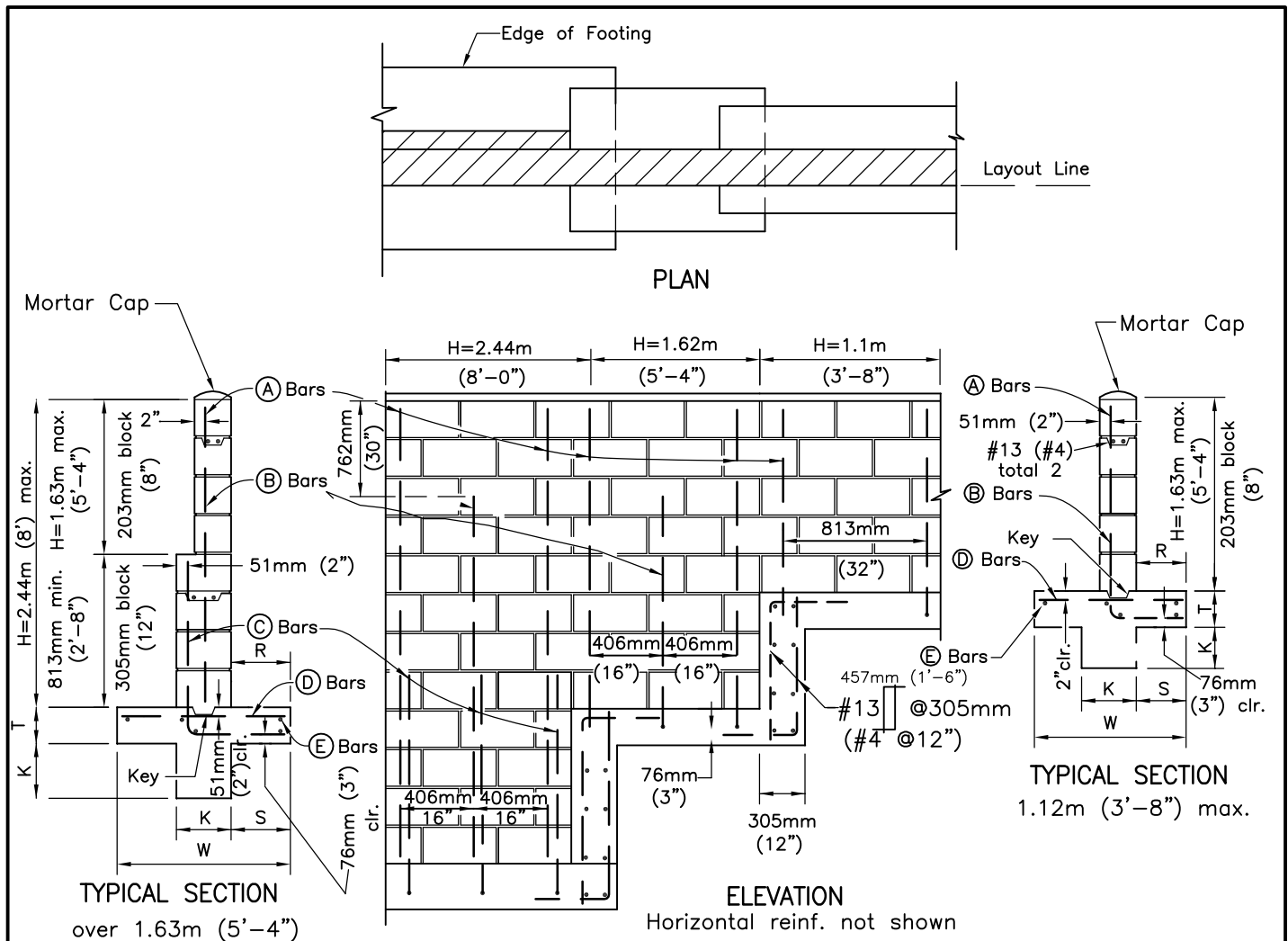
TYPICAL SECTION
over 1.12m (3'-8")

DIMENSIONS AND REINFORCING STEEL				
H (max)	1.63m (5'-4")		1.12m (3'-8")	
T (min)	254mm (0'-10")		203mm (0'-8")	
W (min)	1.22m (4'-0")		914mm (3'-0")	
Ⓐ Bars	#13(#4)@406mm(16")		#13 (#4)@406mm (16")	
Ⓑ Bars	#19(#6)@406mm(16")		—————	
Surcharge	sloping	live load	sloping	live load
Ⓒ Bars	#19(#6)@203mm(8")	#19(#6)@406mm(16")	#19(#6)@406mm(16")	#19(#6)@403mm(16")
K (min)	305mm (1'-0")	203mm (0'-8")	305mm (1'-0")	203mm (0'-8")
Toe Press.	129.3 Kpa (2700 psf)	91 Kpa (1900 psf)	81.4 Kpa (1700 psf)	68.5 Kpa (1430 psf)

NOTES:

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

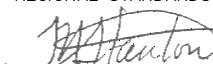
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  3/01/2003 Chairperson R.C.E. 19246 Date
ORIGINAL		Parkinson	02/95		
Add Metric		T. Stanton	03/03	MASONRY RETAINING WALL TYPE 4 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)	DRAWING NUMBER C-4
Reformatted		T. Stanton	04/06		

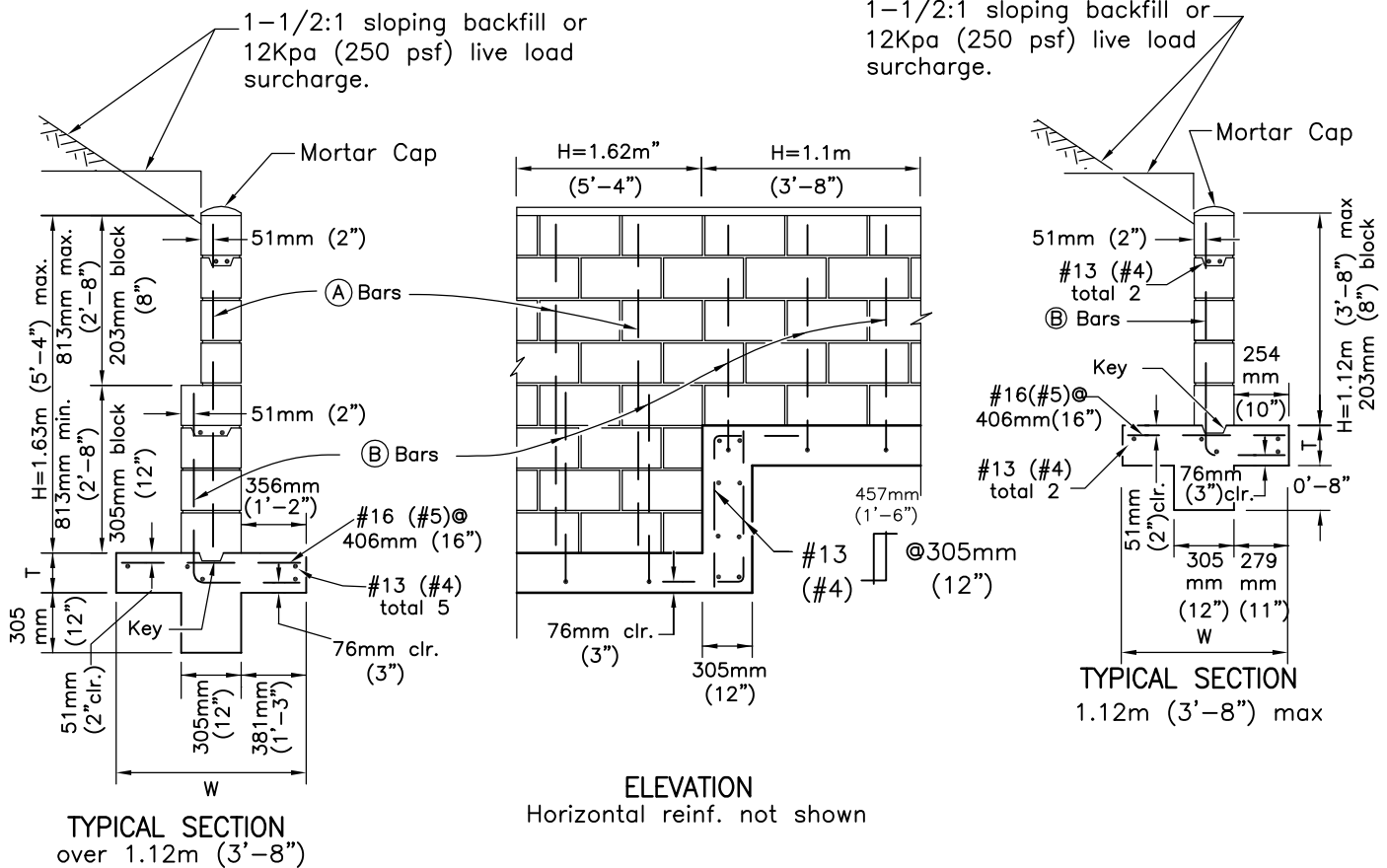
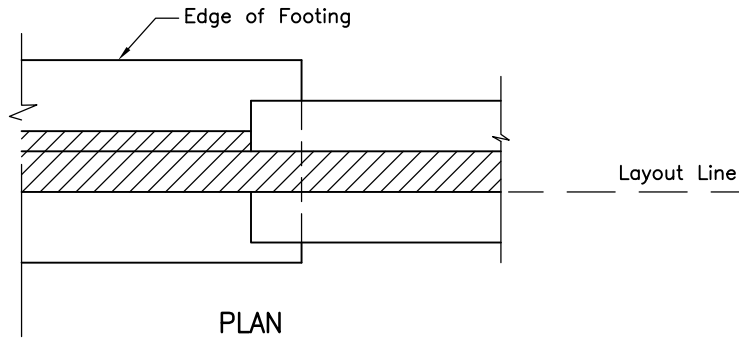


DIMENSIONS AND REINFORCING STEEL			
H (max)	1.12m (3'-8")	1.63m (5'-4")	2.44m (8'-0")
T (min)	203mm (0'-8")	254mm (0'-10")	305mm (1'-0")
W (min)	635mm (2'-1")	940mm (3'-1")	1.25m (4'-3")
R	229mm (0'-9")	356mm (1'-2")	432mm (1'-5")
S	216mm (0'-8 1/2")	318mm (1'-1 1/2")	495mm (1'-7 1/2")
K	203mm (0'-8")	203mm (0'-8")	305mm (1'-0")
(A) Bars	#13(#4)@813mm(32")	#13(#4)@813mm(32")	#13(#4)@813mm(32")
(B) Bars	—	#13(#4)@813mm(32")	#13(#4)@813mm(32")
(C) Bars	—	—	#22(#7)@406mm(16")
(D) Bars	#13(#4)@813mm(32")	#13(#4)@406mm(16")	#13(#4)@406mm(16")
(E) Bars	#13(#4) total 5	#13(#4) total 5	#13(#4) total 6
Max. Toe Press.	37.1 Kpa (774 psf)	49.3 Kpa (1,030 psf)	79.5 Kpa (1,660psf)

NOTES:

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

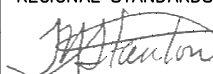
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Parkinson	2/95	MASONRY RETAINING WALL TYPE 5 (LEVEL BACKFILL)		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
						DRAWING NUMBER C-5	



DIMENSIONS AND REINFORCING STEEL		
H (max)	1.63m (5'-4")	1.12m (3'-8")
T (min)	254mm (0'-10")	203mm (0'-8")
W (min)	1.17m (3'-10")	838mm (2'-9")
Ⓐ Bars	#13(#4)@406mm(16")	—
Ⓑ Bars	#19(#6)@406mm(16")	#13(#4)@406mm(16")
Max. Toe Press.	95.8 Kpa (2,000 psf)	67.0 Kpa (1,400 psf)

NOTES:

- See Standard Drawings C-7 and C-8 for additional notes and details.
- Fill all block cells with grout.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE		
ORIGINAL		Parkinson	2/95	MASONRY REATAINING WALL TYPE 6 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)		 3/01/2003		
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date		
						DRAWING		C-6
						NUMBER		

DESIGN CONDITIONS:

Walls are to be used for the loading conditions shown for each type wall. Design H shall not be exceeded. Footing key is required except as shown otherwise or when found unnecessary by the Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure listed in table.

DESIGN DATA:**Reinforced Concrete:**

$F_c=8.3$ Mpa (1200 psi) $F'_c=20.7$ Mpa (3000 psi)
 $F_s=138$ Mpa (20,000 psi) $n=10$

Reinforced Masonry:

$F'_m=41.4$ Mpa (600 psi) $F_m=1.4$ Mpa (200 psi)
 $F_s=138$ Mpa (20,000 psi) $n=50$
 Earth=1922 kg/cu m (120 pcf) and Equivalent Fluid
 Pressure=1.76 kg/sq m (36 psf) per 305mm (foot)
 of height.

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankline's formula for unlimited sloping surcharge with a $\phi = 33^\circ$ 13m(42').

REINFORCEMENT:

Intermediate grade, hard grade, or rail steel deformation shall conform ASTM A615, A616, A617. Bars shall lap 40 diameters, where spliced, unless otherwise shown on the plans. Bends shall conform to the Manual of Standard Practice, A.C.1. Backing for hooks is four diameters. All bar embedments are clear distances to outside of bar. Spacing for parallel bars is center to center bars.

MASONRY:

All reinforced masonry retaining walls be constructed of regular or light weight standard units conforming to the "Standard Specifications for Public Works Construction."

JOINTS:

Vertical control joints shall be placed at 9.75m (32') intervals maximum. Joints shall be designed to resist shear and other lateral forces while permitting longitudinal movement. Vertical expansion joints shall be placed at 29.3m (96') intervals maximum.

CONCRETE:

Footing concrete shall be 332 kg/M³-C-22Mpa (560-C-3250), using Type B aggregate when placing conditions permit.

BACKFILL:

No backfill material shall be placed against masonry retaining walls until grout has reached design strength or until grout has cured for a minimum of 28 days. Compaction of backfill material by jetting or ponding with water will not be permitted. Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compacting is not less than 90%.

FENCING:

Safety fencing shall be installed at the top of the wall as required by the agency.

INSPECTIONS:

Call for inspections as follows:

- A. When the footing has been formed, with the steel tied securely in final position, and is ready for the concrete to be placed.
- B. Where cleanout holes are not provided:

- (1) After the blocks have been laid up to a height of 1.22m (4') or full height for walls up to 1.52m (5'), with steel in place but before the grout is poured, and.....
- (2) After the first lift is properly grouted, the blocks have been laid up to the top of the wall with the steel tied securely in place but before the upper lift is grouted.

Where cleanout holes are provided:

After the blocks have been laid up to the top of the wall, with the steel tied securely in place, but before grouting.

- C. After grouting is complete and after rock or rubble wall drains are in place but before earth backfill is placed.
- D. Final inspection when all work has been completed.

CONCRETE GROUT AND MORTAR MIXES:

Concrete grout shall attain a minimum compressive strength of 13.8 Mpa (2,000 psi) in 28 days and mortar shall attain 12.4 Mpa (1,800) psi in 28 days. All cells shall be filled with grout. Rod or vibrate consolidation. Bring grout within 10 minutes of pouring to insure grout to a point 51mm (2") from the top of masonry units when grouting of second lift is to be continued at another time.

MORTAR KEY:

To insure proper bonding between the footing and the first course of block, a mortar key shall be formed by embedding a flat 2 x 4 flush with and at the top of the freshly poured footing. The 2 x 4 should be removed after the concrete has started to harden (approximately 1 hour).

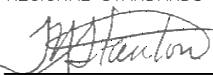
A mortar key may be omitted if the first course of block is set into the fresh concrete when the footing is poured, and a good bond is obtained.

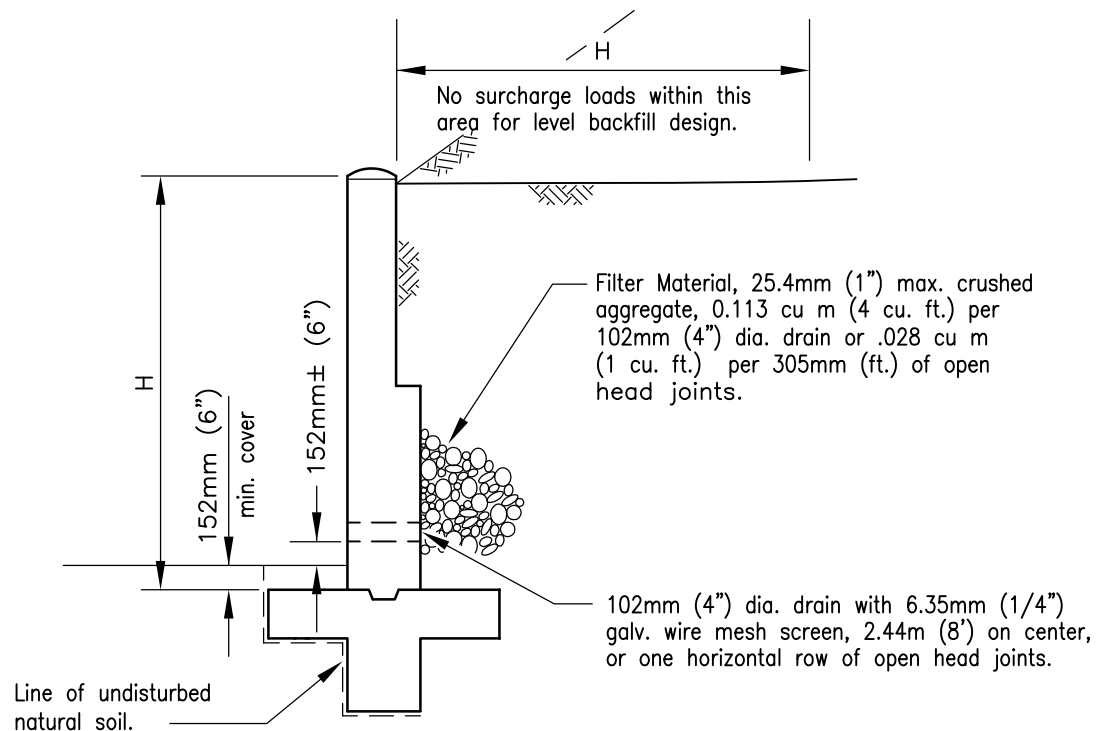
WALL DRAINS:

Wall drains shall be provided in accordance with Standard Drawing C-8.

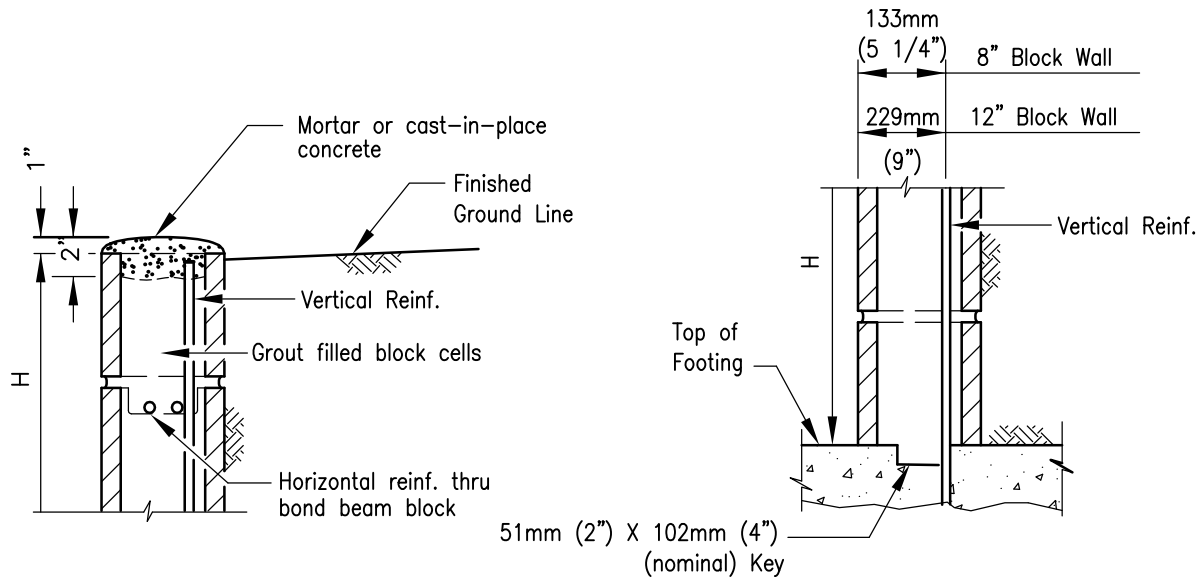
SOIL:

All footings shall extend at least 305mm (12") into undisturbed natural soil or approved compacted fill. Soil should be dampened prior to placing concrete in footings.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		A. Kercheval	12/75	GENERAL NOTES FOR MASONRY RETAINING WALLS		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
						DRAWING NUMBER C-7	



TYPICAL SECTION

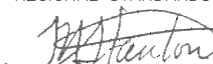


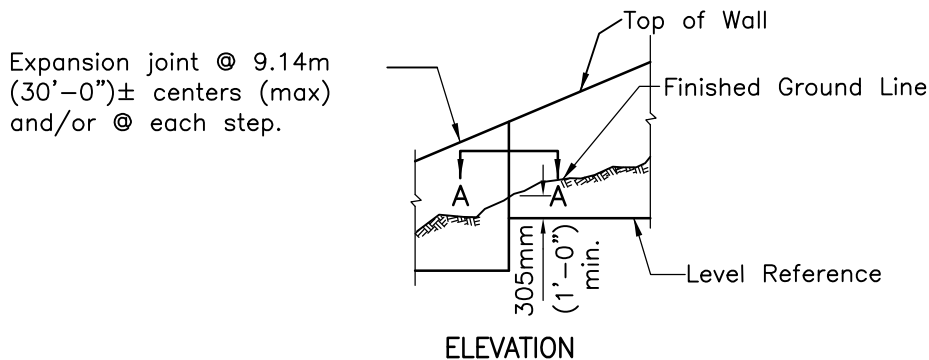
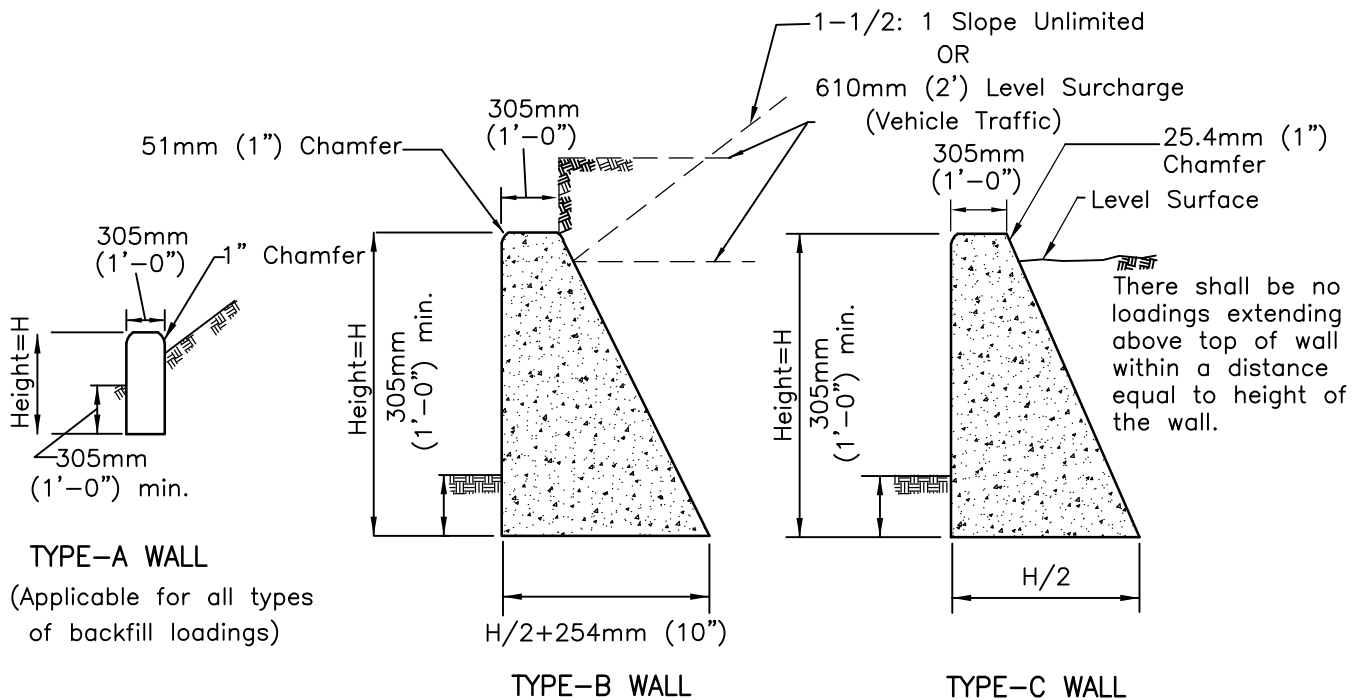
CAP DETAIL

KEY DETAIL

NOTES:

1. All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.
2. 102mm (4") diameter drain may be formed by placing a block on it's side.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
ORIGINAL		Kercheval	12/75	DETAILS FOR MASONRY RETAINING WALL	
Add Metric		T. Stanton	03/03		
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				 3/01/2003 Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER C-8	



WALL TYPE	HEIGHT	BASE	CONCRETE CU M - CF/FT
A	457mm (1'-6")	305mm (1'-0")	.042 cu m (1.50 cu ft.)
	610mm (2'-0")	305mm (1'-0")	.057 cu m (2.00 cu ft.)
B	914mm (3'-0")	711mm (2'-4")	1.41 cu m (4.99 cu ft.)
	1.22m (4'-0")	864mm (2'-10")	.217 cu m (7.66 cu ft.)
	1.52m (5'-0")	1.02m (3'-4")	.306 cu m (10.82 cu ft.)
	1.83m (6'-0")	1.17m (3'-10")	.410 cu m (14.49 cu ft.)
C	914mm (3'-0")	457mm (1'-6")	.106 cu m (3.75 cu ft.)
	1.22m (4'-0")	610mm (2'-0")	.170 cu m (6.00 cu ft.)
	1.52m (5'-0")	762mm (2'-6")	.248 cu m (8.75 cu ft.)
	1.83m (6'-0")	914mm (3'-0")	.340 cu m (12.00 cu ft.)

NOTE:
See Standard Drawings C-10 for Section A-A, notes and details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	GRAVITY RETAINING WALLS	Chairperson R.C.E. 19246 Date
					DRAWING NUMBER C-9

CONCRETE

Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250)

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall. Design H may be exceeded by six inches before going to next size.

DESIGN DATA

$F_c = 8.3 \text{ Mpa (1200 psi)}$
 $F'_c = 20.7 \text{ Mpa (3000 psi)}$
Earth = 1922 kg/cu m (120 pcf)
and equivalent fluid pressure = 176 kg/sq m (36 psf) per 305mm (foot) of height

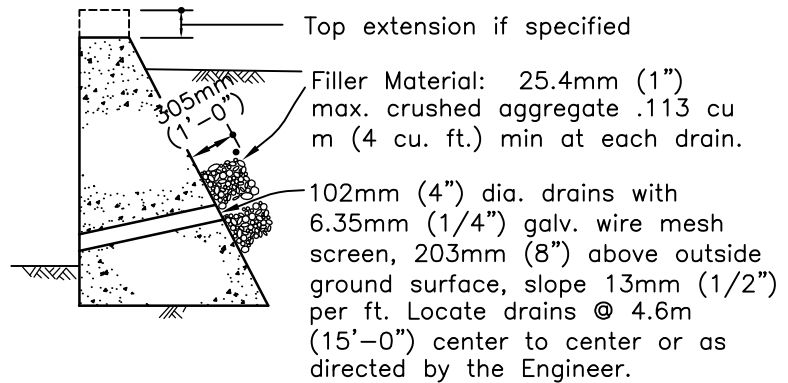
Walls shown for 1-1/2:1 unlimited sloping surcharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with $\phi = 33^\circ$ 13m (42').
Note: Maximum toe pressure under wall footing = 143.6 Kpa (1-1/2 tons/sq. ft.).
Special design required where footing material is incapable of supporting this pressure.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90 percent.

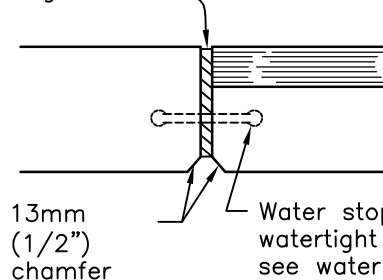
No backfill material shall be deposited against concrete retaining walls until the concrete has developed a strength of 17 Mpa (2,500 psi) in compression as determined by test cylinders, or until 28 days after wall has been placed.



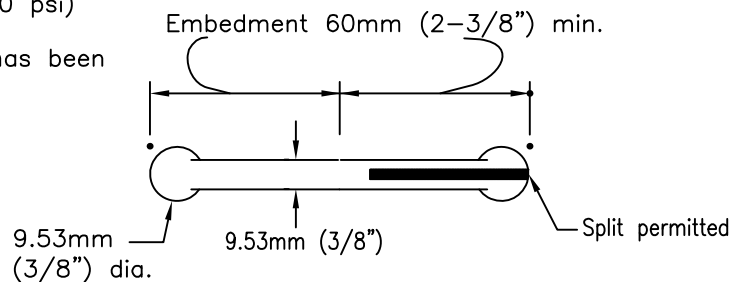
TYPICAL DRAINAGE

WHEN H IS GREATER THAN 1.22m (4'-0")

13mm (1/2") Expansion joint, fill with premolded expansion joint filler. Locate joints at approx. 9.14m (30'-0") centers or as directed by the Engineer.



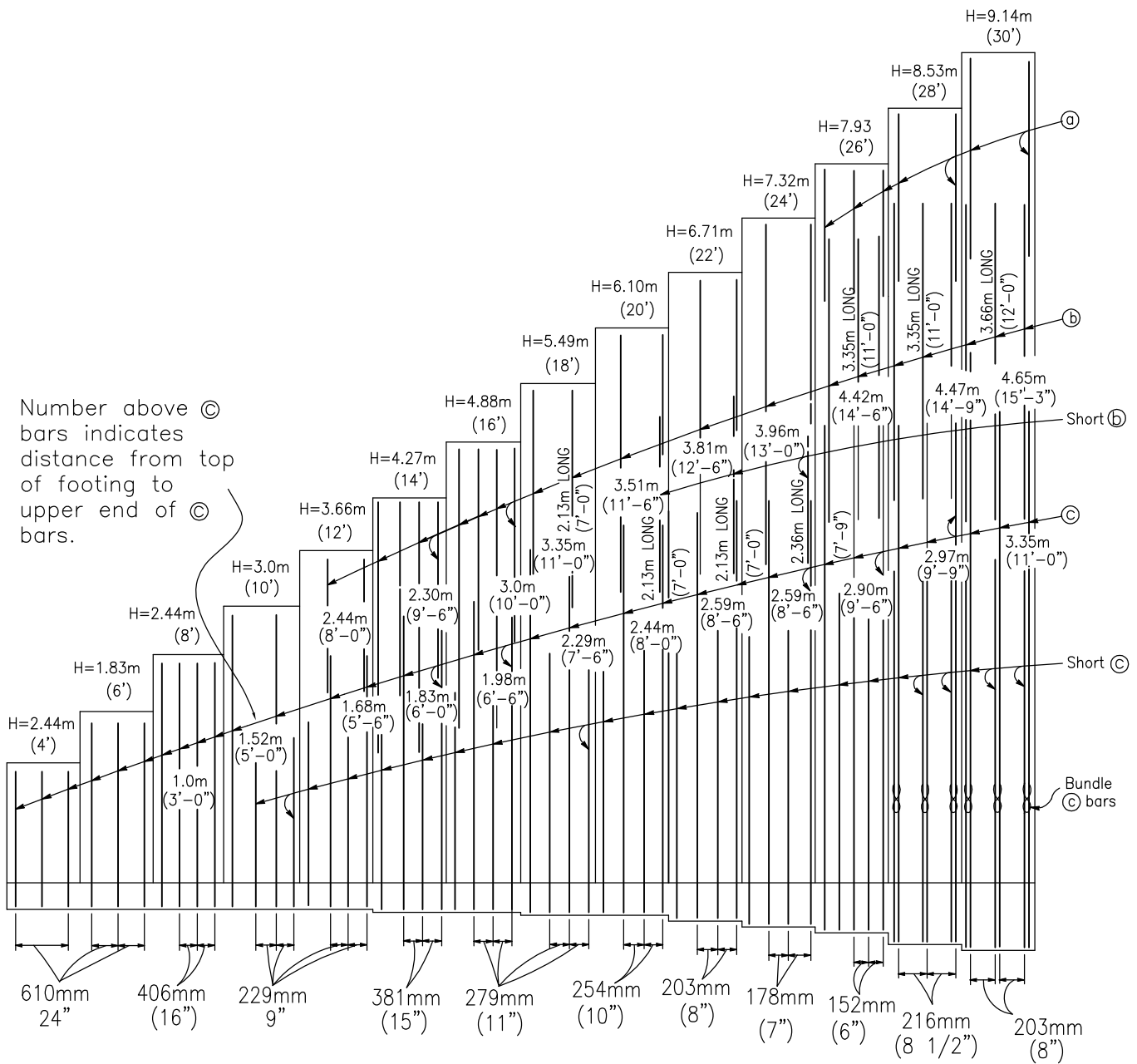
SECTION A-A



RUBBER WATERSTOP

Use only when watertight joint is required.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	GENERAL NOTES AND DETAILS FOR GRAVITY RETAINING WALLS		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
						DRAWING NUMBER	C-10

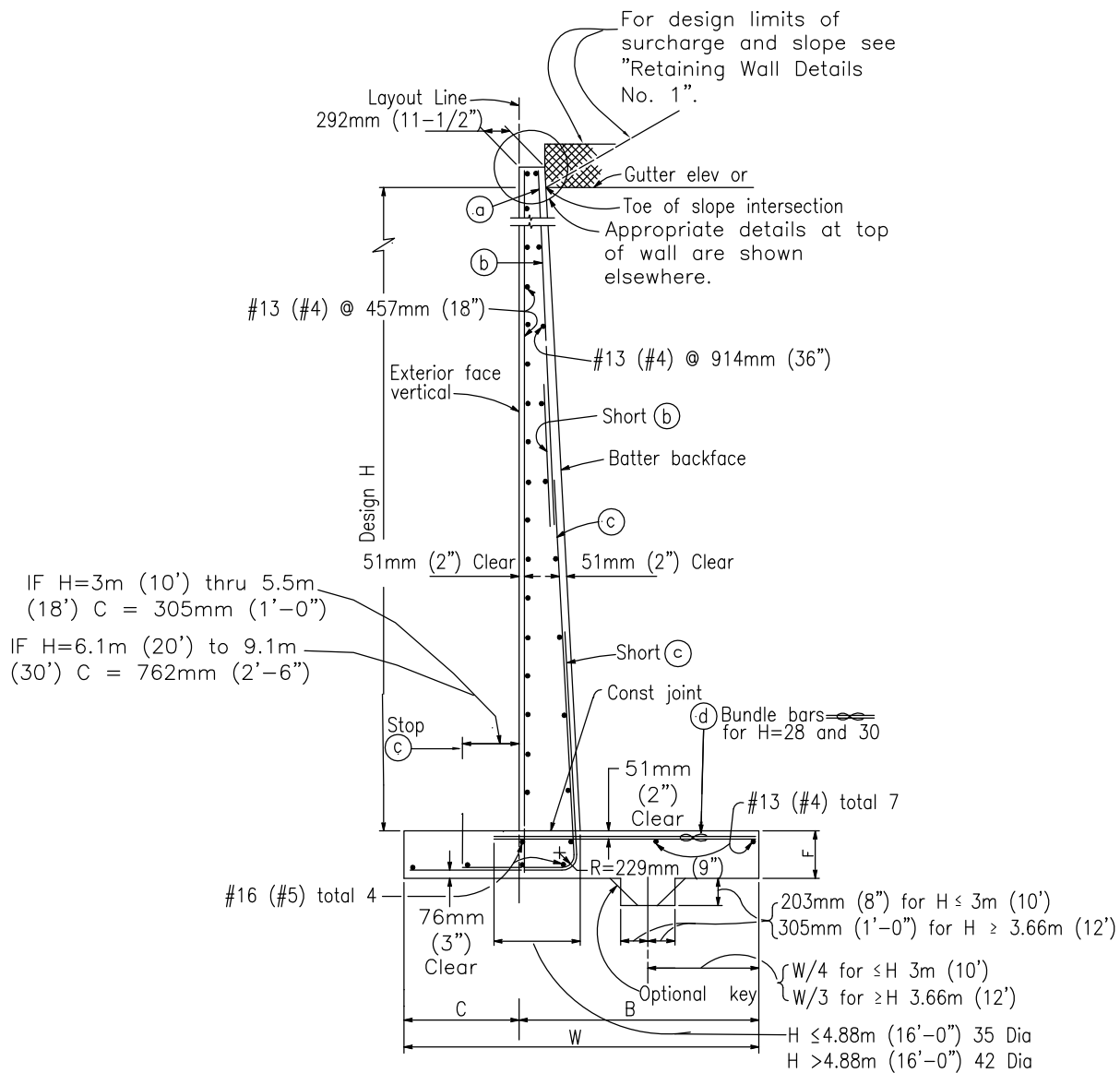


ELEVATION

NOTES:

1. For SPREAD FOOTING SECTION see C-11B
2. For TYPICAL LAYOUT EXAMPLE see C-11C
3. For 45T PILE FOOTING SECTION see C-11C
4. For TABLE OF REINFORCING STEEL DIMENSIONS AND DATA see C-11D

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	REINFORCED CONCRETE RETAINING WALL TYPE 1		<i>T. Stanton</i> 3/01/2003 Chairperson R.C.E. 19246 Date	DRAWING NUMBER C-11A
Add Metric		T. Stanton	03/03				

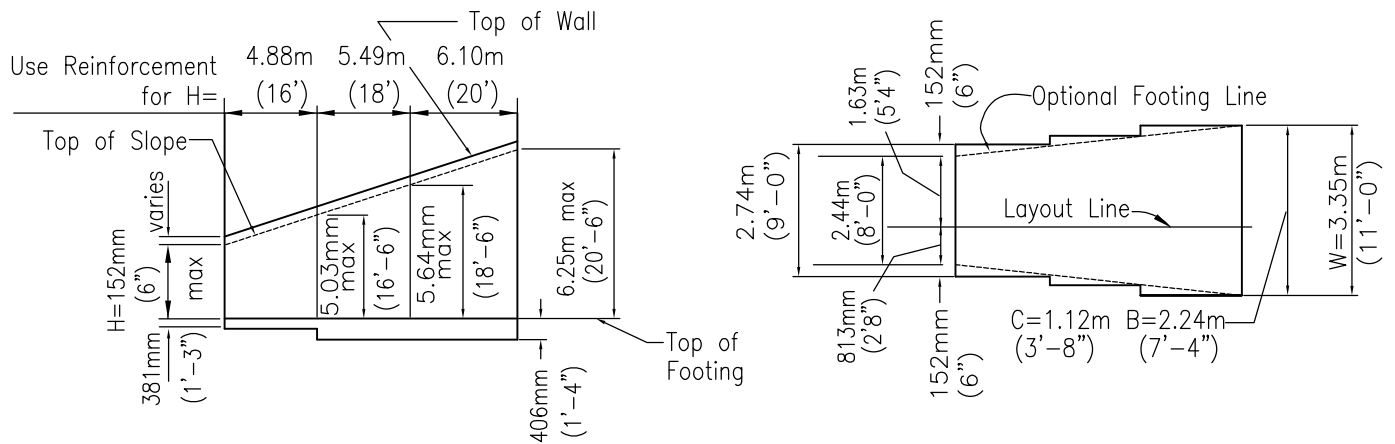


SPREAD FOOTING SECTION

NOTES:

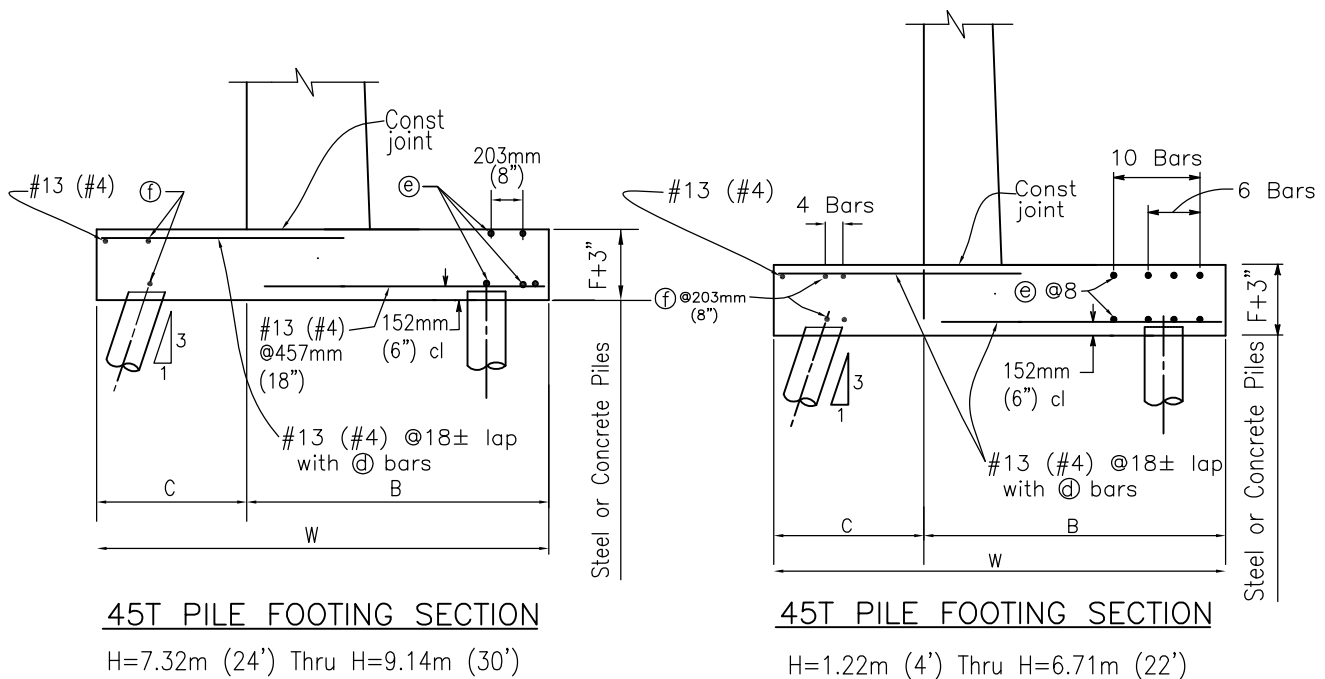
- For details not shown and drainage notes see "Retaining Wall Details No.1." Standard Drawing C-13.
- Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	REINFORCED CONCRETE RETAINING WALL TYPE 1		 3/01/2003	Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03				
						DRAWING NUMBER	C-11B



TYPICAL LAYOUT EXAMPLE

For joints required, see Details 3-3 and 3-4, drawing C-15



45T PILE FOOTING SECTION

H=7.32m (24') Thru H=9.14m (30')

45T PILE FOOTING SECTION

H=1.22m (4') Thru H=6.71m (22')

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	REINFORCED CONCRETE RETAINING WALL TYPE 1	 3/01/2003 Chairperson R.C.E. 19246 Date
				DRAWING NUMBER	C-11C

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

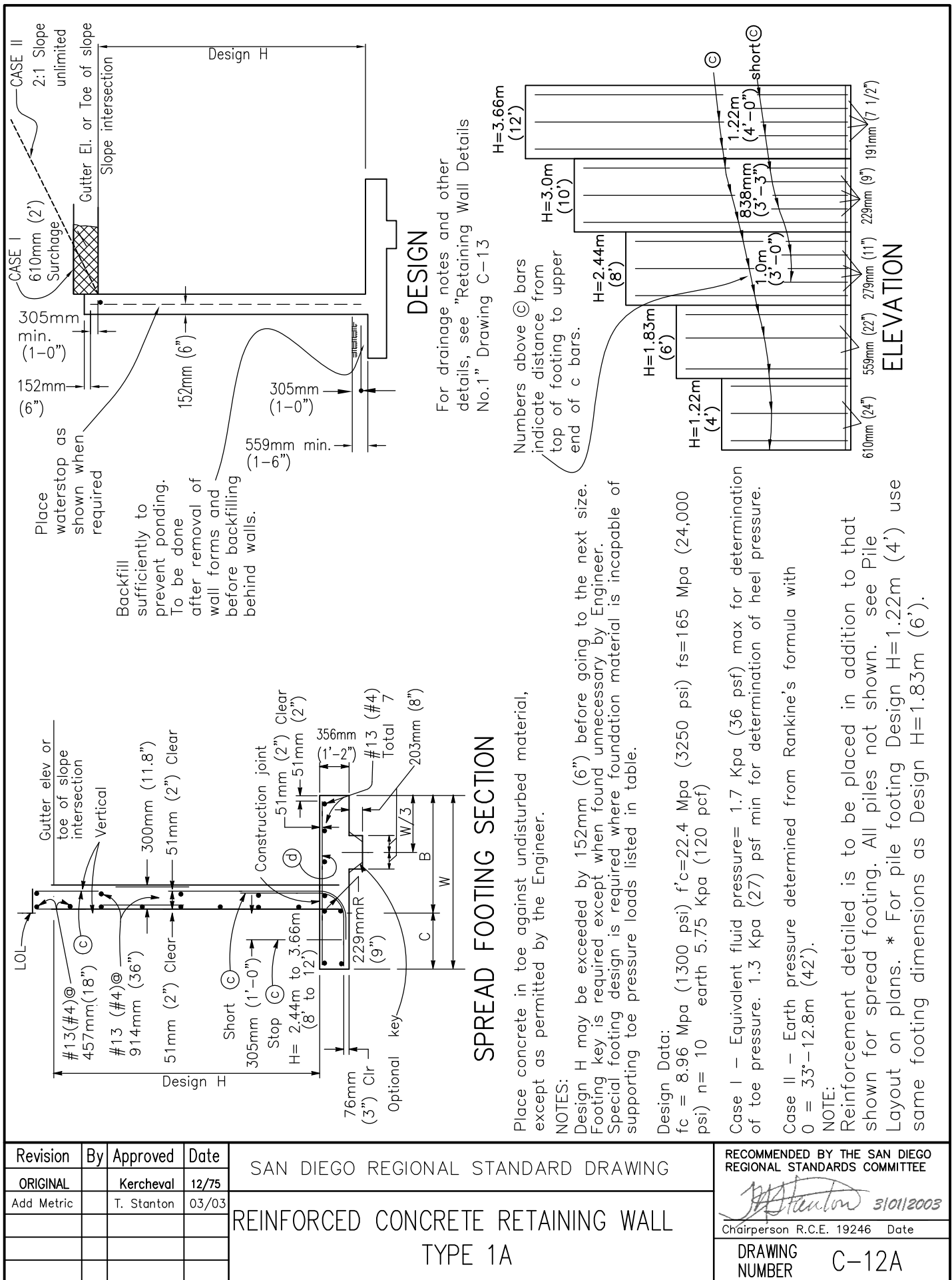
 3/01/2003
Chairperson R.C.E. 19246 Date

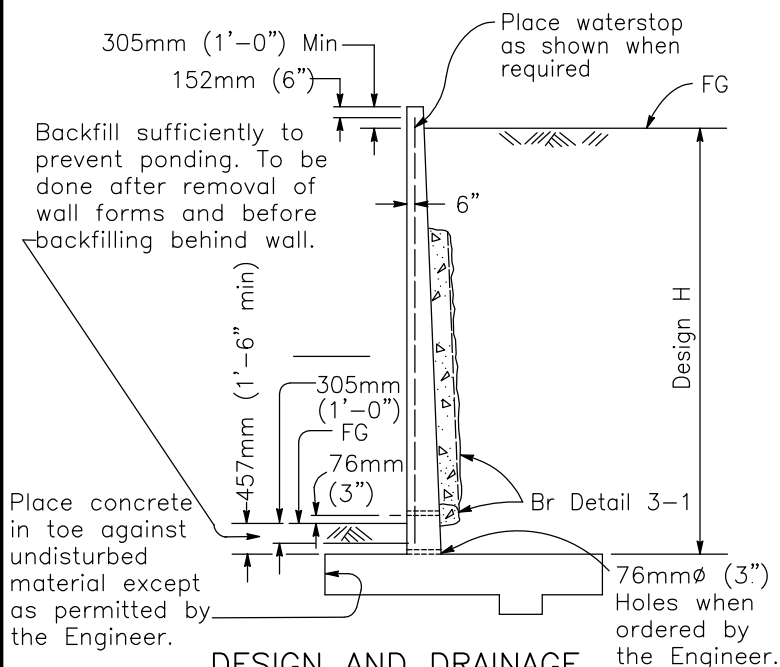
DRAWING
NUMBER C-11D

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA															
Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	
W	Metric U.S. 965mm 3'-2"	1.27m 4'-2"	1.58m 5'-2"	1.88m 6'-2"	2.18m 7'-2"	2.44m 8'-0"	2.74m 9'-0"	3.0 m 10'-0"	3.35m 11'-0"	3.66m 12'-0"	4.04m 13'-3"	4.34m 14'-3"	4.65m 15'-3"	5.10m 16'-9"	
C	Metric U.S. 305mm 1'-0"	406mm 1'-4"	508mm 1'-8"	610mm 2'-0"	711mm 2'-4"	813mm 2'-8"	1.0 m 3'-0"	1.02m 3'-4"	1.12m 3'-8"	1.22m 4'-0"	1.35m 4'-5"	1.45m 4'-9"	1.55m 5'-1"	1.65m 5'-5"	
B	Metric U.S. 660mm 2'-2"	864mm 2'-10"	1.07m 3'-6"	1.27m 4'-2"	1.47m 4'-10"	1.63m 5'-4"	1.83m 6'-0"	2.03m 6'-8"	2.24m 7'-4"	2.44m 8'-0"	2.69m 8'-10"	2.90m 9'-6"	3.10m 10'-2"	3.45m 11'-4"	
F Spread Ftg.	Metric U.S. 356mm 1'-2"	356mm 1'-2"	356mm 1'-2"	356mm 1'-2"	356mm 1'-2"	381mm 1'-3"	406mm 1'-4"	406mm 1'-4"	406mm 1'-4"	457mm 1'-6"	508mm 1'-8"	584mm 1'-11"	660mm 2'-2"	711mm 2'-4"	
Batter	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	5/8:12	3/4:12	3/4:12	7/8:12	
Ⓐ bars	Metric U.S. #19	—	—	—	—	—	—	—	—	—	—	#13 610mm #6@24	#19 432mm #6@17	#19 406mm #6@16	
Ⓑ bars	Metric U.S. #19	—	—	—	#13 457mm #4@18	#19 762mm #6@30	#19 559mm #6@22	#22 559mm #7@22	#25 508mm #8@20	#25 406mm #8@16	#25 356mm #8@14	#25 305mm #8@12	#25 13mm #8@8-1/2	#25 203mm #8@8	
Ⓒ bars	Metric U.S. #19	#16 610mm #5@24	#16 406mm #5@16	#16 229mm #5@9	#19 229mm #6@9	#29 381mm #9@15	#29 279mm #9@11	#32 279mm #10@11	#36 254mm #11@10	#36 203mm #11@8	#36 176mm #11@7	#36 152mm #11@6	#32 216mm #10@8-1/2	#32 203mm #10@8	
Ⓓ bars	Metric U.S. #19	#16 610mm #5@24	#13 406mm #4@16	#13 229mm #4@9	#16 229mm #5@9	#25 381mm #8@15	#25 279mm #8@11	#32 279mm #10@11	#32 279mm #10@11	#32 203mm #10@8	#32 176mm #10@7	#32 152mm #10@6	#29 216mm #9@8-1/2	#29 203mm #9@8	
Total Ⓔ bars	Metric U.S. #19	6-#19	10-#22	10-#22	10-#22	10-#22	6-#22	6-#22	6-#22	6-#22	4-#22	4-#22	4-#22	4-#22	
Total Ⓕ bars	Metric U.S. #19	6-#6	10-#7	10-#7	10-#7	10-#7	6-#7	6-#7	6-#7	6-#7	4-#7	4-#7	4-#7	4-#7	
2' Level surcharge	Toe Pressure U.S.	77Kpa 1.6k/sf	91Kpa 1.9k/sf	105Kpa 2.2k/sf	110Kpa 2.3k/sf	134Kpa 2.8k/sf	158Kpa 3.3k/sf	168Kpa 3.5k/sf	206Kpa 4.3k/sf	220Kpa 4.6k/sf	235Kpa 4.9k/sf	254Kpa 5.3k/sf	273Kpa 5.7k/sf	297Kpa 6.2k/sf	
2:1 unlimited slope	Toe Pressure U.S.	53Kpa 1.1k/sf	72Kpa 1.5k/sf	96Kpa 2.0k/sf	120Kpa 2.5k/sf	129Kpa 2.7k/sf	158Kpa 3.3k/sf	172Kpa 3.6k/sf	201Kpa 4.2k/sf	225Kpa 4.7k/sf	263Kpa 5.5k/sf	311Kpa 6.5k/sf	340Kpa 7.1k/sf	359Kpa 7.5k/sf	
1-1/2:1 limited slope	Toe Pressure U.S.	62Kpa 1.3k/sf	81Kpa 1.7k/sf	101Kpa 2.1k/sf	120Kpa 2.5k/sf	139Kpa 2.9k/sf	163Kpa 3.4k/sf	182Kpa 3.8k/sf	206Kpa 4.3k/sf	230Kpa 4.8k/sf	259Kpa 5.4k/sf	278Kpa 5.8k/sf	311Kpa 6.5k/sf	345Kpa 7.2k/sf	
Spread Footing	Steel kg/ft. Steel lbs/ft. U.S.	7.7kg 17lb.	9.1kg 20lb.	12.7kg 28lb.	16.8kg 37lb.	23kg 51lb.	36.3kg 80lb.	47.6kg 105lb.	66.7kg 147lb.	112kg 246lb.	137kg 303lb.	185kg 407lb.	204kg 449lb.	230kg 507lb.	
Pile ftg.	Conc cu m	28cu m	36cu m	47cu m	58cu m	72cu m	86cu m	1.0cu m	1.3cu m	1.5cu m	1.8cu m	2.1cu m	2.5cu m	3.0cu m	
	Conc cf/ft U.S.	8.9cu ft	12.5cu ft	16.3cu ft	20.2cu ft	25.4cu ft	30.1cu ft	34.6cu ft	40.1cu ft	45.0cu ft	52.1cu ft	63.3cu ft	77.0cu ft	88.1cu ft	
Pile ftg.	Steel kg/ft.	13.2kg	14.5kg	18.6kg	31.8kg	38.1kg	51.3kg	63.5kg	78.0kg	96.2kg	122kg	146kg	194kg	240kg	
	Steel lbs/ft. U.S.	29lb.	32lb.	41lb.	70lb.	84lb.	113lb.	140lb.	172lb.	212lb.	270lb.	322lb.	427lb.	528lb.	
Pile ftg.	Conc cu m	30cu m	34cu m	48cu m	59cu m	72cu m	86cu m	1.1cu m	1.3cu m	1.5cu m	1.8cu m	2.1cu m	2.6cu m	3.0cu m	
	Conc cf/ft U.S.	10.2cu ft	12.7cu ft	16.7cu ft	20.8cu ft	25.2cu ft	30.1cu ft	34.8cu ft	40.6cu ft	45.7cu ft	53.1cu ft	64.7cu ft	78.6cu ft	89.9cu ft	

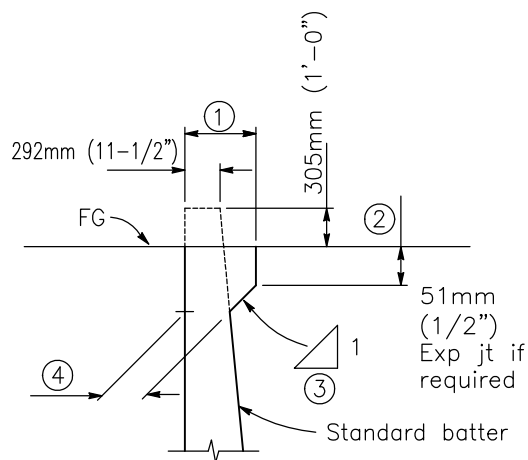
Note: Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown, see Pile Layout on plans. For pile footing Design H=4' use same footing dimensions as Design H=6'

Ⓔ Denotes a bundle of 2 bars





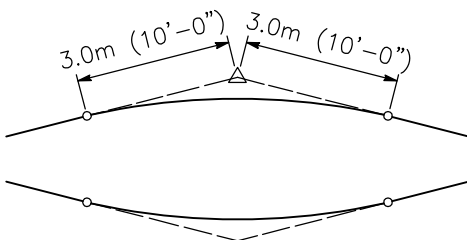
DESIGN AND DRAINAGE



Dimensions ①, ② and ③ to be as shown elsewhere in the Project Plans.

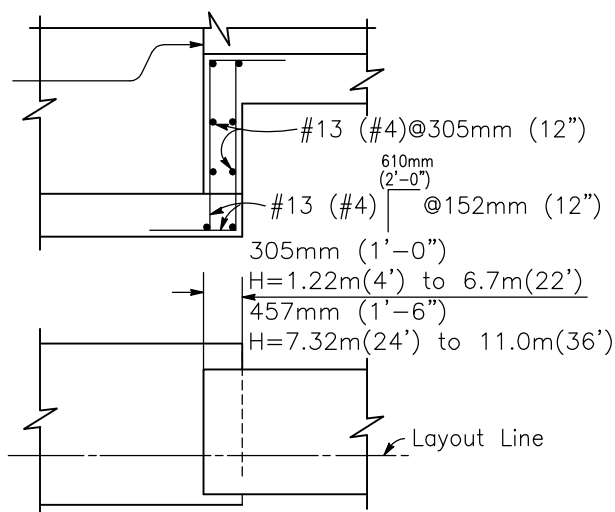
④ Stem width at base of haunch to be determined as shown.

STEM WIDTH AT BASE OF HAUNCH

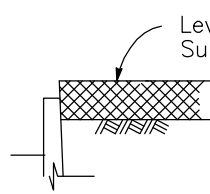


6.1m (20') VC AT TOP OF WALL SLOPE CHANGE

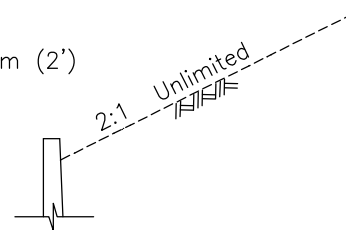
Where shown on the plans



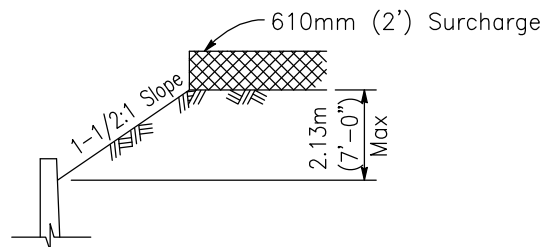
FOOTING STEP



CASE I



CASE II



CASE III

DETAIL OF DESIGN LOADING CASES

- CASE I Level + 610mm (2') Surcharge
- CASE II 2:1 Unlimited Slope
- CASE III 1-1/2:1 Limited Slope (2.13m (7'-0") Max height) + 610mm (2') Surcharge

NOTE: Surcharge Limits Shown Apply To Retaining Walls Type 1 and 3.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

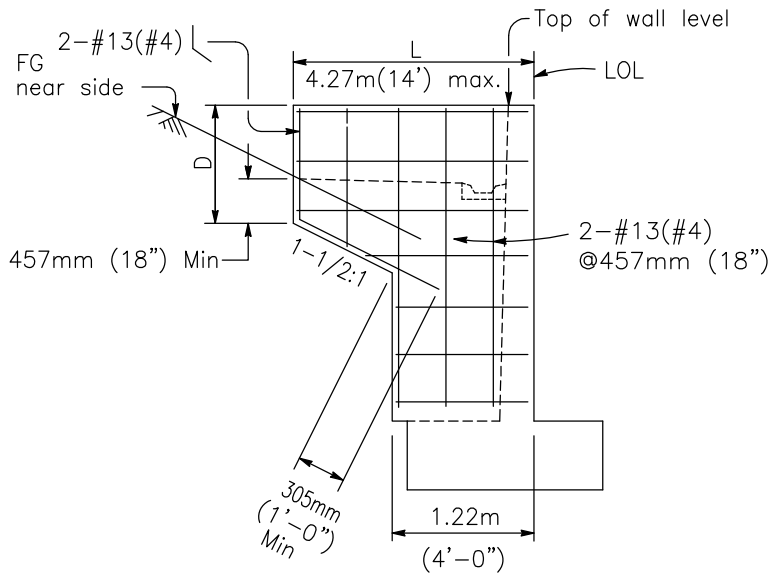
REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

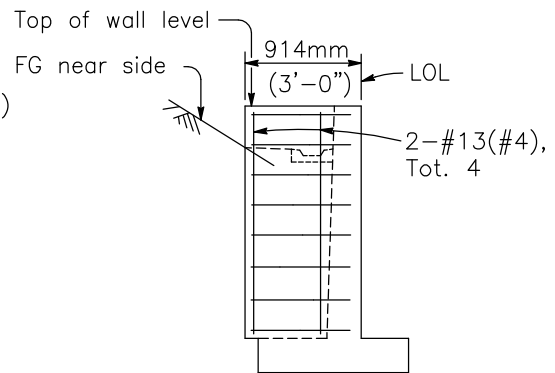
DRAWING
NUMBER C-13A



ELEVATION

RETURN WALL TYPE A

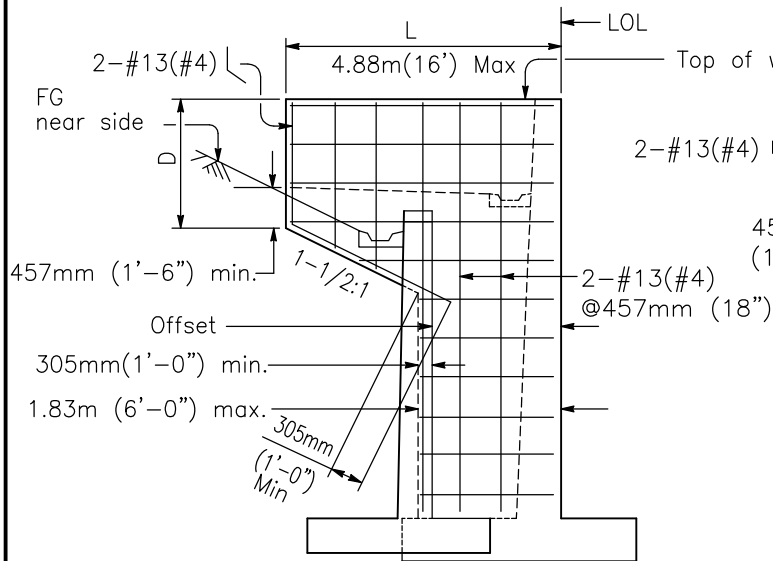
Use where H=2.44m (8') or less



ELEVATION

RETURN WALL TYPE D

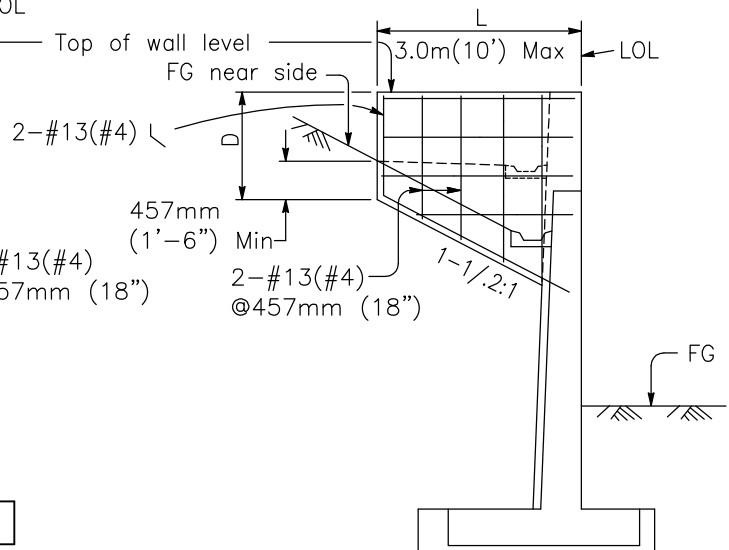
Use where H=1.83m (6') or less



ELEVATION

RETURN WALL TYPE B

Use where H=3.0m (10') or more on offset walls



ELEVATION

RETURN WALL TYPE C

Use where H=3.9m (10') or more on straight walls

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

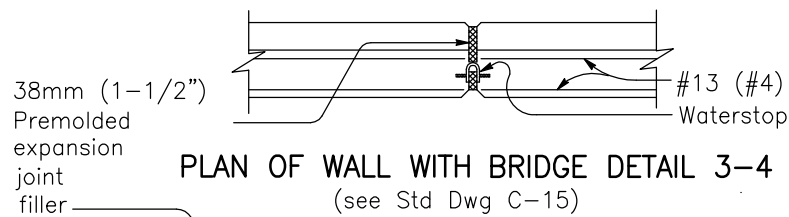
SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

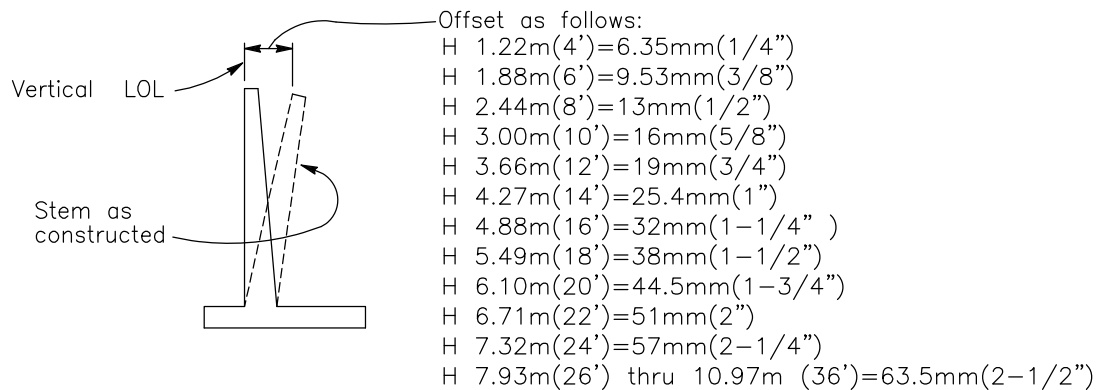
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER C-13C



PLAN OF WALL WITH EXPANSION JOINT ONLY



APPROX. WALL OFFSET VALUES

Not required for wall Types 3 and 4.

Values for offsetting forms to be determined by the Engineer.

NOTES

Design Conditions:

Design H may be exceeded by 152mm (6") before going to the next size. Special footing design is required where foundation material is incapable of supporting toe pressure listed in table. Return wall not required unless shown elsewhere.

Design Data:

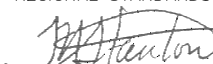
$f_c = 8.96\text{Mpa}$ (1300 psi) $f'_c = 22.4\text{Mpa}$ (3250 psi) $f_s = 166\text{Mpa}$ (24,000 psi)
 $n = 10$ earth = 1922 kg/cu m (120 pcf)
 610mm (2') Surcharge:

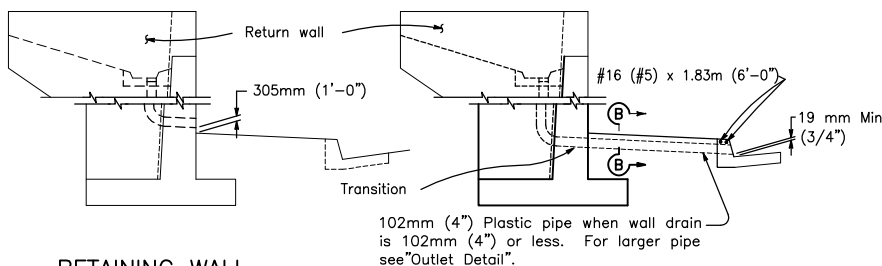
Equivalent fluid pressure =

36 pcf maximum for determination of toe pressure.

27 pcf minimum for determination of heel pressure.

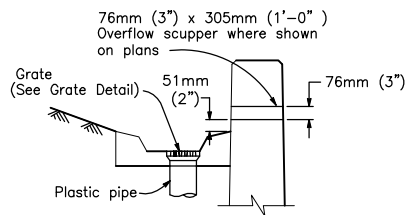
Earth pressures for 2:1 unlimited slope, 1-1/2:1 slope, and 1-1/2:1 unlimited slope, determined from Rankine's formula with $\phi = 33^\circ$ -12.8m(42').

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	REINFORCED CONCRETE RETAINING WALL DETAILS No. 1	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03			DRAWING NUMBER C-13D	

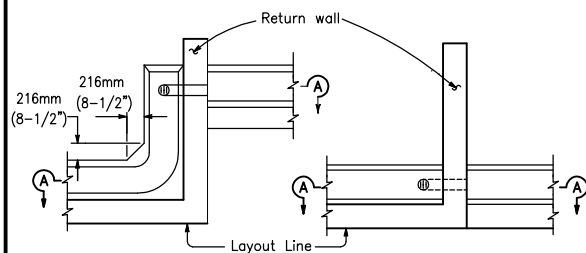


RETAINING WALL,
FACE OF WALL OUTLET

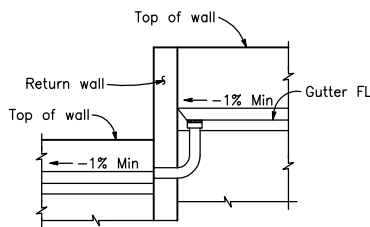
RETAINING WALL, GUTTER OUTLET



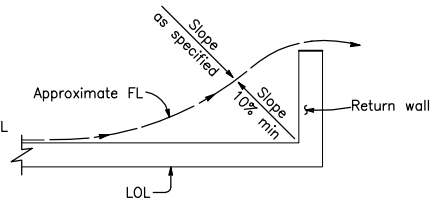
WALL DRAIN DETAIL



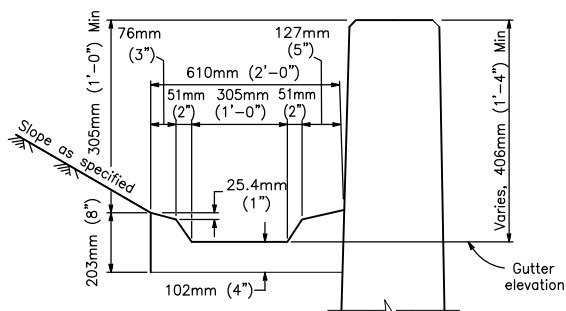
PLAN-OFFSET WALL
DRAIN THROUGH RETURN WALL



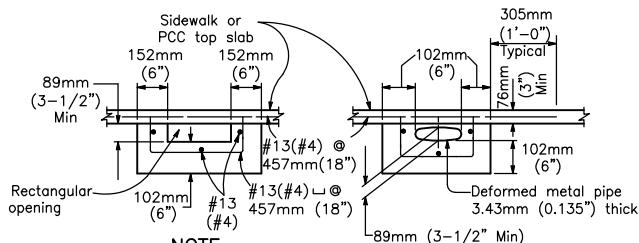
SECTION A-A



WALL DRAINAGE
WHERE GUTTER NOT REQUIRED



TYPICAL GUTTER DETAIL



NOTE

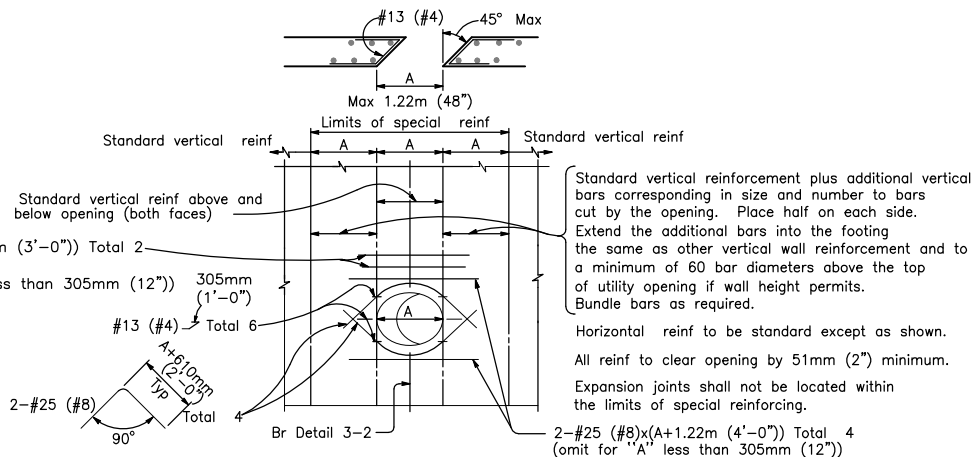
Area of opening to be not less than that of pipe from wall gutter. Make opening transition in wall. Edge opening in curb face to 19mm (3/4") minimum radius.

OUTLET DETAIL - SECTION B-B



GRATE DETAIL

Sizes to fit standard hubs



RETAINING WALL UTILITY OPENING

Max size of opening (A) = 1.22m (48") To be used in conjunction with Standard Drawing C-13.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

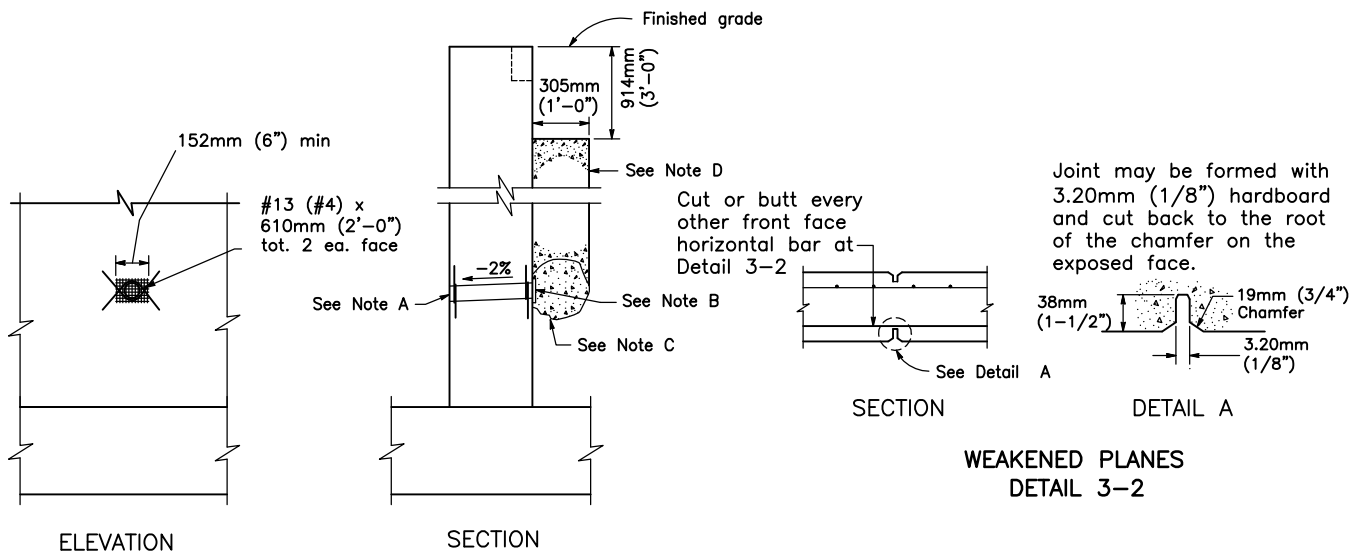
REINFORCED CONCRETE
RETAINING WALL DETAILS No. 2

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

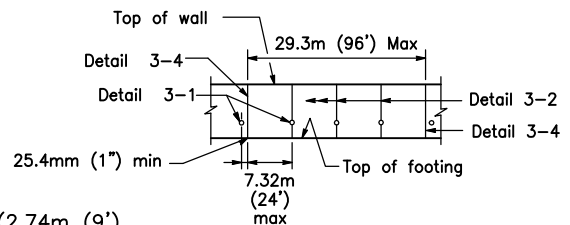
DRAWING
NUMBER C-14



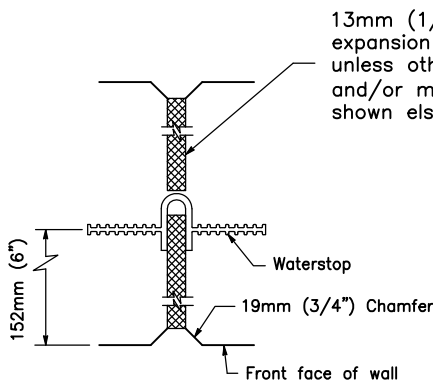
WEEP HOLE AND PERVIOUS BACKFILL
DETAIL 3-1

NOTES

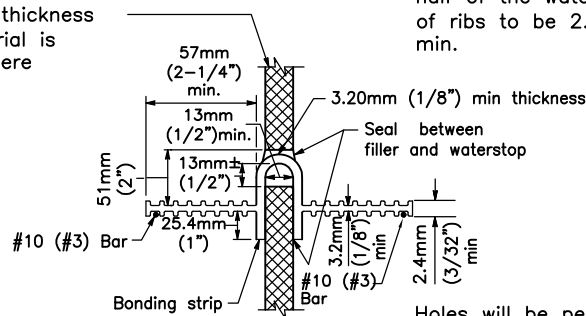
- A. 102mm (4") diameter drain @ 7.62m (25') max. center to center (2.74m (9') c-c for Type 3 and 2.82m (9'-3") c-c for Type 4 Retaining Walls). For walls adjacent to sidewalks or curbs, provide 102mm (4") cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 76mm (3") $\pm$ above finished grade.
- B. 152mm (6") square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter .762mm (0.03")) Anchor firmly to backface.
- C. .028 Cubic Meter (One cubic foot) pervious backfill material in a burlap sack, securely tied.
- D. Pervious backfill material continuous behind retaining wall.



WALL EXPANSION JOINTS
AND WEAKENED PLANES
DETAIL 3-3



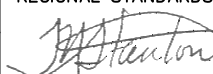
WALL EXPANSION JOINT
DETAIL 3-4



WATERSTOP
DETAIL 3-6

Waterstop to have 5 or more pairs of raised ribs to provide 64.5 sq mm (0.1 sq in) min. rib cross-section area on each half of the water stop. Height of ribs to be 2.38mm (3/32") min.

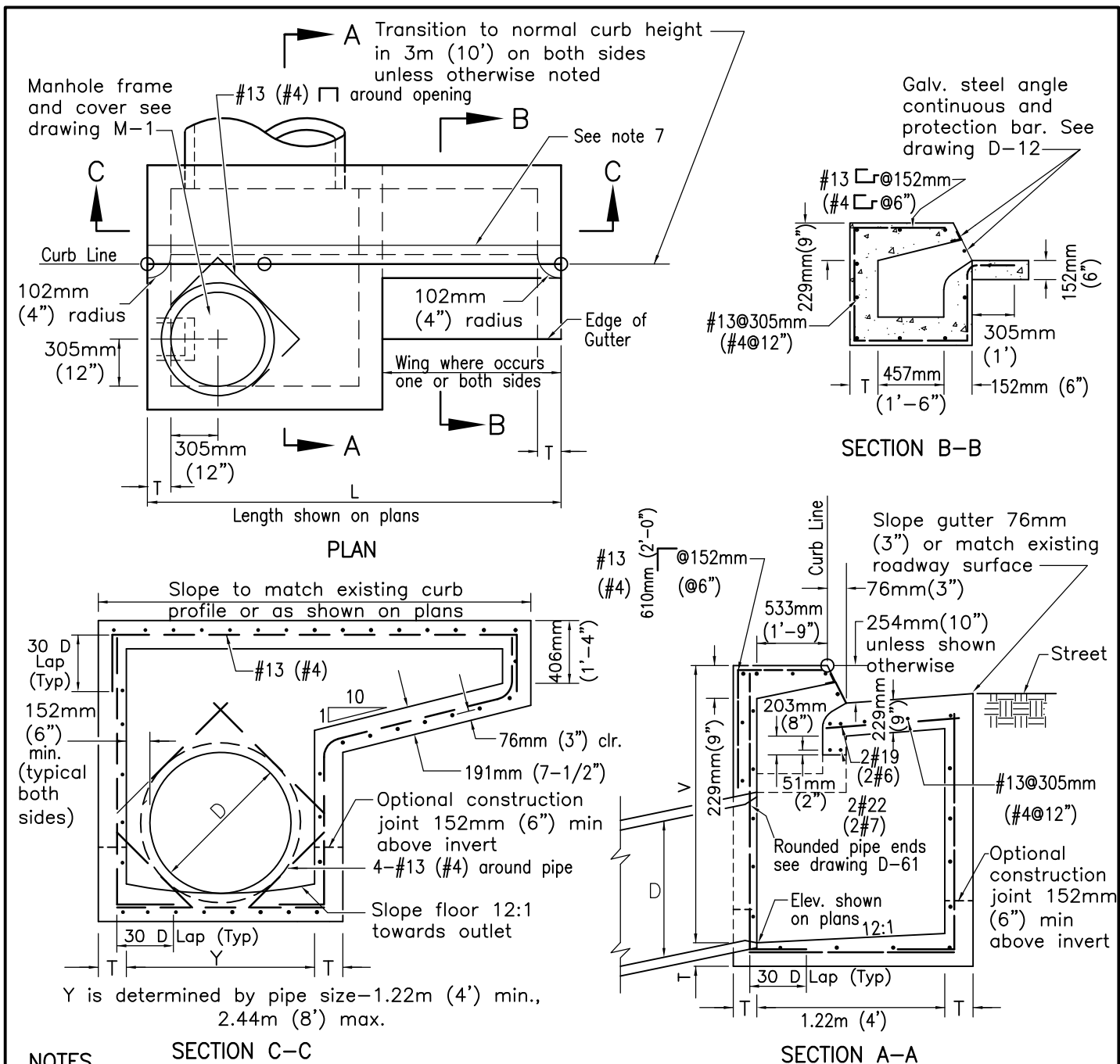
Holes will be permitted in the outer 13mm (1/2") of the web for wire, rings etc. Tie web to #10 (#3) reinforcing bars @ 305mm (12") max intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		REINFORCED CONCRETE RETAINING WALL DETAILS No. 3	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date		
				DRAWING NUMBER		C-15

DRAINAGE SYSTEMS

DRAINAGE SYSTEMS

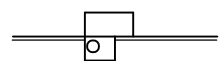
D



NOTES

1. See Standard Drawings D-11A, D-11B, & D-12 for additional notes and details.
2. Types are designated on plans as follows: (no wing)A, (one wing)A-1, (two wings)A-2.
3. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
4. Steps shall be installed when V exceeds 1.22m (4'). See Standard Drawing D-11A for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 6mm (1/4") tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab to match sidewalk finish and slope.
9. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
10. If required by local agency, extend top slab steel reinforcement 305mm (12") into adjacent sidewalk.
11. Elevations shall be shown on plans where indicated by "O" symbol.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

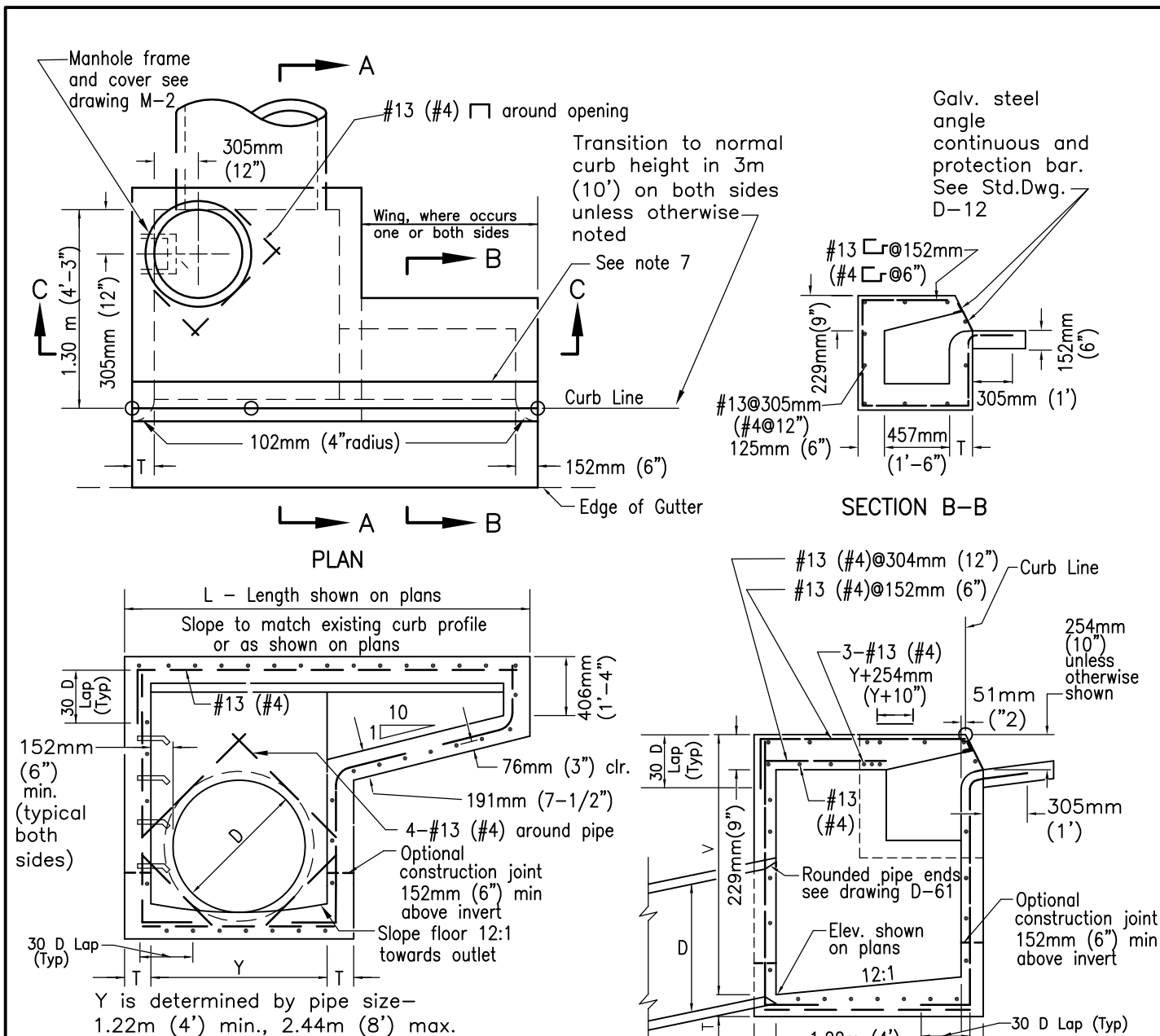
CURB INLET - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-1



NOTES

SECTION C-C

- See Standard Drawings D-11A, D-11B & D-12 for additional notes and details.
- Types are designated as follows: (no wing)B, (one wing)B-1, (two wings)B-2.
- Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
- Steps shall be installed when V exceeds 1.22m (4') . See Standard Drawing D-11A for details.
- Concrete gutter to match adjacent gutters.
- An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
- Provide 6mm (1/4") tooled groove in top slab in line with back of adjacent curb.
- Surface of top slab to match sidewalk finish and slope.
- Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
- If required by local agency, extend top slab steel reinforcement 305mm (12") into adjacent sidewalk. **LEGEND ON PLANS**
- Elevations shall be shown on plans where indicated by "O" symbol.
- Per local agency requirements, dimension "X" shall match adjacent sidewalk, but shall not be less than 1.37m (4.5').

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

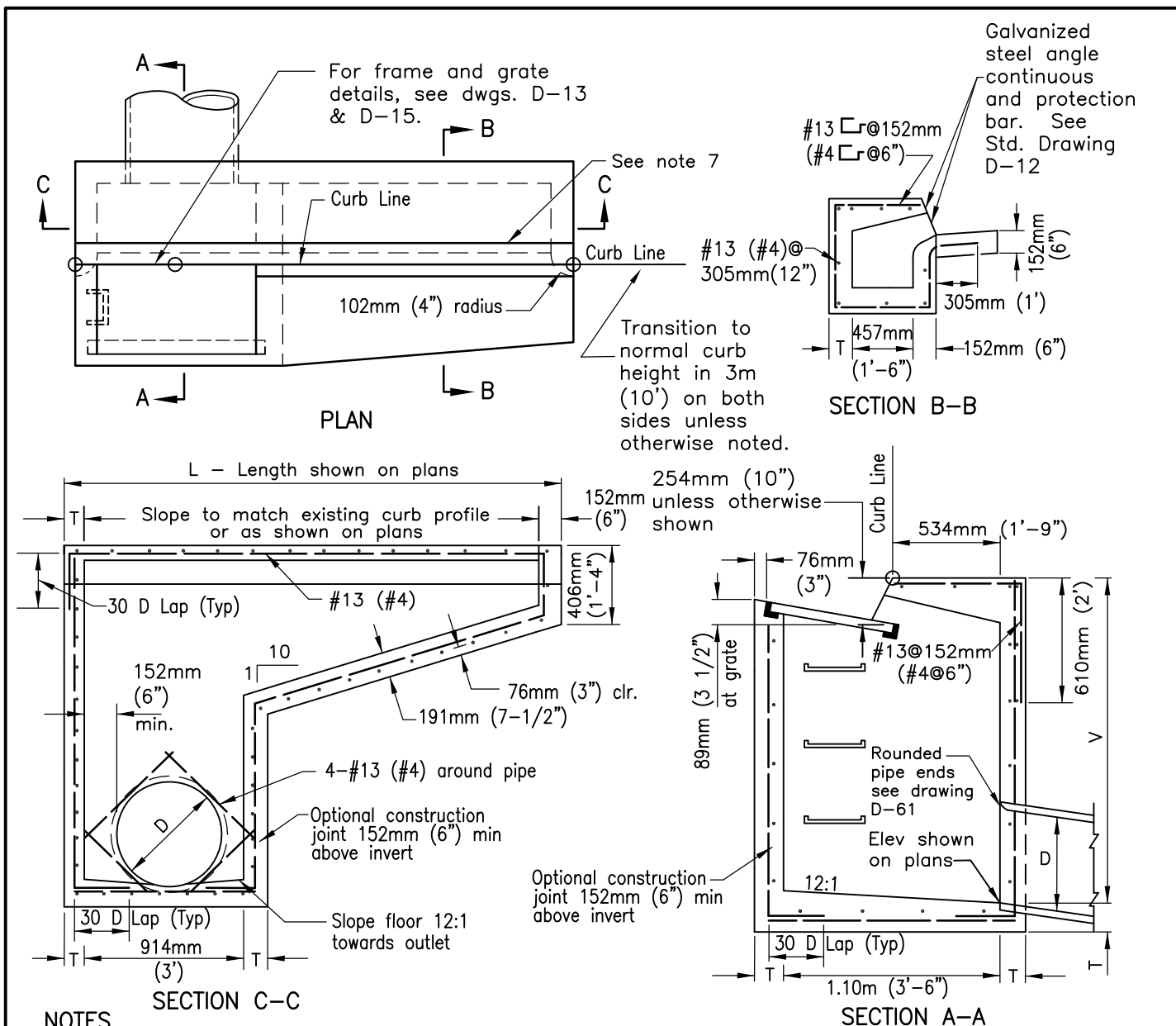
CURB INLET - TYPE B

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

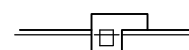
DRAWING
NUMBER D-2

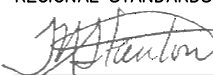


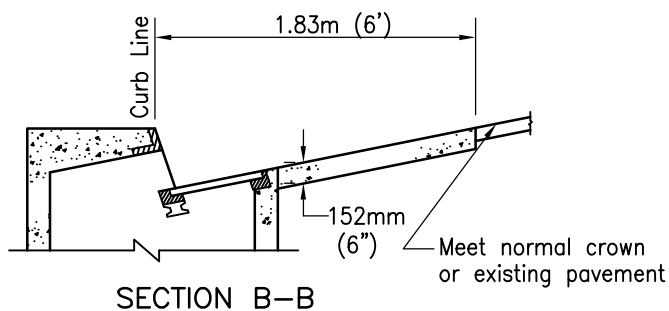
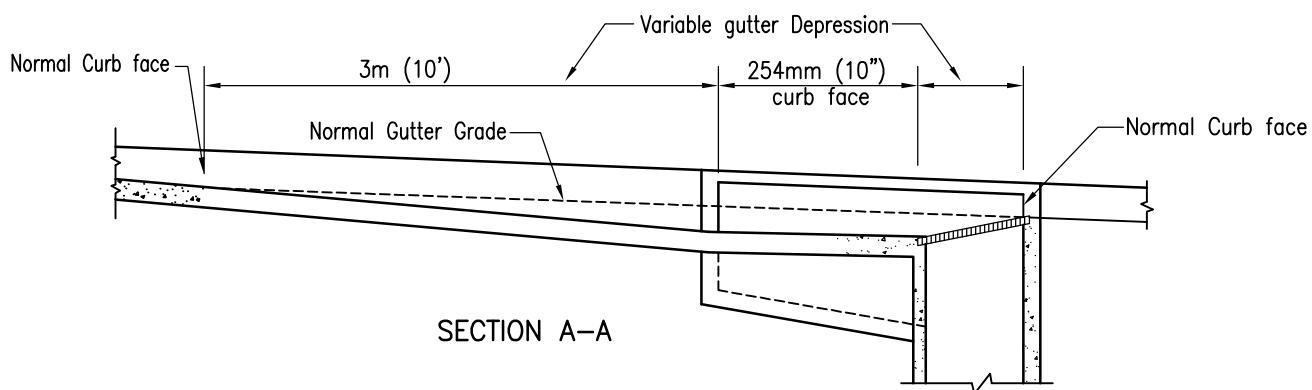
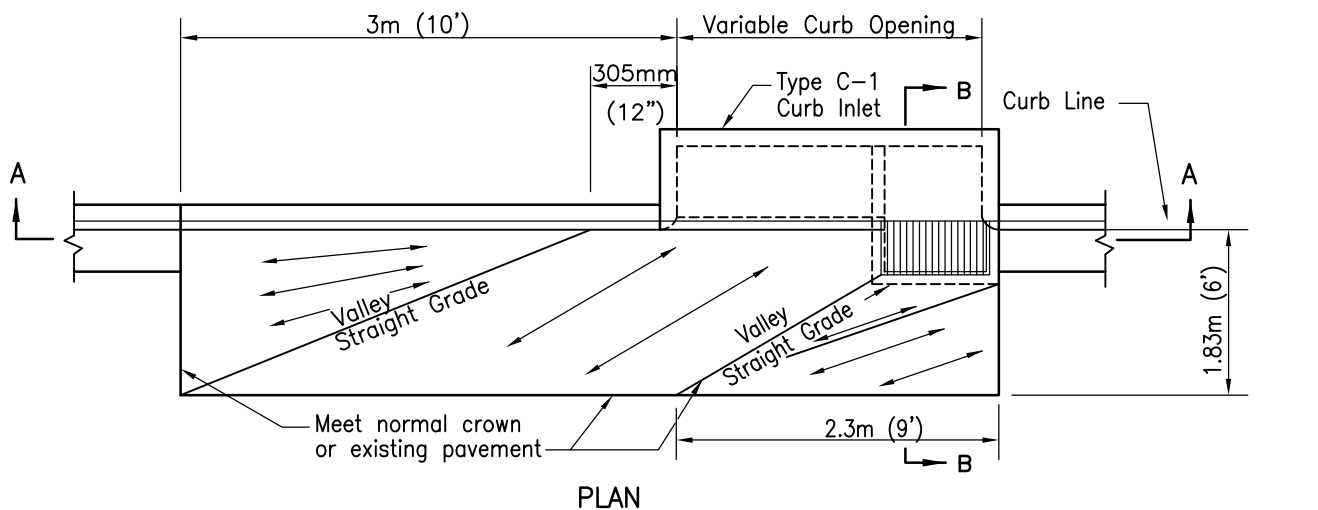
NOTES

1. See Standard Drawings D-11A through D-15 for additional notes and details.
2. Types are designated as follows: (no wing)C, (one wing)C-1, (two wings)C-2.
3. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
4. Steps shall be installed when V exceeds 1.22m (4'). See Standard Drawing D-11A for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 6mm (1/4") tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab to match sidewalk finish and slope.
9. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
10. Where inlet is to be constructed on grade and Standard Drawing D-20 concrete apron is required, lift down-grade end of grate as shown on D-20.
11. If required by local agency, extend top slab steel reinforcement 305mm (12") into adjacent sidewalk.
12. Elevations shall be shown on plans where indicated by "O" symbol.
13. Diameter "D" shall be 610mm (24") maximum; for larger diameter pipes this drawing must be modified.

LEGEND ON PLANS



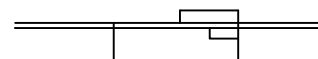
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CURB INLET - TYPE C	 2/26/2009 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
Replaced D-3		T. Stanton	02/09		
					DRAWING NUMBER D-3A



NOTES

1. Curb and apron to be placed monolithically.
2. Use of false header at valleys and slope break line is optional.
3. Extend vertical steel from inlet structure into concrete apron as shown on Standard Drawing D-3, Section B-B.
4. Screed Direction
5. Concrete shall be 308kg/M³ C-17 Mpa (520-C-2500)

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Replaced D-20		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE APRON FOR TYPE C CURB INLET

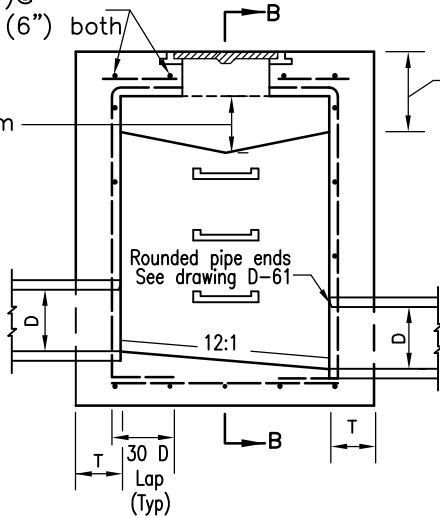
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 2/26/2009
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-3B

#13 (#4)@
152mm (6") both
ways

229mm
(9")



SECTION A-A

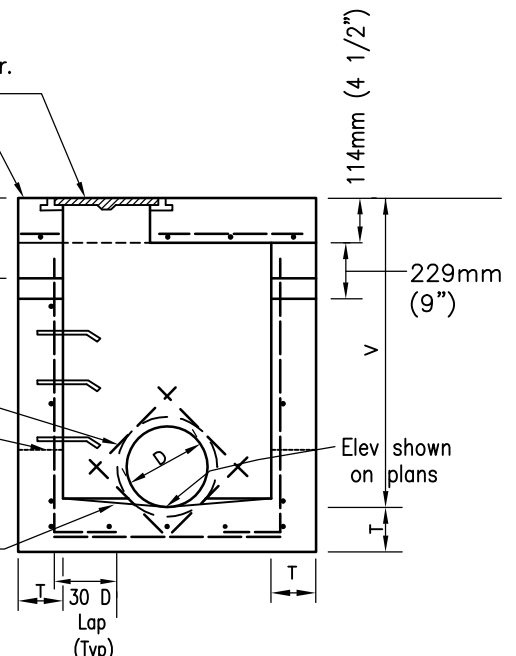
Manhole frame and cover.
See drawing M-2

Elev. shown on plans

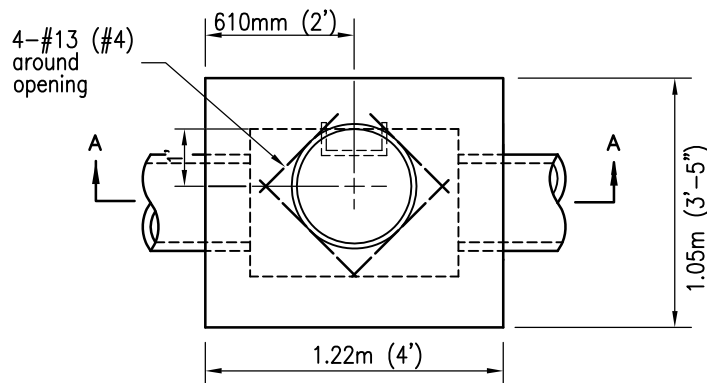
279mm (11")
unless shown
otherwise on
plans

4-#13 (#4)
around pipe
Optional construction
joint 152mm (6") min
above invert

Slope floor 12:1
towards outlet



SECTION B-B

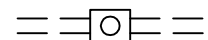


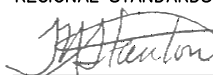
PLAN

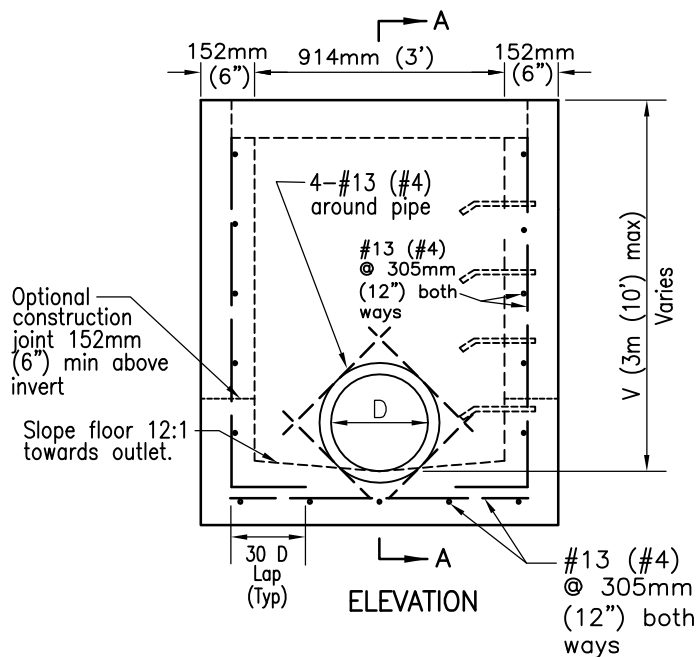
NOTE:

1. See Standard Drawing D-11A & 11B for additional notes and details.
2. When V exceeds 1.22m (4') steps shall be installed. See Standard Drawing D-11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
4. Construct openings on both sides unless otherwise shown on plans.
5. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface.
6. Install 25mm (1") steel protection bar.
7. Diameter "D" shall be 457mm (18") max, for larger diameter pipes this drawing must be modified.

LEGEND ON PLANS

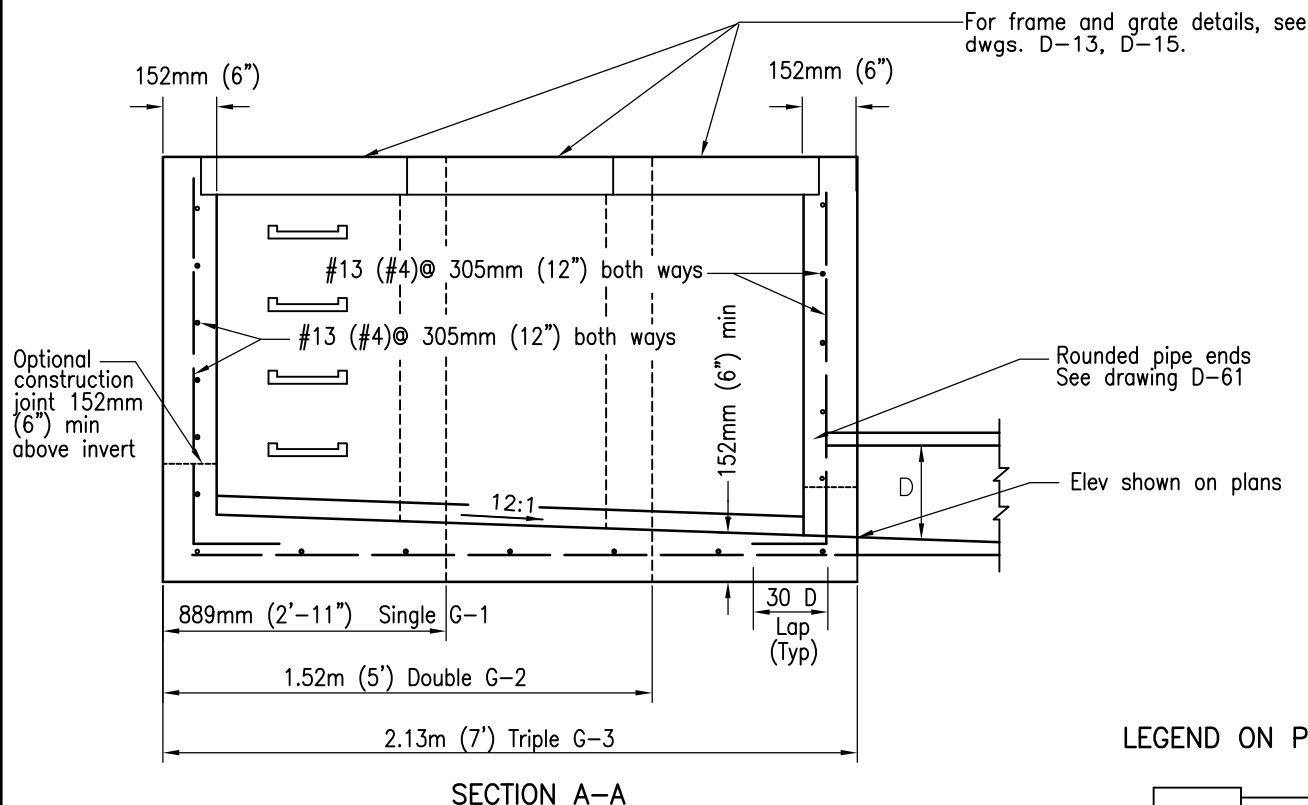


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CATCH BASIN - TYPE F	 Chairperson R.C.E. 19246 Date 3/01/2003
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
					DRAWING NUMBER D-7

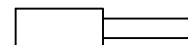


NOTES

1. See Standard Drawing D-11A & D-11B for additional notes and details.
2. When V exceeds 1.22m (4'), steps shall be installed. See Standard Drawing D-11A for details.
3. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface.
4. Increase in allowable depth subject to approval by Agency.
5. Section A-A shows 3 sizes and shall not imply that an interior wall is to be built for the structures with double or triple frame and grate.
6. Exposed edges of concrete shall be rounded with radius of 13mm (1/2").
7. Designate types as follows: Single G-1, Double G-2 and Triple G-3.
8. Only end bearing grates shall be used. See Std. Drawing D-15.



LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

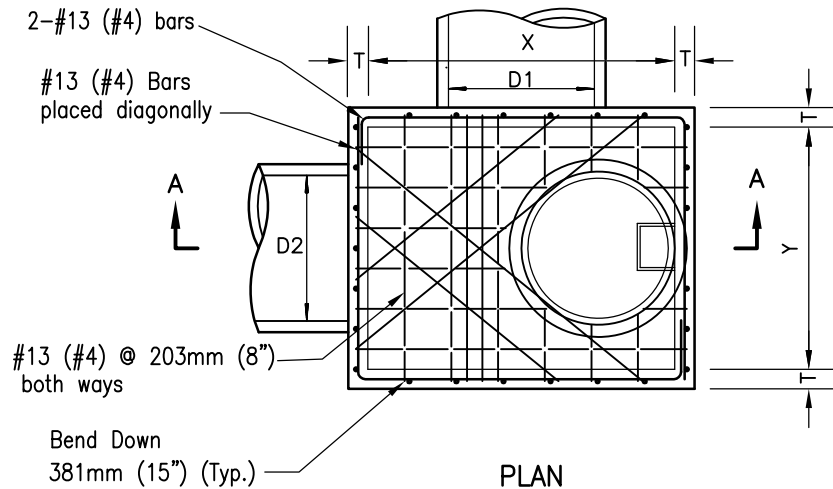
CATCH BASIN - TYPE G

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

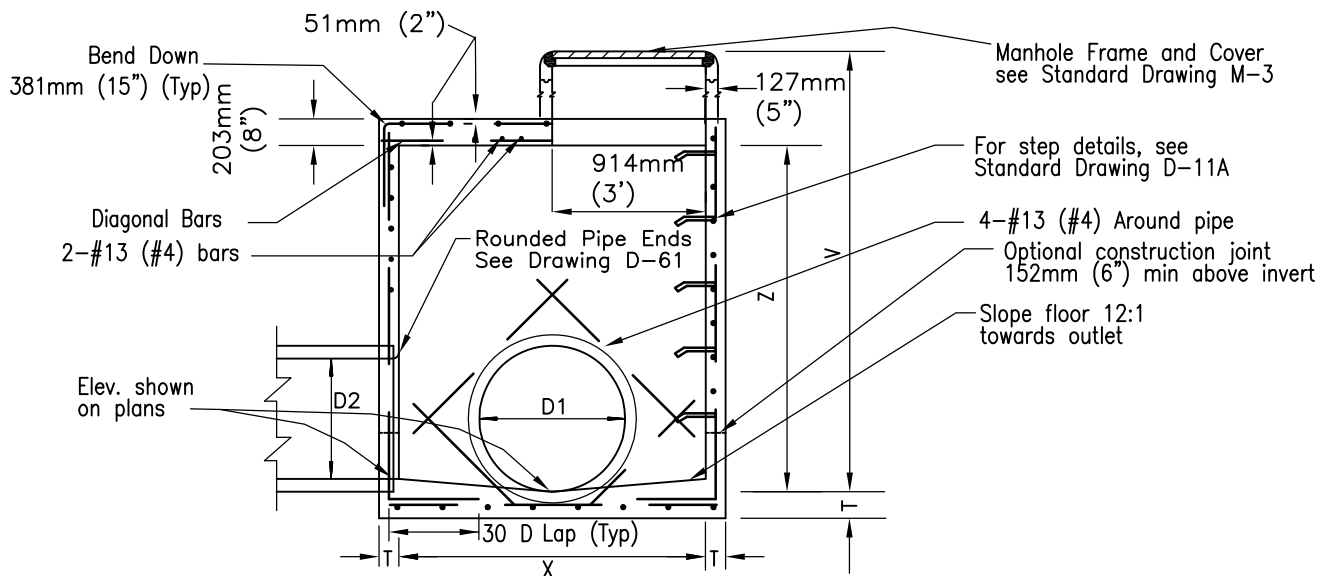
T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-8



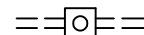
TYPE	PIPE DIAMETER (D1)	X	Y	Z
A 4	up to 991mm (39")	1.22m (4')	1.22m (4')	1.83m (6')
A 5	1.1m (42") to 1.22m (48")	1.52m (5')	1.22m (4')	1.83m (6')
A 6	1.30m (51") to 1.50m (60")	1.83m (6')	1.22m (4')	1.83m (6')
A 7	1.60m (63") to 1.80m (72")	2.13m (7')	1.22m (4')	2.13m (7')
A 8	1.90m (75") to 2.13m (84")	2.44m (8')	1.22m (4')	2.44m (8')



NOTES

1. See Standard Drawing D-11 & D-11B for additional notes and details.
2. Concrete base shall be 332kg/M³-C-22Mpa (560-C-3250)
3. All precast components shall be reinforced with 6mm (1/4") diameter steel, wound spirally on 102mm (4") centers.
4. All joints shall be set in Class C mortar.
5. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
7. Manhole cover to be designated "Storm Drain".
8. Table applicable only to "in-line" designs. Modifications to "Y" dimension required if pipe (D2) exceeds 991mm (39").

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

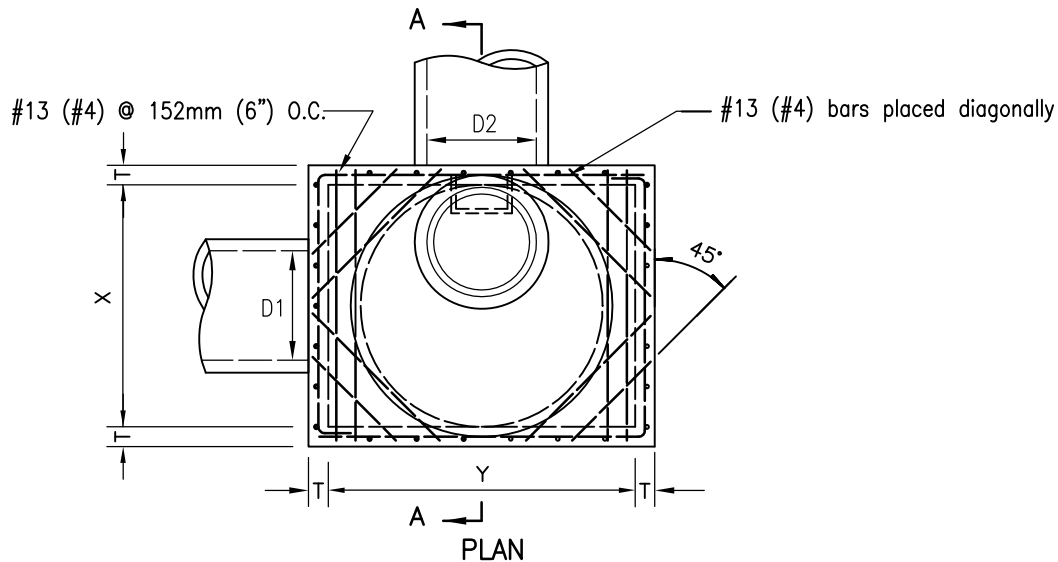
STORM DRAIN CLEANOUT - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-9

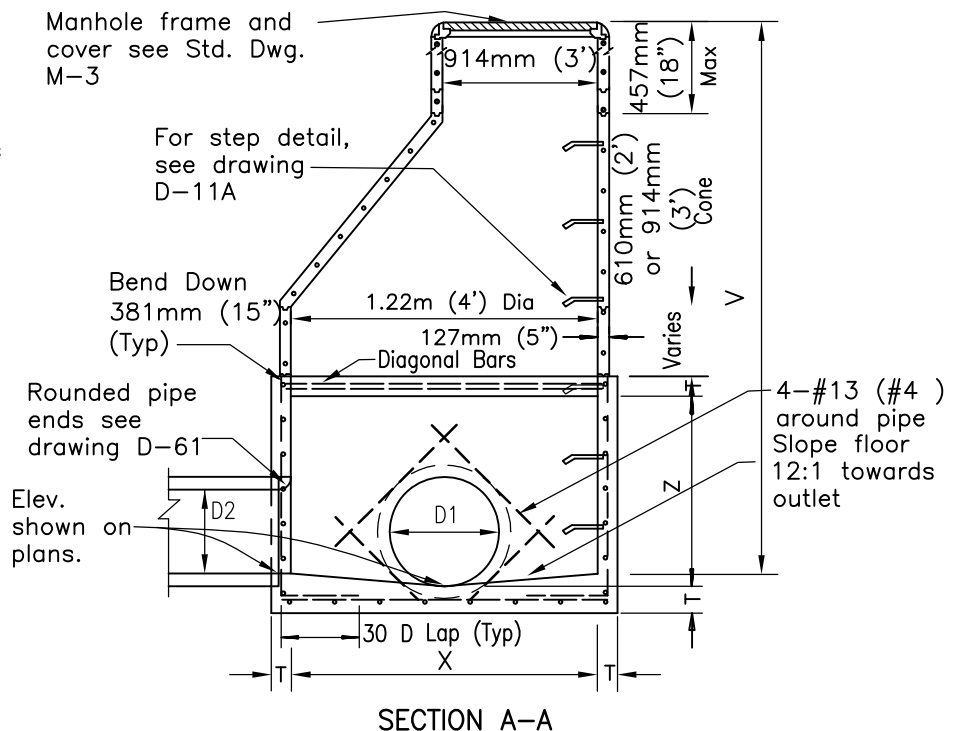


TYPE	PIPE DIAMETER (D1)	X	Y	Z
B 5	up to 1.30m (51")	1.53m (5')	1.22m (4')	1.53m (5')
B 6	1.37m (54") to 1.52m (60")	1.83m (6')	1.22m (4')	1.83m (6')
B 7	1.60m (63") to 1.80m (69")	2.13m (7')	1.22m (4')	2.13m (7')
B 8	1.83m (72") to 2.10m (81")	2.44m (8')	1.22m (4')	2.44m (8')
B 9	2.13m (84") to 2.30m (90")	2.74m (9')	1.22m (4')	2.74m (9')

NOTES

1. See Standard Drawing D-11A & D-11B for additional notes and details.
 2. All joints shall be set in Class C mortar.
 3. All precast components shall be reinforced with 6mm (1/4") diameter steel wound spirally on 102mm (4") centers.
 4. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface.
 5. Concrete base shall be 332kg/M³-C-22-Mpa (560-C-3250).
 6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
 7. Manhole cover to be designated "Storm Drain".
 8. Table applicable only to "in-line" designs.
- Modifications to "Y" dimension required if pipe (D2) exceeds 991mm (39").

Manhole frame and cover see Std. Dwg. M-3



LEGEND ON PLANS

= =

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

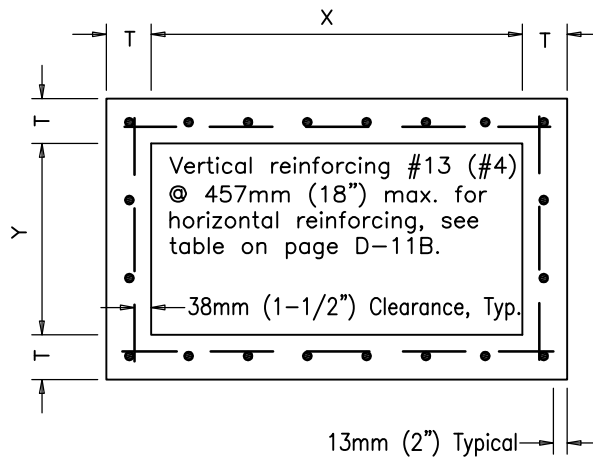
STORM DRAIN CLEANOUT - TYPE B

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

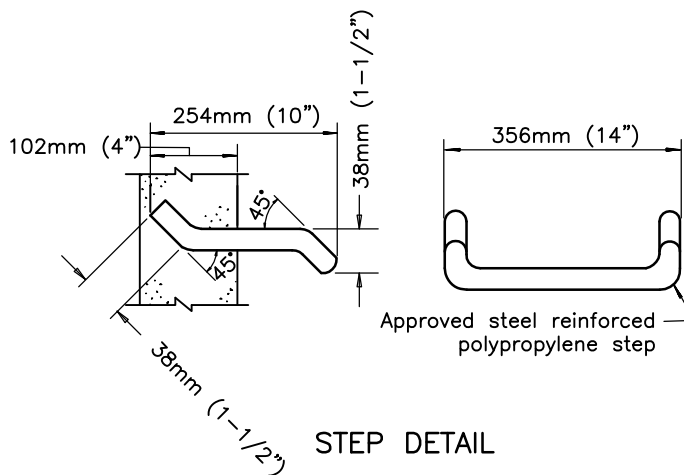
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-10



TYPICAL BOX SECTION



STEP DETAIL

NOTES

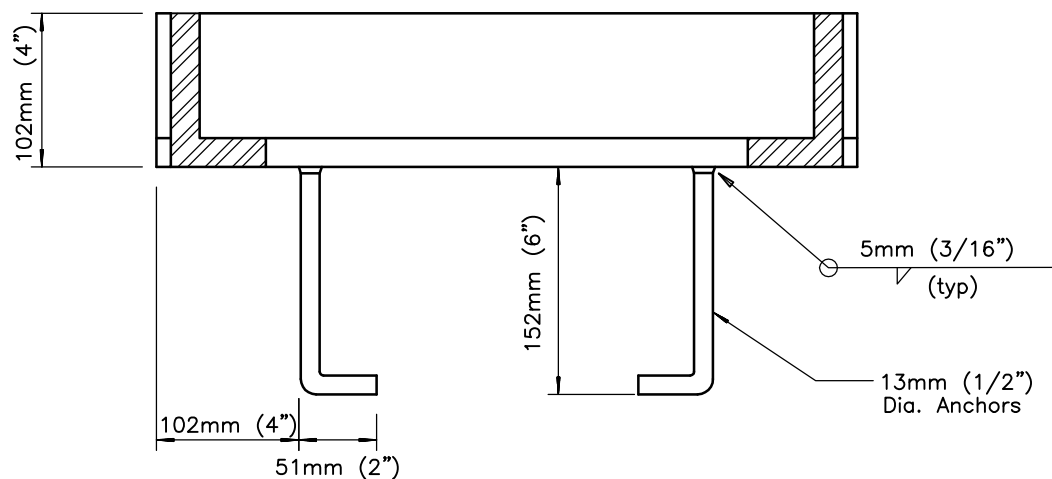
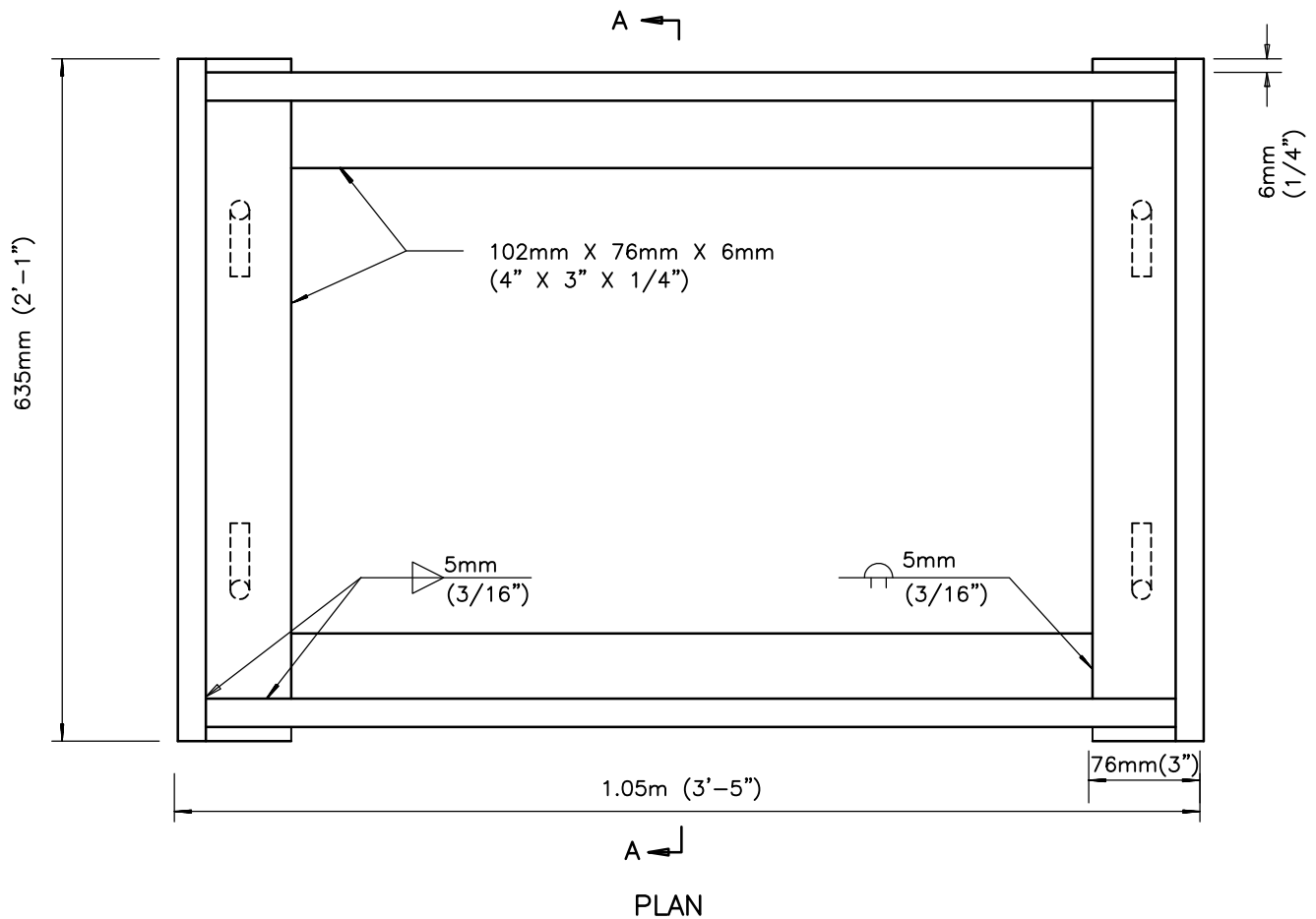
1. Concrete shall be 332kg/M-C-22-Mpa (560-C-3250) unless otherwise noted.
2. Reinforcing steel shall comply with this drawing unless otherwise specified.
3. Reinforcing steel shall be intermediate grade deformed bars conforming to latest ASTM specifications.
4. Bends shall be in accordance with latest ACI code.
5. Minimum splice length for reinforcing shall be 30 diameters.
6. Floor shall have a wood trowel finish and, except where used as junction boxes, shall have a minimum slope of 1:12 toward the outlet.
7. Depth V is measured from the top of the structure to the flowline of the box.
8. Wall thickness and reinforcing steel required may be decreased in accordance with table above.
9. Wall thickness shall be stepped on the outside of the box.
10. When the structure depth V exceeds 1.21m (4'), steps shall be cast into the wall at 381mm (15") intervals from 381mm (15") above floor to within 305mm (12") of top of structure. Where possible place steps in wall without pipe opening, otherwise over opening of smallest diameter.
11. Alternate step may be an approved steel reinforced polypropylene step.
12. Upon approval of the Agency and the Engineer, as defined by Section 6703 of the Business and Professions Code, the use of precast storm structures is acceptable as an alternate to cast-in-place. Precast units shall conform to ASTM standards and be manufactured in a permanent facility designed for that purpose.
13. Dimension "T" shall be a minimum of 152mm (6").
14. Typical reinforcement lap shall be 30 times the bar diameter minimum.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
				INLETS AND CLEANOUTS NOTES AND DETAILS	 3/01/2003
					Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D-11A

BOX SECTION REINFORCEMENT			
MAXIMUM SPAN X or Y	DEPTH V	THICKNESS T	HOR. & FLR. REINF.
914mm (3'-0") to 1.22m (4'-0")	1.22m (4'-0")	152mm (6")	#13 (#4) @ 457mm (18")
1.24m (4'-1") to 2.13m (7'-0")		152mm (6")	#13 (#4) @ 305mm (12")
2.16m (7'-1") to 2.44m (8'-0")		152mm (6")	#13 (#4) @ 203mm (8")
914mm (3'-0") to 1.22m (4'-0")	1.24m to 2.44m (4'-1" to 8'-0")	152mm (6")	#13 (#4) @ 457mm (18")
1.24m (4'-1") to 1.52m (5'-0")		152mm (6")	#13 (#4) @ 305mm (12")
1.55m (5'-1") to 1.83m (6'-0")		152mm (6")	#13 (#4) @ 203mm (8")
1.85m (6'-1") to 2.44m (8'-0")		152mm (6")	#13 (#4) @ 152mm (6")
914mm (3'-0") to 1.22m (4'-0")	2.46m to 3.66m (8'-1" to 12'-0")	152mm (6")	#13 (#4) @ 381mm (15")
1.24m (4'-1") to 1.52m (5'-0")		203mm (8")	#13 (#4) @ 305mm (12")
1.55m (5'-1") to 1.83m (6'-0")		203mm (8")	#13 (#4) @ 203mm (8")
1.85m (6'-1") to 2.44m (8'-0")		203mm (8")	#13 (#4) @ 152mm (6")
914mm (3'-0") to 1.22m (4'-0")	3.68m to 4.88m (12'-1" to 16'-0")	203mm (8")	#13 (#4) @ 305mm (12")
1.24m (4'-1") to 1.52m (5'-0")		203mm (8")	#13 (#4) @ 305mm (12")
1.55m (5'-1") to 1.83m (6'-0")		203mm (8")	#13 (#4) @ 203mm (8")
1.85m (6'-1") to 2.13m (7'-0")		203mm (8")	#13 (#4) @ 152mm (6")
2.13m (7'-1") to 2.44m (8'-0")		203mm (8")	#13 (#5) @ 203mm (8")
914mm (3'-0") to 1.22m (4'-0")	4.90m to 6.10m (16'-1" to 20'-0")	203mm (8")	#13 (#4) @ 305mm (12")
1.24m (4'-1") to 1.52m (5'-0")		254mm (10")	#13 (#4) @ 305mm (12")
1.55m (5'-1") to 1.83m (6'-0")		254mm (10")	#13 (#4) @ 203mm (8")
1.85m (6'-1") to 2.13m (7'-0")		254mm (10")	#13 (#4) @ 152mm (6")
2.13m (7'-1") to 2.44m (8'-0")		254mm (10")	#13 (#5) @ 203mm (8")
914mm (3'-0") to 1.22m (4'-0")	6.12m to 7.32m (20'-1" to 24'-0")	203mm (8")	#13 (#4) @ 305mm (12")
1.24m (4'-1") to 1.52m (5'-0")		254mm (10")	#13 (#4) @ 305mm (12")
1.55m (5'-1") to 1.83m (6'-0")		254mm (10")	#13 (#4) @ 203mm (8")
1.85m (6'-1") to 2.13m (7'-0")		254mm (10")	#13 (#4) @ 152mm (6")
2.13m (7'-1") to 2.44m (8'-0")		305mm (12")	#13 (#5) @ 203mm (8")

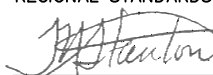
HORIZONTAL & FLOOR REINFORCING

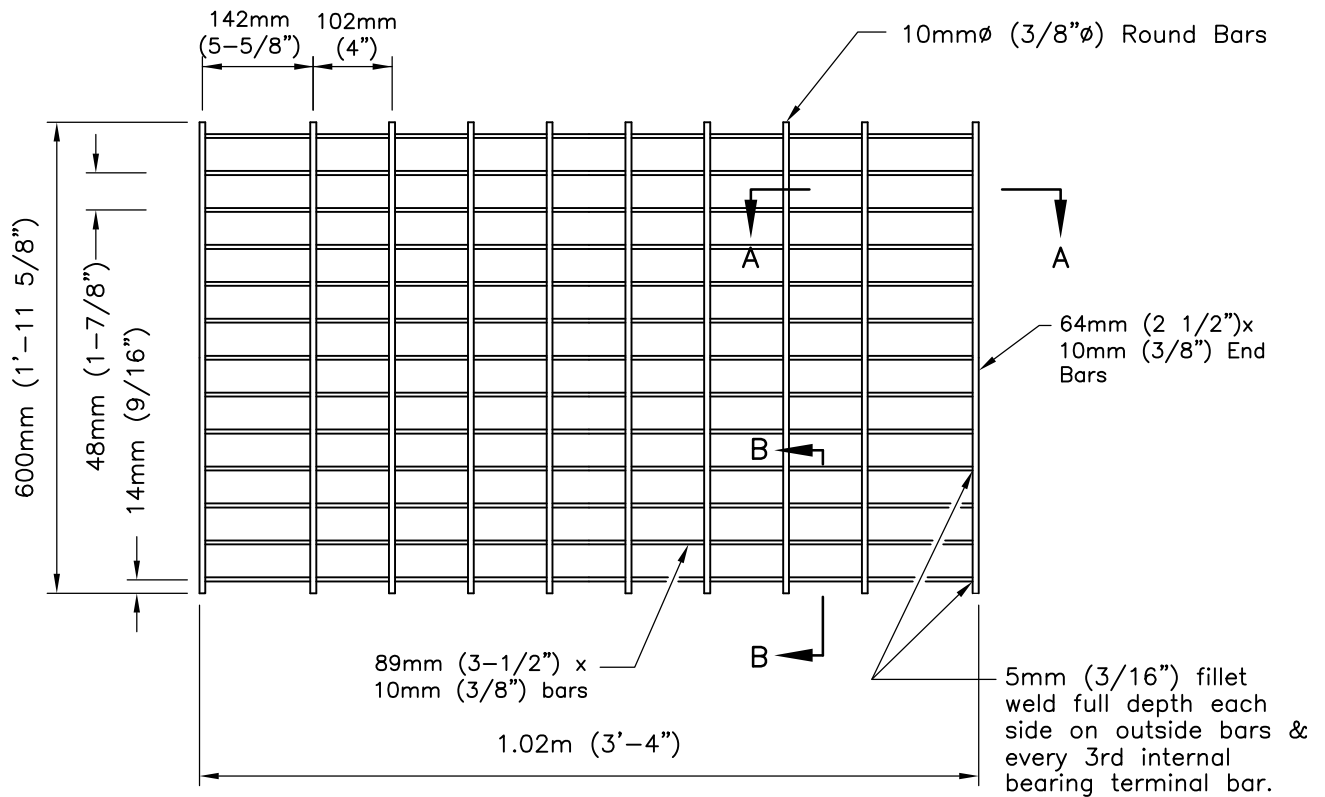
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		INLETS AND CLEANOUTS NOTES AND DETAILS
Add Metric		T. Stanton	03/03		
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER D-11B



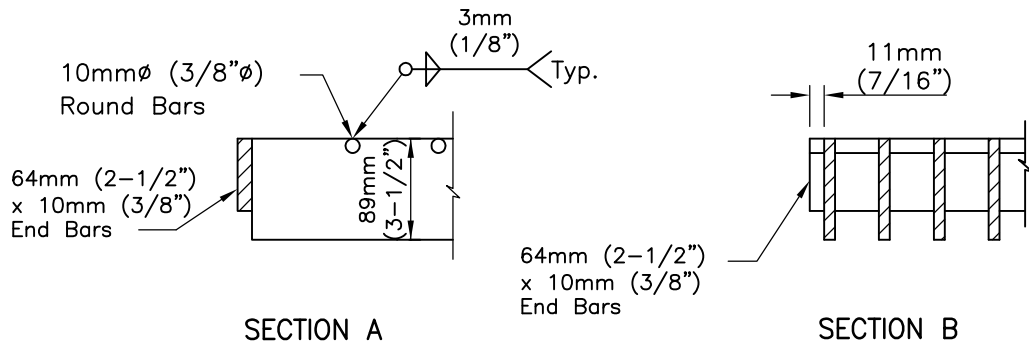
NOTE

Hot dip galvanize all parts after fabrication.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	WELDED STEEL GRATE FRAME	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
					DRAWING NUMBER D-13



PLAN



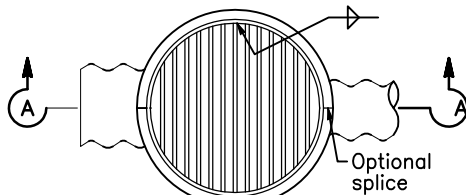
SECTION A

SECTION B

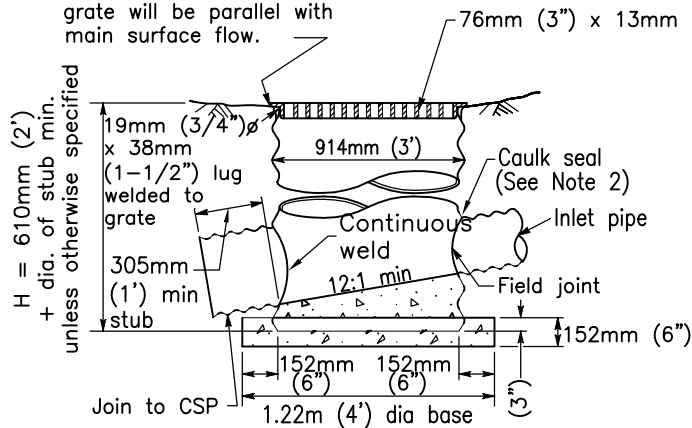
NOTES

1. Hot dip galvanize all parts after fabrication.
2. Dimensions to centerline of bars unless otherwise noted.
3. Not to be used in pedestrian areas.
4. Weight: 90.7kg (200lbs) +/-

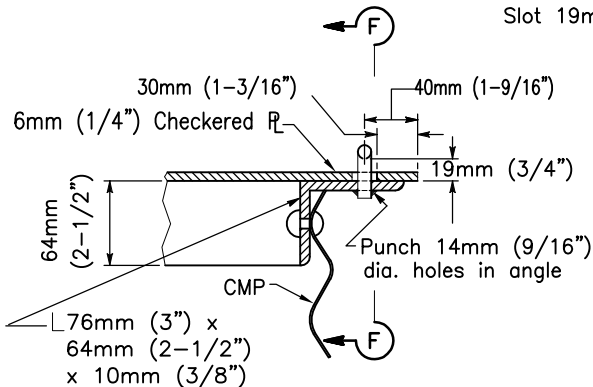
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		DRAINAGE STRUCTURE GRATE	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reformatted		T. Stanton	04/06	DRAWING		D-15
Edited		T. Stanton	02/09	NUMBER		



Punch 25mm (1") hole in CSP
Place pipe so bars of grate will be parallel with main surface flow.



SECTION A-A
TYPE A

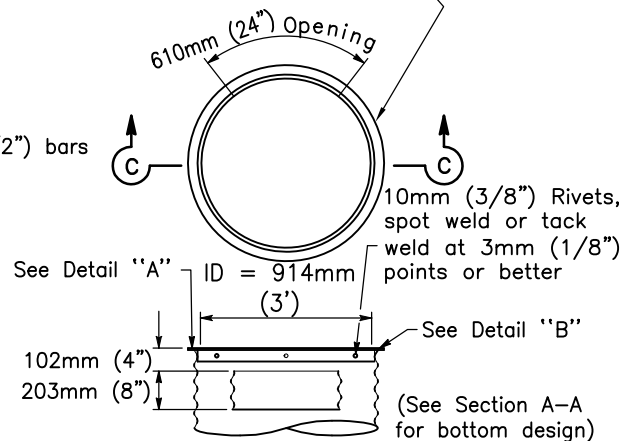


DETAIL "B"

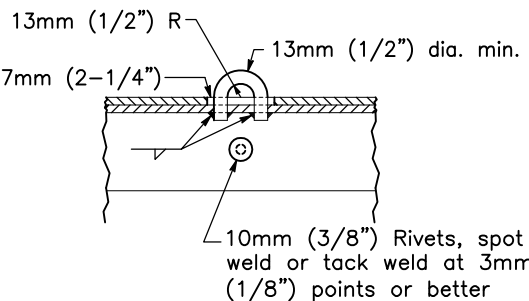
NOTES

1. All components shall be galvanized.
2. Inlet and outlet pipes shall be set at factory and positioned as shown on plans
3. Ladders and Steps: None required where "H" is 1.10m (3'-6") or less. Where "H" is between 1.10m (3'-6") and 1.50m (4'-11") place one step + 406mm (16") above the floor. If "H" is 1.52m (5') or more install a ladder placing lowest rung 406mm (16") above the floor and the highest rung not more than 356mm (14") below top of inlet. Place single step or ladder in wall with wall opening.
4. See Standard Drawing D-17 for additional details.
5. Grate to be provided when specified.
6. Grate detail shall be as shown on Standard Drawing D-17 unless otherwise approved by Agency.

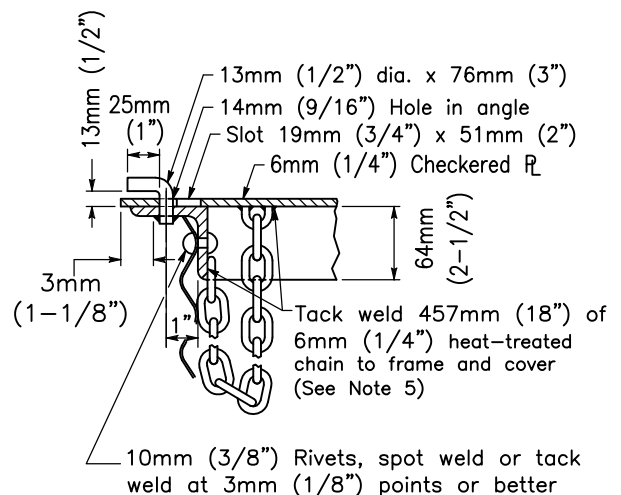
L 76mm (3") X 64mm (2-1/2") X 10mm (3/8")
Rivet, Spot Weld or Tack
Weld at 3mm 1/8" points or better to CSP



SECTION C-C
TYPE B



SECTION F-F



DETAIL "A"

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

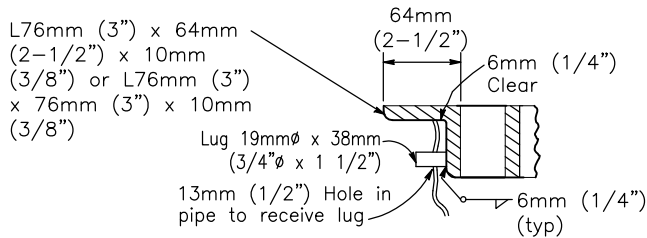
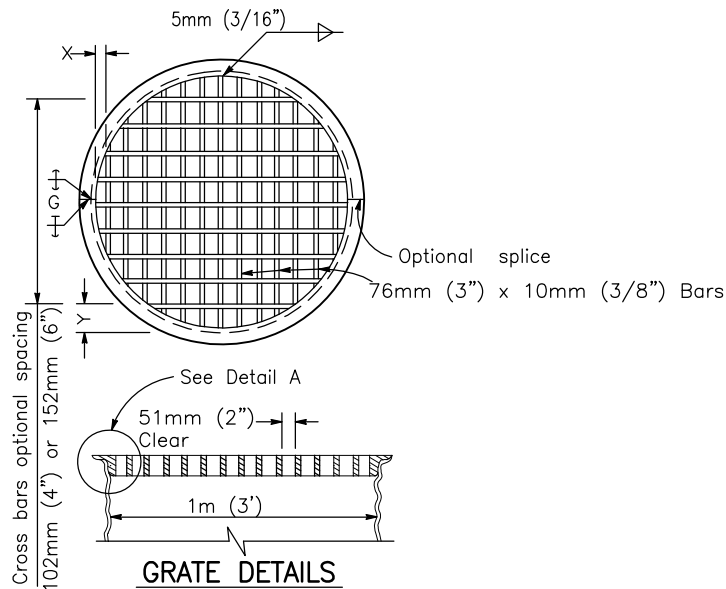
CORRUGATED STEEL PIPE INLETS TYPES A AND B

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

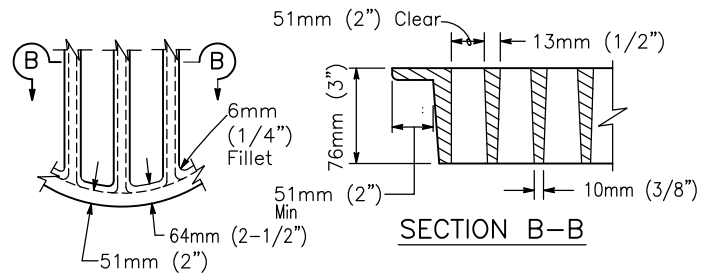
T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

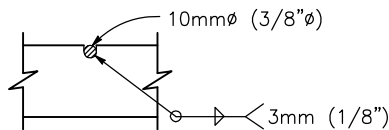
DRAWING
NUMBER D-16



DETAIL A

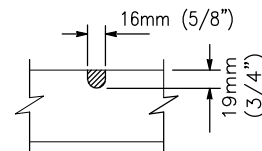


**ALTERNATIVE CAST NODULAR IRON GRATE
OR CAST STEEL GRATE**



10mm (3/8") Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

**CROSS BAR DETAIL TYPE
WELDED STEEL GRATE**



**CROSS BAR DETAIL
ALTERNATIVE CAST NODULAR
IRON GRATE OR CAST STEEL GRATE**

GRATE BAR SPACING TABLE

TYPE	NO. OF BARS	CLEAR BAR SPACING	X	Y	
				102mm (4") SPACING	152mm (6") SPACING
Welded Steel	15	51mm (2")	14mm (9/16")	95mm (3-3/4")	146mm (5-3/4")
Cast	13	51mm (2")	54mm (2-1/8")	95mm (3-3/4")	146mm (5-3/4")

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

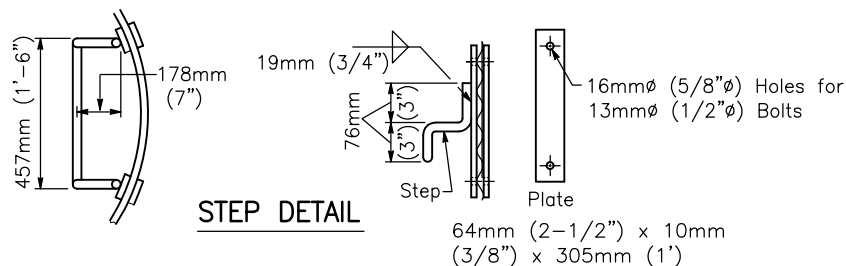
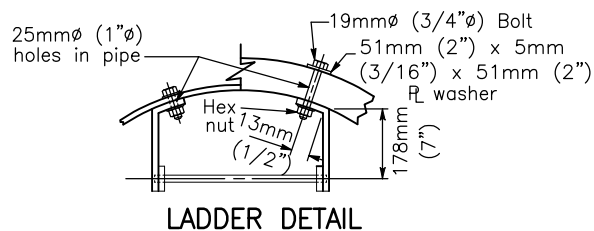
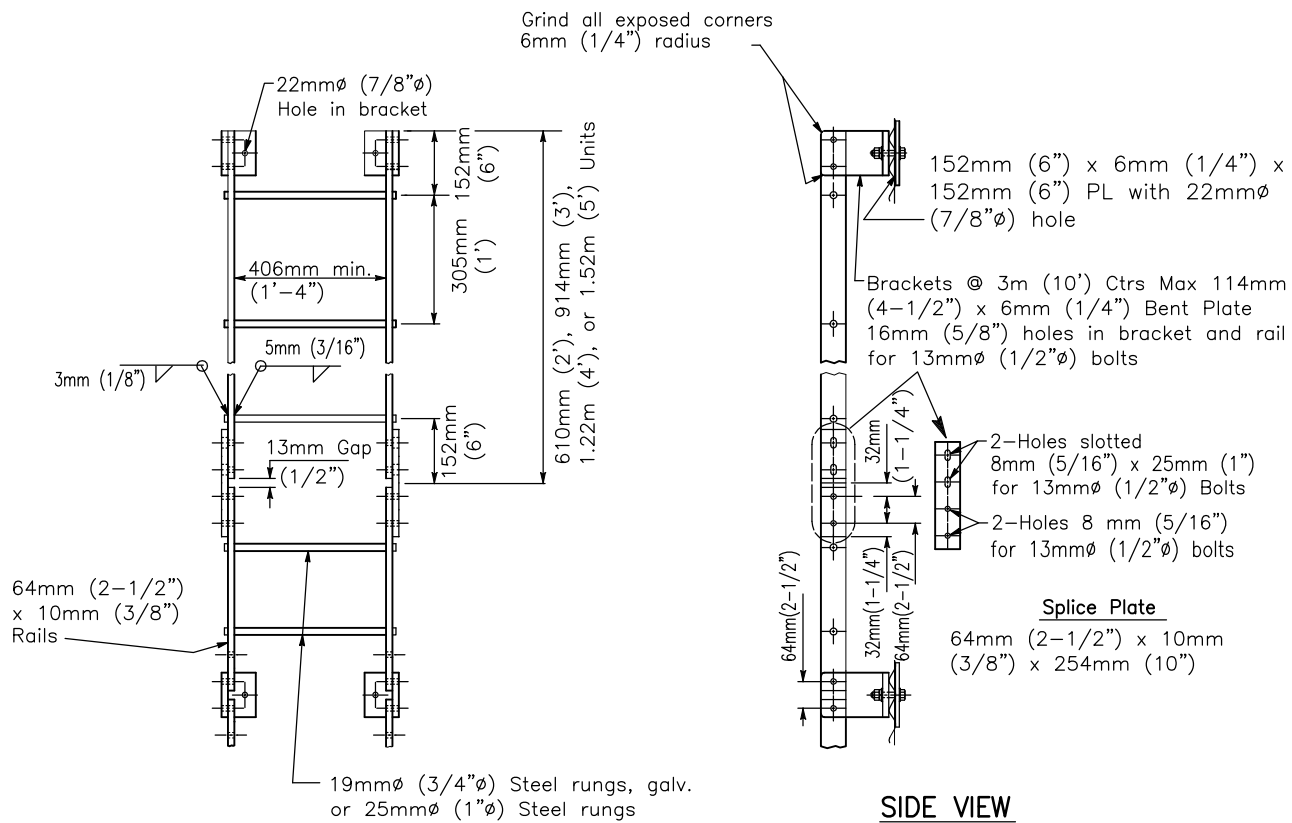
CORRUGATED STEEL PIPE INLETS,
DETAILS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

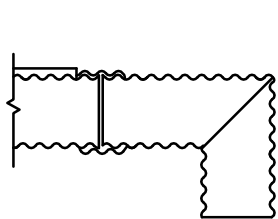
T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

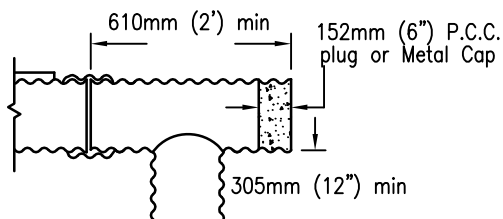
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NUMBER D-17A



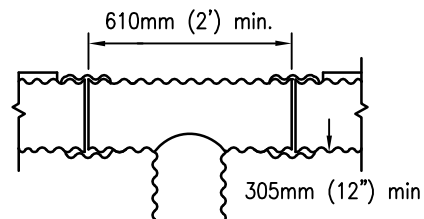
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	CORRUGATED STEEL PIPE INLETS, DETAILS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75			<i>T. Stanton</i> 3/01/2003
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06			DRAWING NUMBER D-17B
Edited		T. Stanton	02/09			



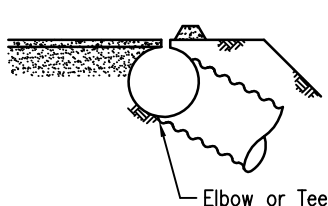
ELBOW



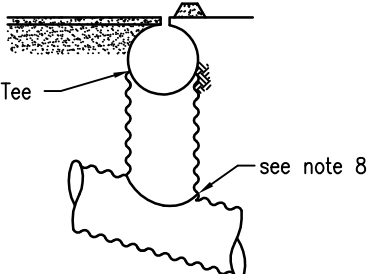
TEE



TEE-SAG CONDITION

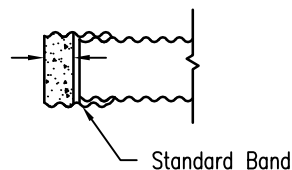


OVERSIDE DRAIN

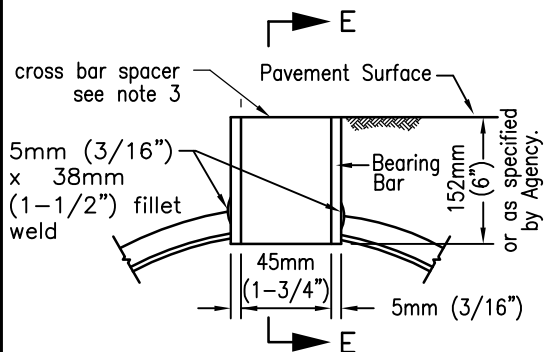


Elbow or Tee

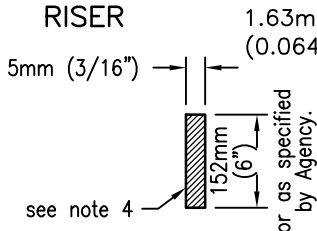
152mm (6") min P.C.C.



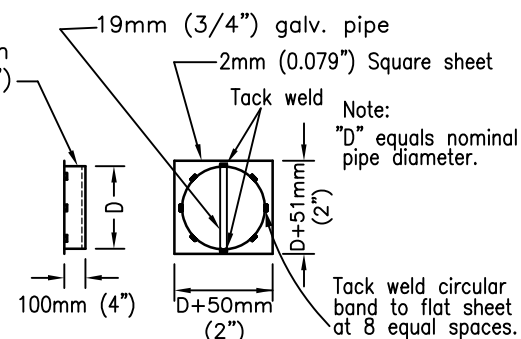
BAND PLUG



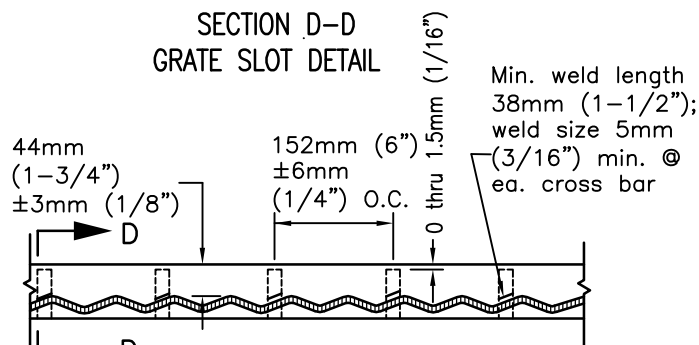
SECTION D-D
GRATE SLOT DETAIL



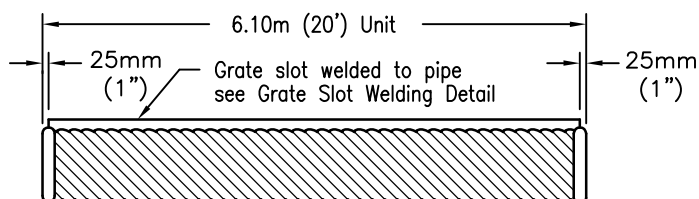
SECTION E-E



METAL CAP DETAIL



GRATE SLOT WELDING DETAIL



GRATE SLOT DRAIN

NOTES

1. Drain seams may be constructed by riveting or resistance spot-welding, continuous helical lock seam or helical welding seam at equal centers.
2. Each drain section shall be assembled with standard coupling bands.
3. Cross bar spacer of grate shall be pressure fused or plug welded to bearing bars in such a manner as to develop the strength of the cross bar spacer.
4. Cross bar spacer (Section E-E) may differ from that shown provided section area is equal or greater.
5. Grate material shall be a weldable grade of steel complying to the requirements of ASTM A 36.
6. The maximum variance from a straight line from the extreme top corners of the bearing bar shall be 13mm (1/2") in 6.1m (20').
7. Installation lengths shall be 3m (10') or multiples thereof.
8. Either field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (Mixture of 1 part portland cement, 3 - 5 parts sand and 1-1/2 parts SSI emulsified asphalt), or continuous weld.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

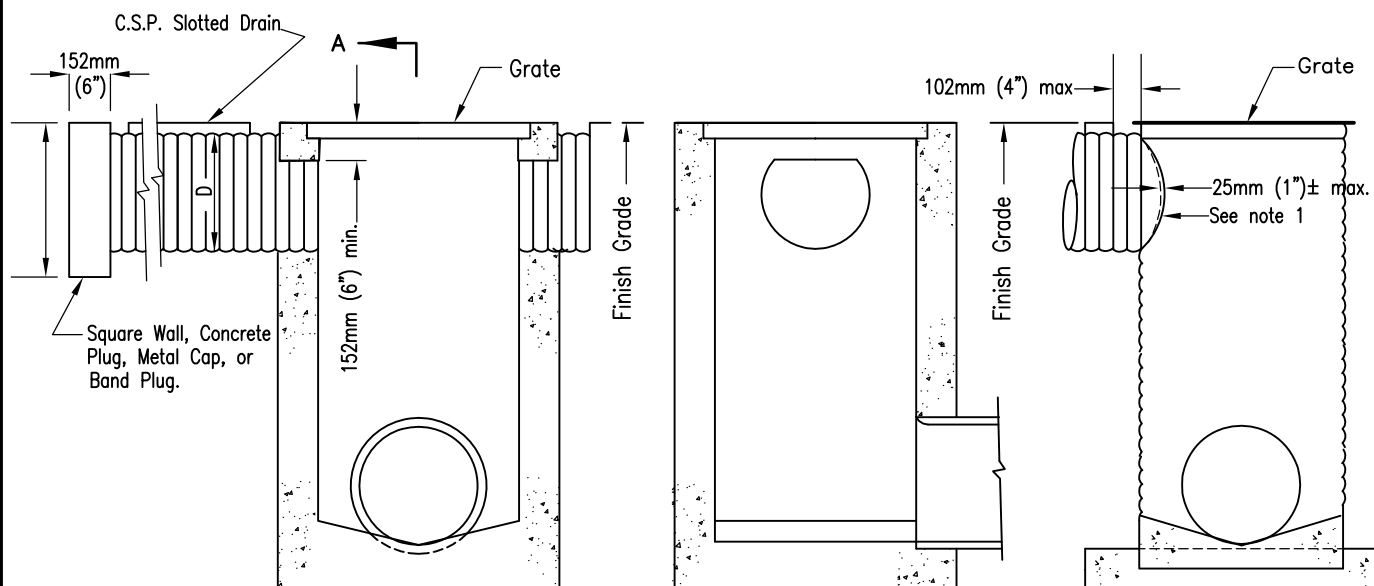
SLOTTED CORRUGATED STEEL
PIPE DRAINS 305mm (12") THROUGH 610mm (24")

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-18

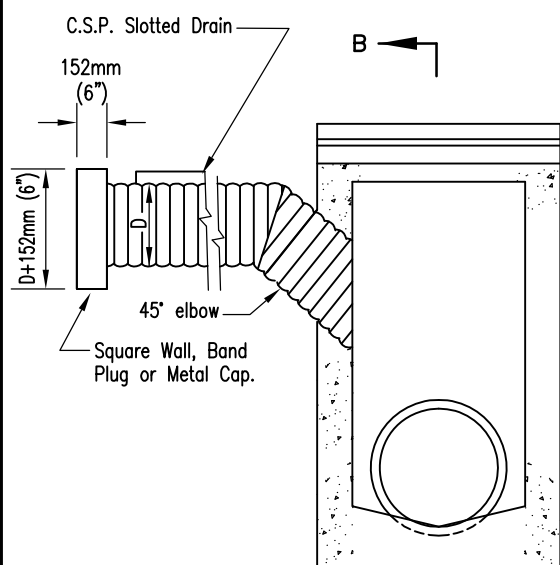


A ←

SECTION A-A

C.S.P. INLET

CATCH BASIN



B ←

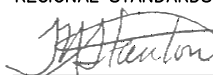
SECTION B-B

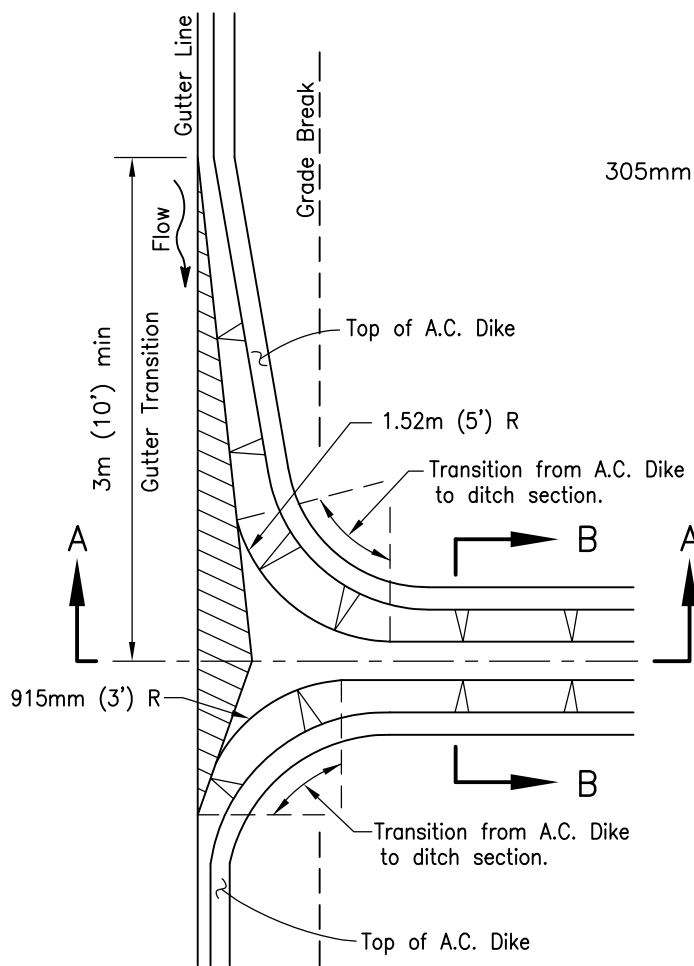
ALTERNATE
SECTION B-B

INLETS

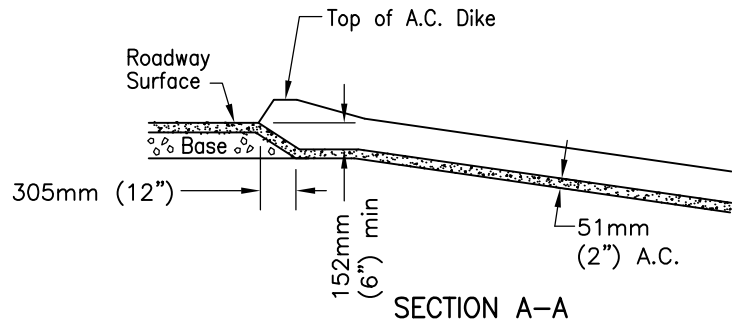
NOTES

1. Either field joint with a pliable mixture of sand, portland cement emulsified asphalt (mixture of 1 part portland cement, 3-5 parts sand, and 1-1/2 parts SSI emulsified asphalt), or continuous weld.
2. See Standard Drawing D-18 for additional notes and details.
3. Slotted drain installations shall be encased with 152mm (6 inch) PCC 308kg/M³-C-17 Mpa (520-C-2500) all around and shall be poured monolithically with the curb and gutter.

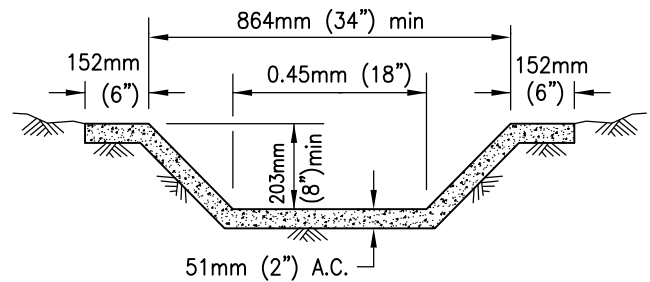
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
					DRAWING NUMBER D-19



PLAN



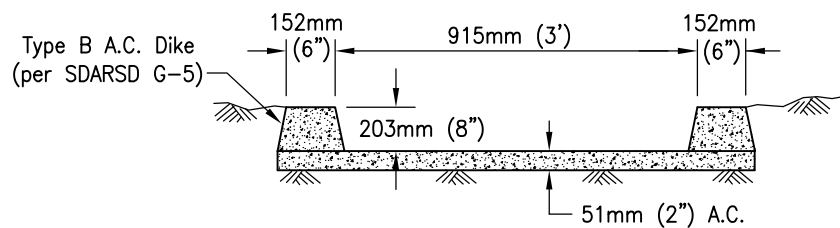
SECTION A-A



NOTE

1. Cross sectional area of ditch may be round or trapezoidal.

SECTION B-B



ALTERNATE SECTION B-B

NOTE

1. A.C. spillway may be used when fill is 3m (10') or less, and where fill slope 1-1/2:1 or flatter.
2. Use 3m (10') min. length of gutter transition on each side of downdrain in sag condition.
3. A round sectional area of equal flow capacity may be used.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

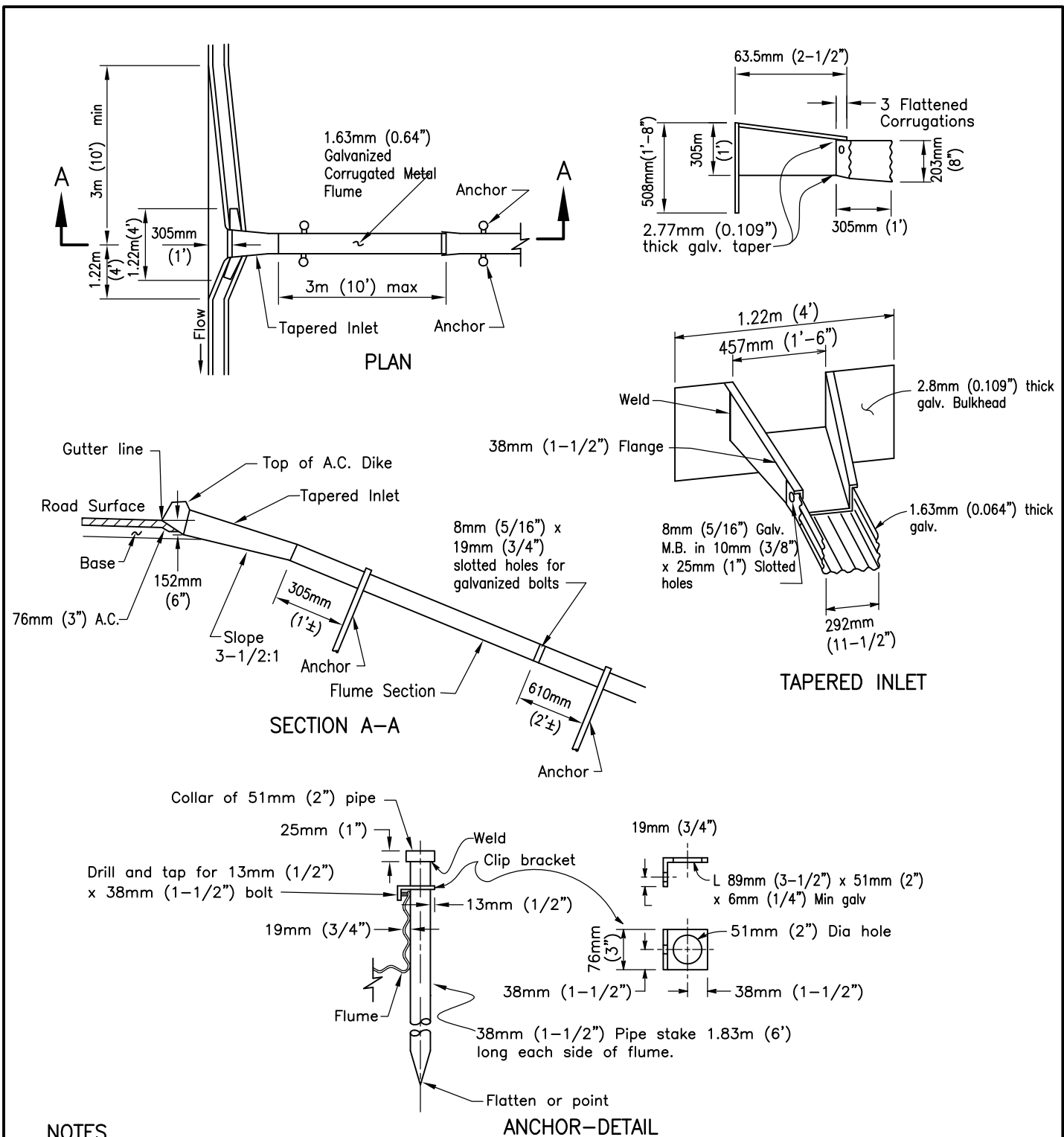
ASPHALT CONCRETE SPILLWAY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-22



NOTES

1. Downdrain flume may be used where fill slope is 1 1/2:1 or flatter.
2. Use 3m (10') min. length of gutter transition on each side of downdrain in sag condition.
3. All metal parts to be galvanized after fabrication.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

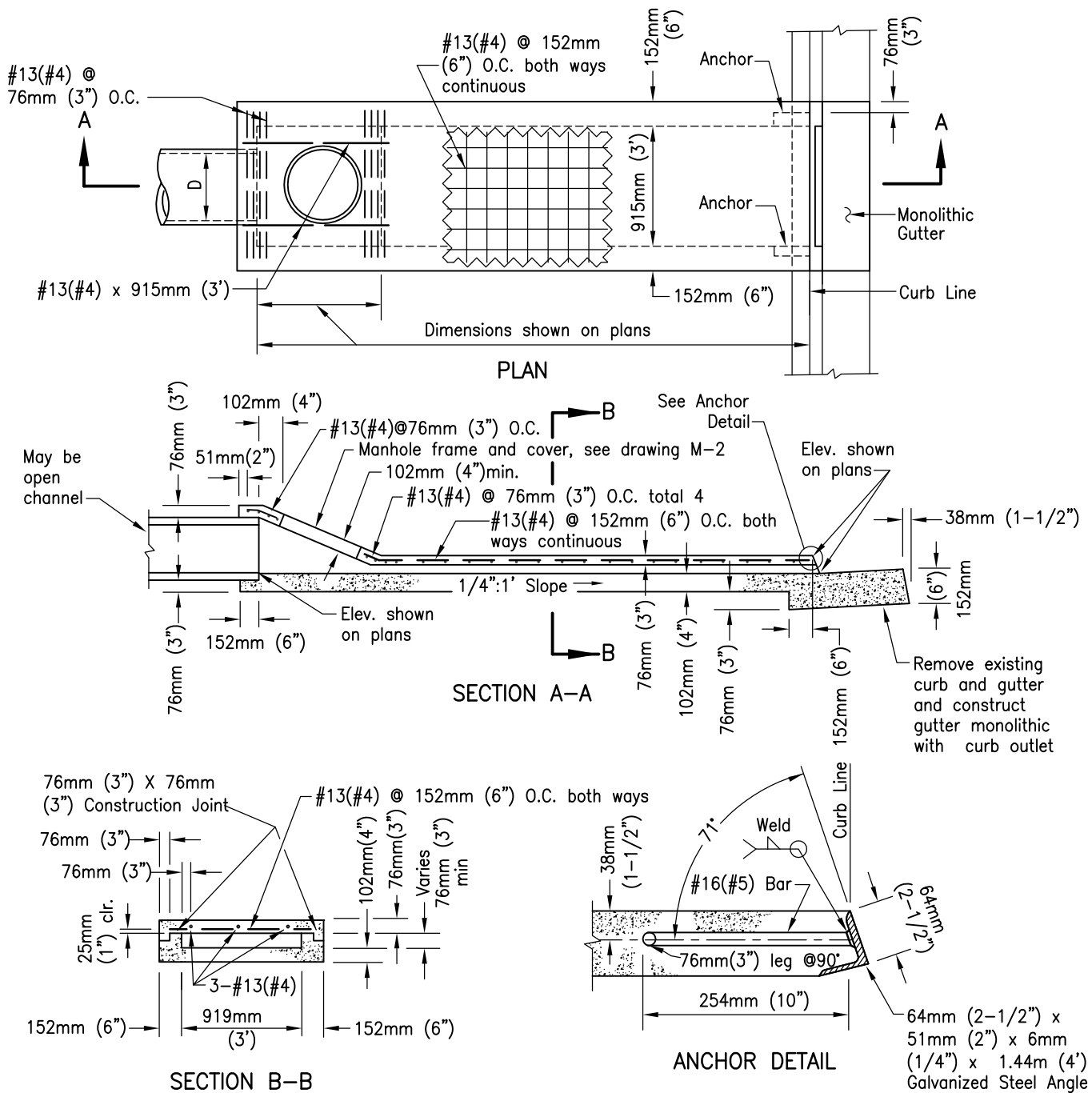
TAPERED INLET AND DOWNDRAIN FLUME

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

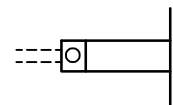
DRAWING NUMBER D-23



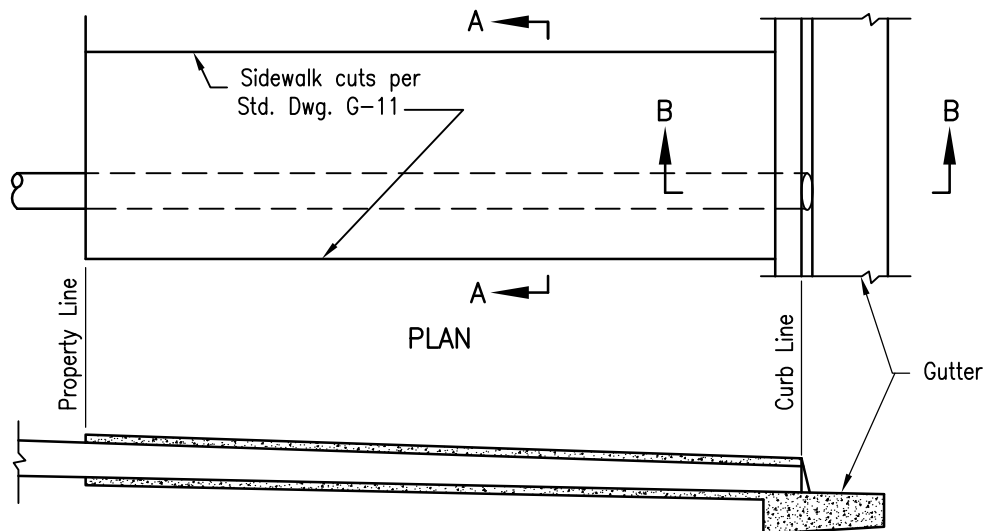
NOTES

1. Concrete shall be 332 kg/M³-C-22Mpa (560-C-3250)
2. D=inside diameter of pipe or depth of channel.
3. Section to be sloped laterally with top conforming to the grades of the existing sidewalk and curb.
4. Manhole frame and cover may be deleted with open channel.
5. Trowel finish top surface and reproduce markings of existing sidewalk and curb.
6. Trowel finish floor of outlet.
7. Provide 6mm (1/4") tooled groove in top slab in line with back of curb.

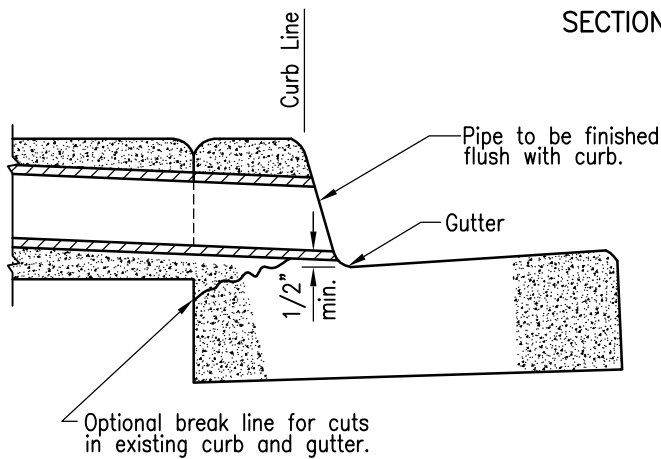
LEGEND ON PLANS



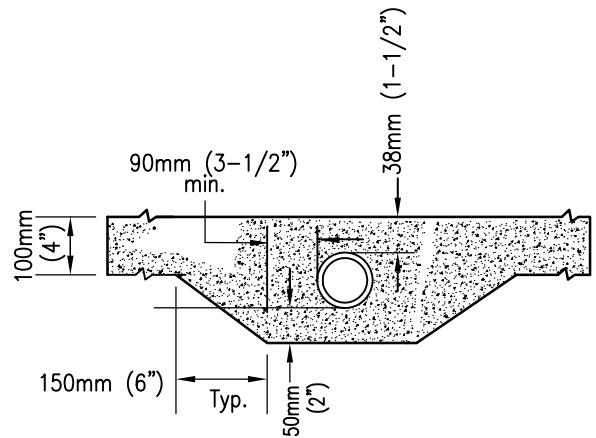
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T.Stanton	03/03	CURB OUTLET - TYPE A	 Chairperson R.C.E. 19246 Date
Reformatted		T.Stanton	04/06		
Revised		T.Stanton	11/08		
					DRAWING NUMBER D-25



SECTION



SECTION B-B

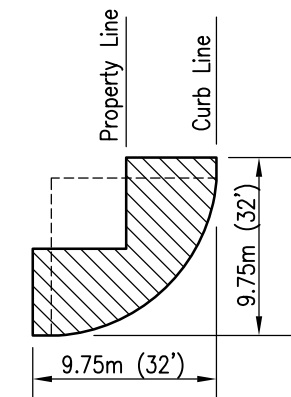


SECTION A-A

APPROVED DRAIN PIPE SIZES	
PIPE SIZE	CURB HEIGHT
75mm (3")	150mm (6") to 200mm (8") CURB FACE
100mm (4")	200mm (8") CURB FACE
150mm (6")	250mm (10") CURB FACE

NOTES

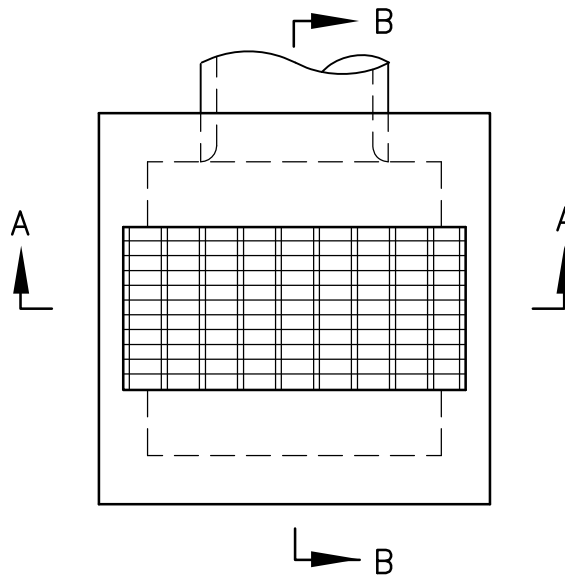
1. Pipe shall be one continuous length from property line to curb line.
2. Multiple pipes to be set a minimum distance of $D/2$ apart.
3. Concrete shall be $308\text{kg}/\text{M}^3\text{-C-17}$ Mpa (520-C-2500)
4. Pipe shall be circular rigid plastic, or approved equal.
5. Coring of existing curb may be used as an alternative.



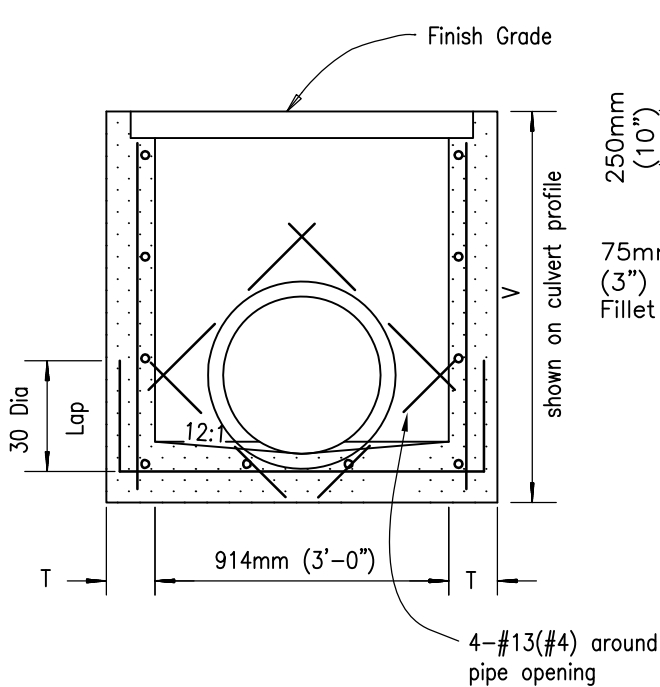
Drain shall not occupy the hatched area

BLOCK CORNER

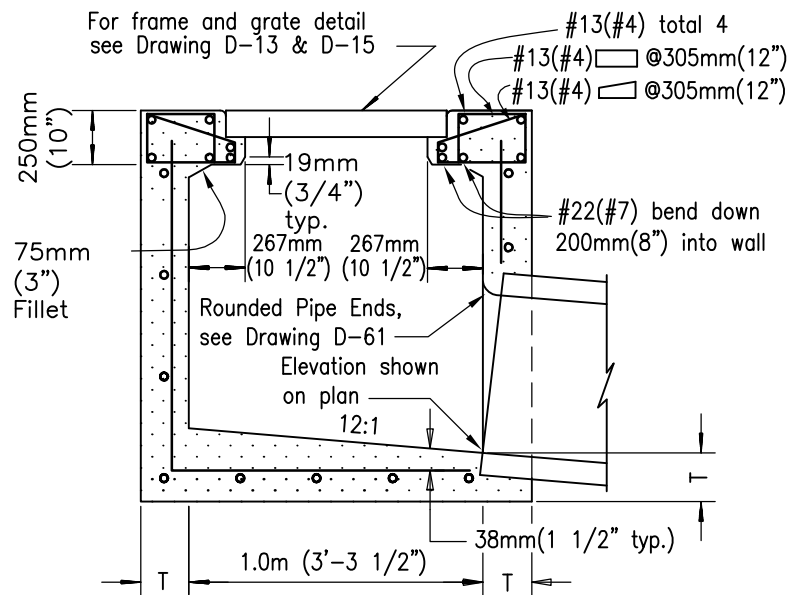
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	SIDEWALK UNDERDRAIN PIPE		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T.Stanton	03/03				
Reformatted		T.Stanton	04/06				
						DRAWING NUMBER D-27	



PLAN



SECTION A-A

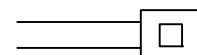


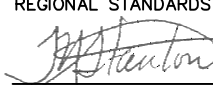
SECTION B-B

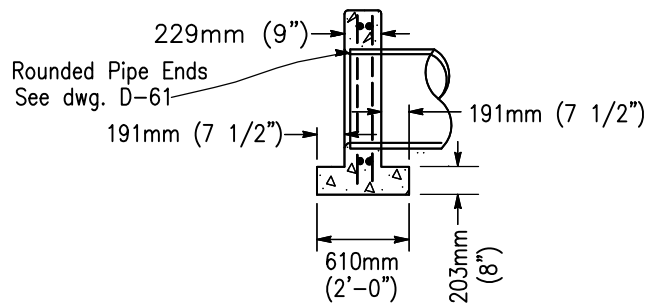
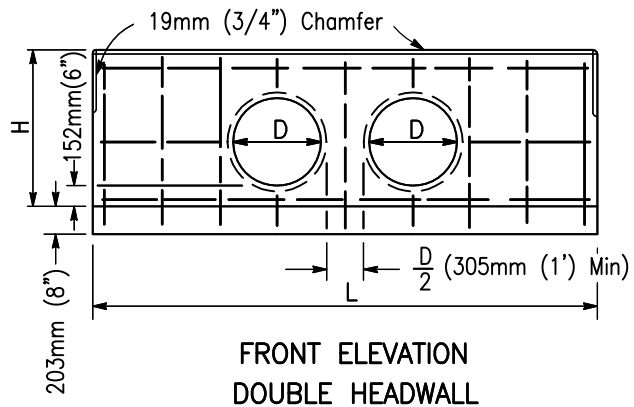
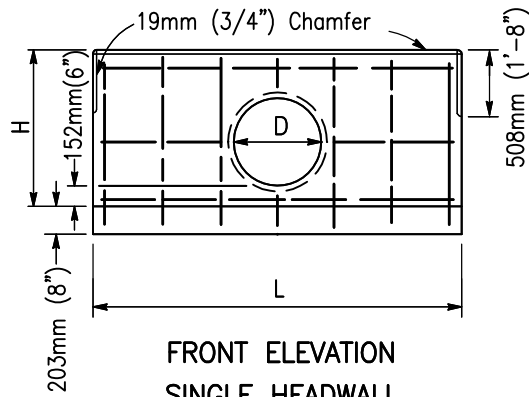
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 1.2m (4'), steps shall be installed

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Solomon	7/79	CATCH BASIN - TYPE I		 3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
Reformatted		T. Stanton	04/06			
						DRAWING NUMBER D-29

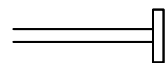


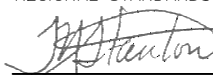
D	H	SINGLE			DOUBLE		
		L	Steel kg Lbs.	Concrete cu m C.Y.	L	Steel kg Lbs.	Concrete cu m C.Y.
300mm(12")	813mm(2'-8")	1.52m (5'-0")	15.9 (35)	0.46 (0.60)	2.44m (8'-0")	22.7 (50)	0.72 (0.94)
375mm(15")	889mm(2'-11")	1.83m (6'-0")	18.1 (40)	0.57 (0.75)	2.90m (9'-6")	27.2 (60)	0.89 (1.17)
450mm(18")	965mm(3'-2")	2.13m (7'-0")	22.7 (50)	0.70 (0.91)	3.20m (10'-6")	34.0 (75)	1.03 (1.35)
525mm(21")	1.04m (3'-5")	2.29m (7'-6")	27.2 (60)	0.78 (1.02)	3.51m (11'-6")	40.8 (90)	1.16 (1.52)
600mm(24")	1.12m (3'-8")	2.59m (8'-6")	34.0 (75)	0.92 (1.20)	3.81m (12'-6")	45.4 (100)	1.32 (1.72)
675mm(27")	1.19m (3'-11")	2.90m (9'-6")	38.6 (85)	1.06 (1.39)	4.27m (14'-0")	52.2 (115)	1.53 (2.00)
750mm(30")	1.27m (4'-2")	3.05m (10'-0")	38.6 (85)	1.16 (1.52)	4.57m (15'-0")	57.2 (126)	1.69 (2.21)
825mm(33")	1.35m (4'-5")	3.35m (11'-0")	45.4 (100)	1.32 (1.73)	4.88m (16'-0")	59.0 (130)	1.85 (2.42)
900mm(36")	1.42m (4'-8")	3.65m (12'-0")	47.6 (105)	1.49 (1.95)	5.18m (17'-0")	65.8 (145)	2.03 (2.65)
975mm(39")	1.50m (4'-11")	3.81m (12'-6")	59.0 (130)	1.60 (2.09)	5.49m (18'-0")	77.1 (170)	2.20 (2.88)
1050mm(42")	1.57m (5'-2")	4.11m (13'-6")	63.5 (140)	1.79 (2.34)	5.79m (19'-0")	84.0 (185)	2.39 (3.13)
1150mm(45")	1.65m (5'-5")	4.42m (14'-6")	68.0 (150)	1.99 (2.60)	6.10m (20'-0")	88.5 (195)	2.58 (3.38)
1225mm(48")	1.73m (5'-8")	4.57m (15'-0")	72.6 (160)	2.10 (2.75)	6.40m (21'-0")	90.7 (200)	2.78 (3.64)
1300mm(51")	1.80m (5'-11")	4.88m (16'-0")	81.6 (180)	2.32 (3.03)	6.86m (22'-6")	102 (225)	3.07 (4.02)
1375mm(54")	1.88m (6'-2")	5.18m (17'-0")	86.2 (190)	2.53 (3.31)	7.16m (23'-6")	109 (240)	3.29 (4.30)

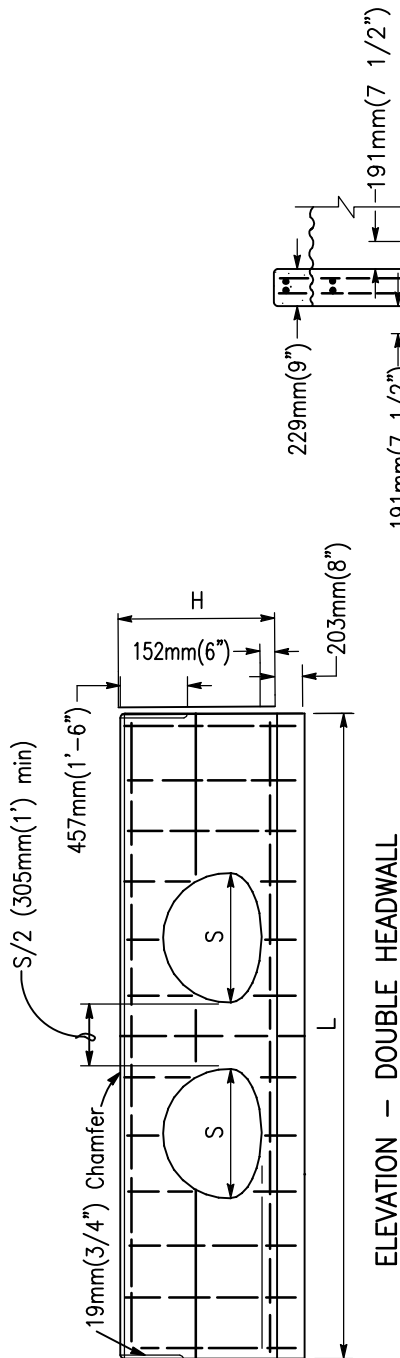
NOTES

- Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250)
- All reinforcing shall be #13(#4) bars. All vertical and horizontal tie bars @ 457mm (18") maximum spacing.

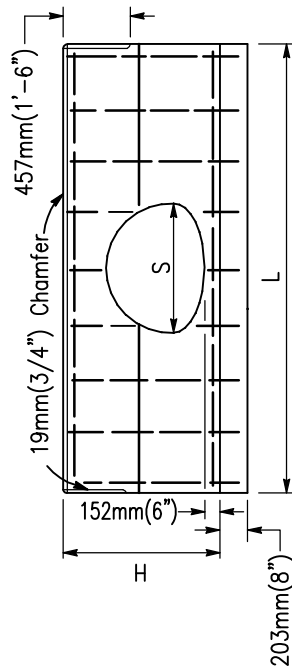
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	STRAIGHT HEADWALL - TYPE A [CIRCULAR PIPE]		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER D-30	

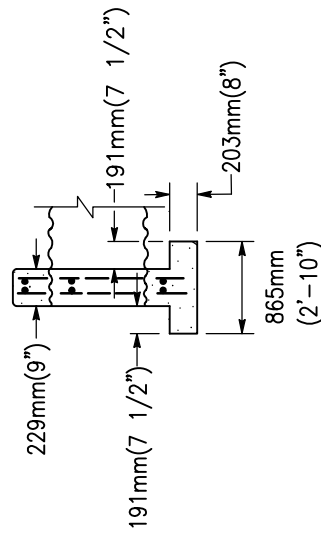


ELEVATION - DOUBLE HEADWALL



ELEVATION - SINGLE HEADWALL

SECTION, SINGLE &
DOUBLE HEADWALLS



LEGEND ON PLANS



C.S.P. ARCH SIZE Metric (inches)	SINGLE			DOUBLE		
	H Metric (ft/in)	L Metric (ft/in)	Steel cu m C.Y.	L Metric (ft/in)	Steel kg Lbs.	Concrete cu m C.Y.
450mmx275mm (18x11)	787mm (2-7)	1.68m (5-6)	16.8 (37)	2.44m (8'-0")	23.6 (52)	.700 (0.91)
525mmx375mm (21x15)	889mm (2-11)	1.98m (6-6)	20.4 (45)	3.05m (10'-0")	27.2 (60)	.940 (1.22)
600mmx450mm (24x18)	965mm (3-2)	2.29m (7-6)	22.7 (50)	3.51m (11'-6")	31.8 (70)	1.11 (1.45)
700mmx500mm (28x20)	1.02m (3-4)	2.59m (8-6)	27.3 (60)	4.12m (13'-6")	40.9 (90)	1.35 (1.76)
875mmx600mm (35x24)	1.12m (3-8)	3.20m (10-6)	38.6 (85)	4.72m (15'-6")	54.5 (120)	1.66 (2.16)
1050mmx725mm (42x29)	1.24m (4-1)	3.81m (12-6)	50.0 (110)	5.49m (18'-0")	65.8 (145)	1.97 (2.57)
1225mmx825mm (49x33)	1.35m (4-5)	4.42m (14-6)	59.0 (130)	6.40m (21'-0")	77.2 (170)	2.40 (3.13)
1425mmx950mm (57x38)	1.47m (4-10)	5.18m (17-0)	70.4 (155)	7.47m (24'-6")	95.3 (210)	2.96 (3.86)
1550mmx1050mm (64x43)	1.60m (5-3)	5.79m (19-0)	79.4 (175)	8.23m (27'-0")	104.4 (230)	3.38 (4.42)
1775mmx1175mm (71x47)	1.70m (5-7)	6.40m (21-0)	88.5 (195)	9.14m (30'-0")	115.7 (255)	3.90 (5.09)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

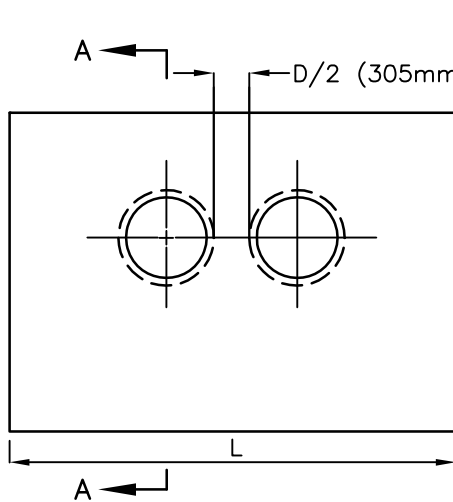
STRAIGHT HEADWALL - TYPE A
[C.S.P. - ARCH]

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

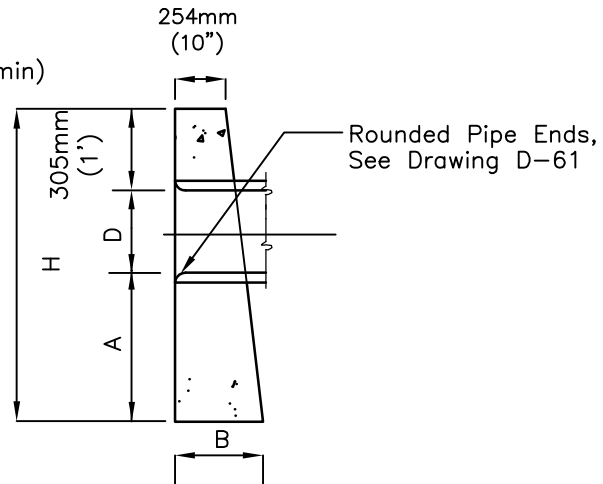
T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

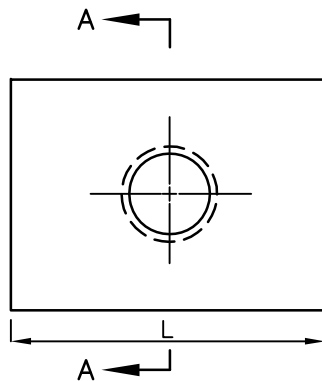
DRAWING
NUMBER D-31



DOUBLE PIPE
ELEVATION



SECTION A-A



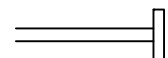
SINGLE PIPE
ELEVATION

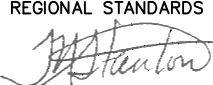
D mm in.	A mm ft./in.	B mm ft./in.	H m ft./in.	SINGLE		DOUBLE	
				L m ft./in.	Concrete kg C.Y.	L m ft./in.	Concrete kg C.Y.
300 (12")	610 (2'-0")	305 (1'-0")	1.22 (4'-0")	1.22 (4'-0")	.345 (0.45)	1.73 (5'-8")	.475 (.62)
375 (15")	610 (2'-0")	330 (1'-1")	1.30 (4'-3")	1.52 (5'-0")	.482 (0.63)	2.16 (7'-1")	.650 (.85)
450 (18")	610 (2'-0")	356 (1'-2")	1.40 (4'-6")	1.83 (6'-0")	.635 (0.83)	2.59 (8'-6")	.860 (1.12)
600 (24")	762 (2'-6")	432 (1'-5")	1.68 (5'-6")	2.44 (8'-0")	1.18 (1.54)	3.45 (11'-4")	1.60 (2.09)
750 (30")	762 (2'-6")	533 (1'-9")	1.83 (6'-0")	3.05 (10'-0")	1.85 (2.41)	4.32 (14'-2")	2.50 (3.26)
900 (36")	914 (3'-0")	610 (2'-0")	2.13 (7'-0")	3.66 (12'-0")	2.86 (3.74)	5.18 (17'-0")	3.87 (5.05)

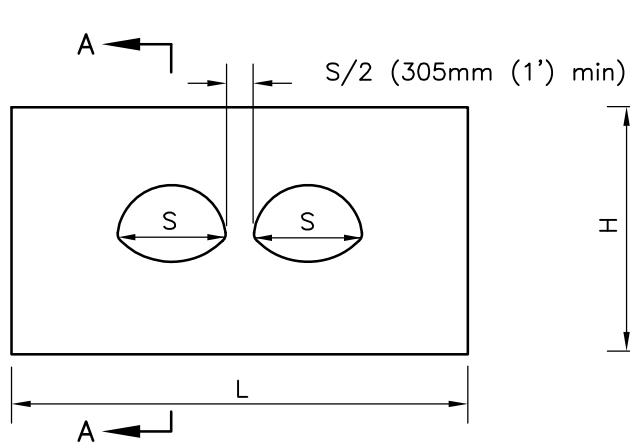
NOTES

- Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250).
- Exposed corners shall be chamfered 19mm (3/4").

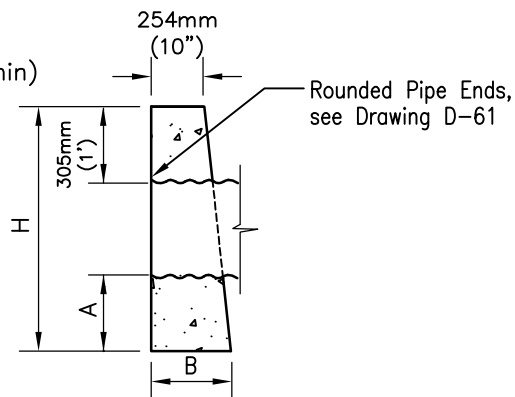
LEGEND ON PLANS



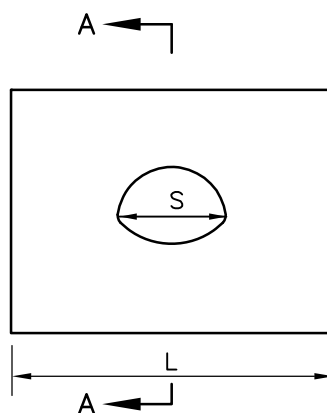
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	STRAIGHT HEADWALL - TYPE B [CIRCULAR PIPE]		 Chairperson R.C.E. 19246 Date 3/01/2003
Add Metric		T. Stanton	03/03			
Reformatted		T. Stanton	04/06			
Edited		T. Stanton	02/09			
						DRAWING NUMBER D-32



DOUBLE PIPE
ELEVATION



SECTION A-A



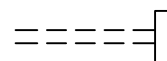
SINGLE PIPE
ELEVATION

C.S.P. ARCH SIZE Metric (inches)	A		B		H		SINGLE		DOUBLE	
	mm	ft./in.	mm	ft./in.	m	ft./in.	L m ft.	Concrete cu m C.Y.	L m ft./in.	Concrete cu m C.Y.
450mmx275mm (18x11)	610	(2'-0")	356	(1'-2")	1.19	(3'-11")	1.83 (6')	0.64 (0.83)	2.21 (7'-3")	0.75 (0.97)
525mmx375mm (21x15)	610	(2'-0")	406	(1'-4")	1.24	(4'-3")	2.13 (7')	0.83 (1.08)	2.95 (9'-8")	1.12 (1.46)
600mmx450mm (24x18)	610	(2'-0")	457	(1'-6")	1.32	(4'-6")	2.44 (8')	1.08 (1.41)	3.51 (11'-6")	1.52 (1.98)
700mmx500mm (28x20)	762	(2'-6")	508	(1'-8")	1.52	(5'-2")	2.74 (9')	1.51 (1.97)	3.81 (12'-6")	2.04 (2.66)
875mmx600mm (35x24)	762	(2'-6")	610	(2'-0")	1.63	(5'-6")	3.05 (10')	1.96 (2.56)	4.37 (14'-5")	2.76 (3.60)

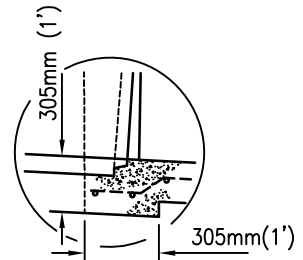
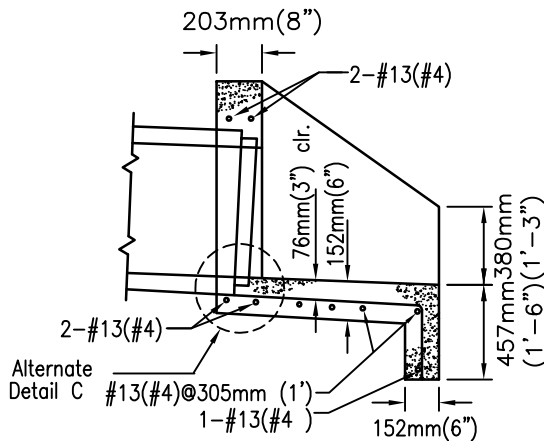
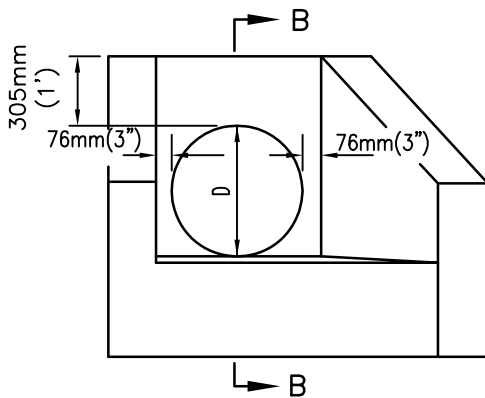
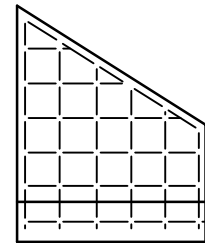
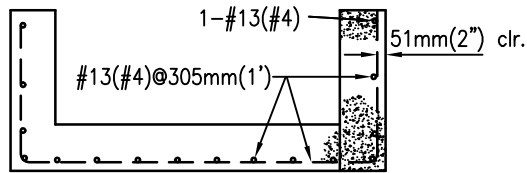
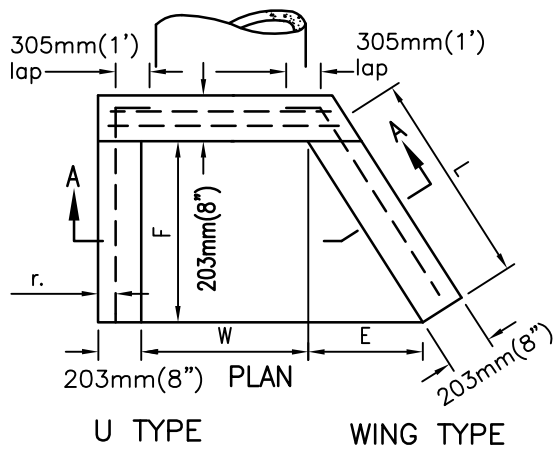
NOTES

- Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250)
- Exposed corners to be chamfered 19mm (3/4").

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			<i>T. Stanton</i> 3/10/2003	
Add Metric		T. Stanton	03/03	STRAIGHT HEADWALL - TYPE B (C.S.P. - ARCH PIPE)		Chairperson R.C.E. 19246 Date	
Reformatted		T. Stanton	04/06			DRAWING	
Edited		T. Stanton	02/09			NUMBER D-33	

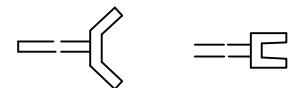


	DIA. OF PIPE	DIMENSIONS			SINGLE PIPE					DOUBLE PIPE				
					W	U TYPE		WING TYPE		W	U TYPE		WING TYPE	
		L	E	F		CONC.	STEEL	CONC.	STEEL		CONC.	STEEL	CONC.	STEEL
Metric	450mm	689mm	381mm	571mm	610mm	0.43kg	16kg	0.49kg	20kg	AS SHOWN ON PLANS	0.63kg	24kg	0.69kg	28kg
US	18"	2'-3 1/8"	1'-3"	1'-10 1/2"	2'-0"	0.55yd	35lb	0.63yd	43lb		0.82yd	53lb	0.90yd	61lb
Metric	600mm	962mm	533mm	800mm	762mm	0.61kg	22kg	0.72kg	28kg		1.0kg	34kg	1.1kg	39kg
US	24"	3'-1 7/8"	1'-9"	2'-7 1/2"	2'-6"	0.79yd	47lb	0.93yd	60lb		1.22yd	73lb	1.36yd	86lb
Metric	750mm	1.24m	686mm	1.03m	914mm	.81kg	33kg	1.0kg	39kg		1.3kg	50kg	1.5kg	56kg
US	30"	4'-5/8"	2'-3"	3'-4 1/2"	3'-0"	1.05yd	71lb	1.29yd	85lb		1.66yd	109lb	1.92yd	123lb
Metric	900mm	1.51m	838mm	1.26m	1.07m	1.02kg	40kg	1.30kg	52kg		1.70kg	62kg	1.95kg	74kg
US	36"	4'-11 1/2"	2'-9"	4'-1 1/2"	3'-6"	1.33yd	88lb	1.69yd	114lb		2.19yd	136lb	2.55yd	162lb

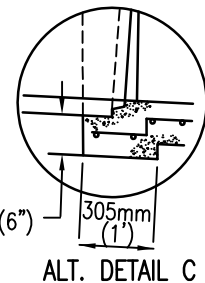
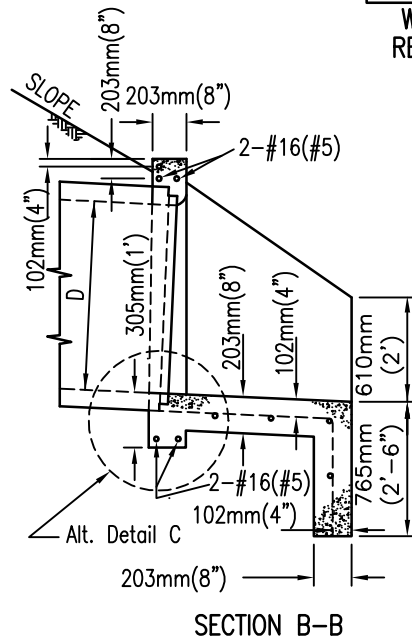
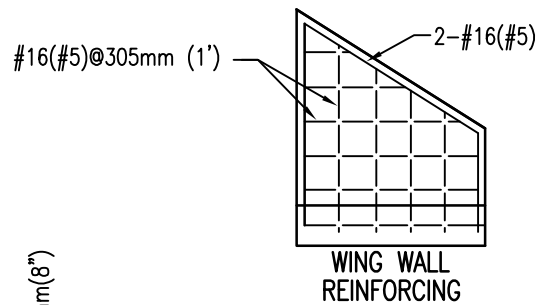
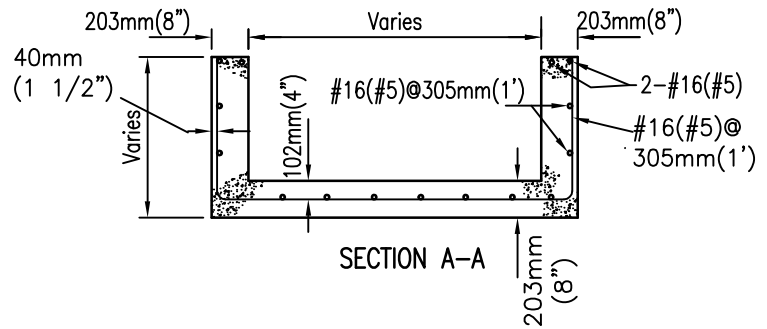
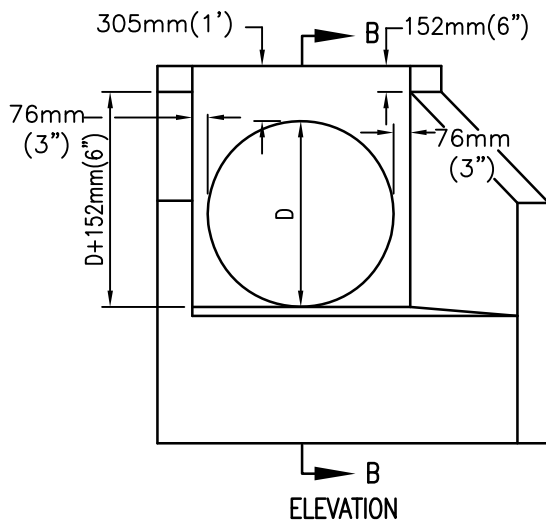
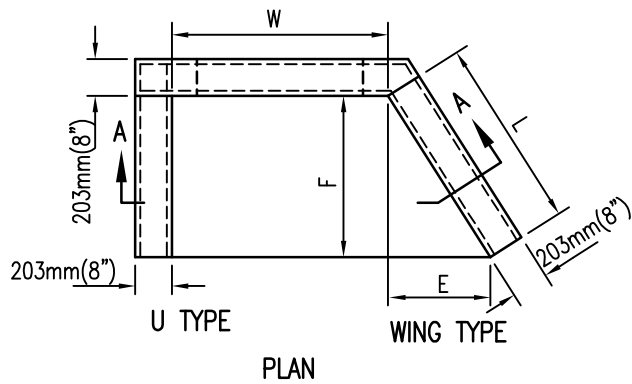
NOTES:

- Concrete shall be 332kg/M³ -C-22Mpa (560-C-3250)
- Exposed corners to be chamfered 19mm (3/4").
- Multiple pipes to be set a distance of D/2, with a 305mm(1') minimum between outside diameters of pipes.
- Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
- Skewed pipes: Dimension W to be increased in width or length due to skew or multiple pipes.
- For pipe wall thickness greater than 76mm (3") use alternate Detail-C.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75				
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
				WING AND U TYPE HEADWALLS		Chairperson R.C.E. 19246 Date	
				FOR 450mm (18") TO 900mm (36") PIPES		DRAWING NUMBER D-34	



NOTE:

For Dimension Table and General Notes, see D-35B

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	WING AND U TYPE HEADWALLS FOR 1.0m (42") TO 2.0m (84") PIPE		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER D-35A	

TABLE OF DIMENSIONS AND QUANTITIES
FOR DRAWING D-35A

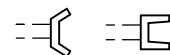
	DIA. OF PIPE	DIMENSIONS			SINGLE PIPE					DOUBLE PIPE				
		L	E	F	W	U TYPE		WING TYPE		W	U TYPE		WING TYPE	
						CONC.	STEEL	CONC.	STEEL		CONC.	STEEL	CONC.	STEEL
						C.Y.	LBS.	C.Y.	LBS.		C.Y.	LBS.	C.Y.	LBS.
Metric	1050mm	1.10m	610mm	914mm	1.22m	1.20 cu m	53.1 kg	1.46 kg	61.3 kg	AS SHOWN ON PLANS	2.1 cu m	86.2 kg	2.5 cu m	97.1 kg
U.S.	42"	3'-7 1/4"	2'-0"	3'-0"	4'-0"	1.57 C.Y.	117lb	1.90 C.Y.	135 lb		2.69 C.Y.	190 lb	3.16 C.Y.	214 lb
Metric	1200mm	1.37m	762mm	1.14m	1.37m	1.51 cu m	70.0 kg	1.90 cu m	84.0 kg		2.62 cu m	115 kg	3.11 cu m	131 kg
U.S.	48"	4'-6"	2'-6"	3'-9"	4'-6"	1.97 C.Y.	153 lb	2.48 C.Y.	184 lb		3.43 C.Y.	252 lb	4.06 C.Y.	288 lb
Metric	1350mm	1.65m	914mm	1.37m	1.52m	1.85 cu m	86.2 kg	2.35 cu m	112 kg		3.25 cu m	145 kg	3.87 cu m	176 kg
U.S.	54"	5'-4 7/8"	3'-0"	4'-6"	5'-0"	2.41 C.Y.	190 lb	3.07 C.Y.	246 lb		4.24 C.Y.	319 lb	5.06 C.Y.	368 lb
Metric	1500mm	1.92m	1.10m	1.60m	1.68m	2.21 cu m	109 kg	2.87 cu m	134 kg		3.40 cu m	175 kg	4.72 cu m	201 kg
U.S.	60"	6'-3 3/4"	3'-6"	5'-3"	5'-6"	2.88 C.Y.	239 lb	3.75 C.Y.	294 lb		5.13 C.Y.	386 lb	6.17 C.Y.	442 lb
Metric	1650mm	2.20m	1.22m	1.83m	1.83m	2.59 cu m	134 kg	3.46 cu m	162 kg	AS SHOWN ON PLANS	4.65 cu m	206 kg	5.51 cu m	234 kg
U.S.	66"	7'-2 1/2"	4'-0"	6'-0"	6'-0"	3.38 C.Y.	294 lb	4.52 C.Y.	356 lb		6.08 C.Y.	454 lb	7.20 C.Y.	516 lb
Metric	1800mm	2.47m	1.37m	2.06m	1.98m	3.0 cu m	167 kg	4.22 cu m	190 kg		5.44 cu m	237 kg	6.35 cu m	267 kg
U.S.	72"	8'-1 3/8"	4'-6"	6'-9"	6'-6"	3.93 C.Y.	368 lb	5.52 C.Y.	417 lb		7.11 C.Y.	522 lb	8.30 C.Y.	588 lb
Metric	1950mm	2.74m	1.52m	2.29m	2.13m	3.45 cu m	202 kg	5.13 cu m	229 kg		6.27 cu m	270 kg	7.27 cu m	315 kg
U.S.	78"	9'-0"	5'-0"	7'-6"	7'-0"	4.50 C.Y.	444 lb	6.70 C.Y.	503 lb		8.20 C.Y.	595 lb	9.50 lb	693 lb
Metric	2100mm	2.71m	1.68m	2.51m	2.29m	3.99 cu m	245 kg	6.24 cu m	281 kg		7.27 cu m	312 kg	8.26 cu m	357 kg
U.S.	84"	9'-10 3/4"	5'-6"	8'-3"	7'-6"	5.21 C.Y.	540 lb	8.15 C.Y.	619 lb		9.50 C.Y.	687 lb	10.80 C.Y.	786 lb

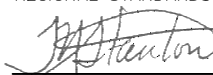
Note: Dimensions E and L apply to wing type only.

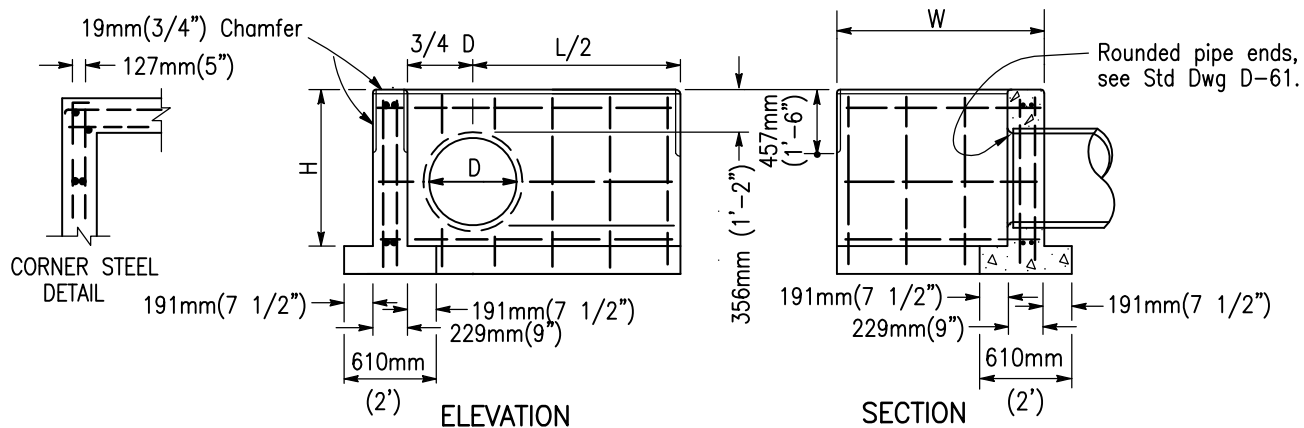
NOTES:

1. Skewed Pipes: Dimension W to be increased to take care of increased width or length due to skew of multiple pipes.
2. Tops of headwalls, on grade culverts, shall be placed parallel to profile grade when the grades are 3% or more.
3. Concrete shall be 332 kg/M³-C-22Mpa (560-C-3250).
4. Exposed corners shall chamfered 19mm(3/4").
5. Multiple pipes shall be set a distance of D/2, with a 25mm(1") minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 76mm(3") use Alternate Detail-C.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	WING AND U TYPE HEADWALLS FOR 1.0 m (42") TO 2.0 m (84") PIPE		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER D-35B	

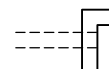


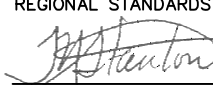
D	H	L/2	LENGTH OF W									
			965mm (3'-4")		1.47m (4'-10")		1.93m (6'-4")		2.39m (7'-10")		2.85m (9'-4")	
			Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc
300mm 12"	813mm 2'-8"	762mm 2'-6"	22.7kg 50lb	0.61cu m 0.79 C.Y.	27.3kg 60lb	.750cu m 0.98 C.Y.	—	—	—	—	—	—
375mm 15"	889mm 2'-11"	914mm 3'-0"	25.0kg 55lb	0.70cu m 0.91 C.Y.	30.0kg 65lb	.850cu m 1.11 C.Y.	—	—	—	—	—	—
450mm 18"	965mm 3'-2"	1.07m 3'-6"	30.0kg 65lb	.796cu m 1.04 C.Y.	34kg 75lb	.956cu m 1.25 C.Y.	—	—	—	—	—	—
525mm 21"	1.04m 3'-5"	1.14m 3'-9"	34.0kg 75lb	.880cu m 1.15 C.Y.	40.9kg 90lb	1.04cu m 1.36 C.Y.	—	—	—	—	—	—
600mm 24"	1.12m 3'-8"	1.30m 4'-3"	38.6kg 85lb	.990cu m 1.29 C.Y.	45.4kg 100lb	1.16cu m 1.51 C.Y.	50.0kg 110lb	1.33cu m 1.74 C.Y.	—	—	—	—
675mm 27"	1.14m 3'-11"	1.45m 4'-9"	40.9kg 90lb	1.10cu m 1.44 C.Y.	47.7kg 105lb	1.28cu m 1.67 C.Y.	52.2kg 115lb	1.91cu m 1.91 C.Y.	—	—	—	—
750mm 30"	1.27m 4'-2"	1.52m 5'-0"	43.0kg 95lb	1.19cu m 1.55 C.Y.	50.0kg 110lb	1.38cu m 1.80 C.Y.	54.5kg 120lb	2.05cu m 2.05 C.Y.	61.3kg 135lb	1.75cu m 2.29 C.Y.	—	—
825mm 33"	1.35m 4'-5"	1.68m 5'-6"	47.7kg 105lb	1.31cu m 1.71 C.Y.	54.5kg 120lb	1.51cu m 1.97 C.Y.	61.3kg 135lb	2.23cu m 2.23 C.Y.	68.0kg 150lb	1.90cu m 2.48 C.Y.	—	—
900mm 36"	1.42m 4'-8"	1.83m 6'-0"	50.0kg 110lb	1.44cu m 1.88 C.Y.	56.7kg 125lb	1.65cu m 2.15 C.Y.	63.5kg 140lb	2.41cu m 2.41 C.Y.	70.3kg 155lb	2.05cu m 2.68 C.Y.	77.2kg 170lb	2.26cu m 2.95 C.Y.
975mm 39"	1.25m 4'-11"	1.90m 6'-3"	—	—	68.0kg 150lb	1.75cu m 2.28 C.Y.	77.2kg 170lb	2.56cu m 2.56 C.Y.	84.0kg 185lb	2.18cu m 2.84 C.Y.	90.8kg 200lb	2.39cu m 3.12 C.Y.
1050mm 42"	1.58m 5'-2"	2.06m 6'-9"	—	—	70.3kg 155lb	1.85cu m 2.42 C.Y.	79.4kg 175lb	2.76cu m 2.76 C.Y.	86.2kg 190lb	2.34cu m 3.05 C.Y.	95.3kg 210lb	2.56cu m 3.34 C.Y.
1125mm 45"	1.65m 5'-5"	2.21m 7'-3"	—	—	—	—	81.7kg 180lb	2.97cu m 2.97 C.Y.	90.8kg 200lb	2.50cu m 3.27 C.Y.	97.6kg 215lb	2.73cu m 3.57 C.Y.
1200mm 48"	1.73m 5'-8"	2.29m 7'-6"	—	—	—	—	86.2kg 190lb	3.13cu m 3.13 C.Y.	98.0kg 216lb	2.63cu m 3.44 C.Y.	105kg 230lb	2.87cu m 3.75 C.Y.
1275mm 51"	1.80m 5'-11"	2.44m 8'-0"	—	—	—	—	—	—	99.8kg 220lb	2.81cu m 3.67 C.Y.	107kg 235lb	3.05cu m 3.99 C.Y.
1350mm 54"	1.88m 6'-2"	2.59m 8'-6"	—	—	—	—	—	—	107kg 235lb	2.99cu m 3.91 C.Y.	114kg 250lb	3.25cu m 4.24 C.Y.

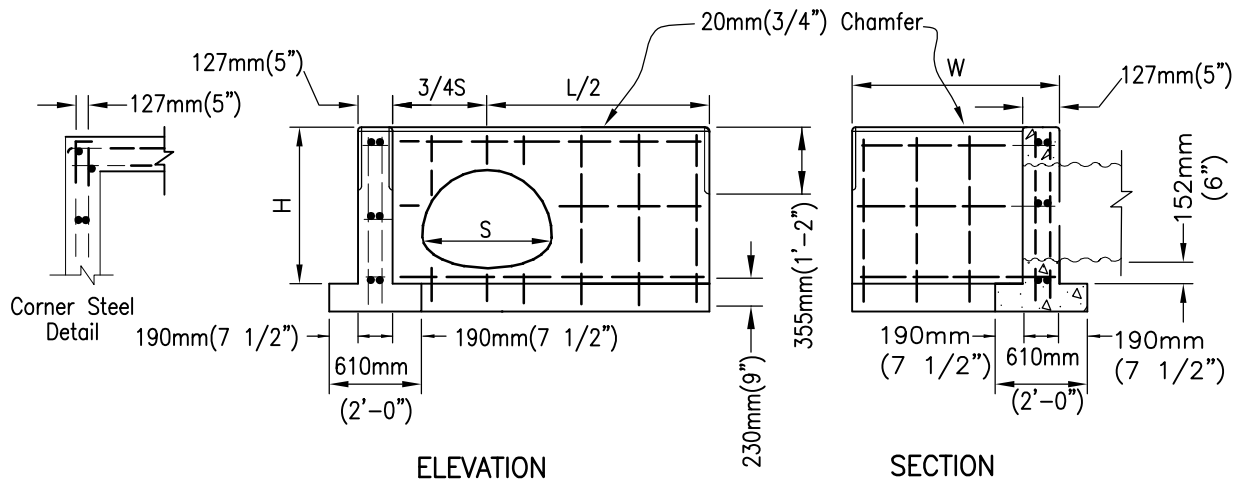
NOTES

- Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250).
- All reinforcing steel #13(#4) bars. All vertical and horizontal tie bars 457mm(18") maximum spacing.
- When multiple pipes are used, the distance between pipes shall be D/2 (305mm(1') min.). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	L TYPE HEADWALLS CIRCULAR PIPES		 3/10/2003 Chairperson R.C.E. 19246 Date	
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Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER D-36	

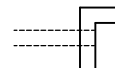


CSP ARCH SIZE		H	L/2	LENGTH OF W									
				1.02m (3'-4")		1.47m (4'-10")		1.93m (6'-4")		2.39m (7'-10")		2.84m (9'-4")	
				Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc
Metric	450mm x 275mm	787mm	838mm	22.7kg	.643cu m	27.3kg	.788cu m	31.8kg	.926cu m	36.3kg	1.07cu m	40.9kg	1.20cu m
U.S.	18"x11"	2'-7"	2'-9"	50lb	0.84 C.Y.	60lb	1.03 C.Y.	70lb	1.21 C.Y.	80lb	1.39 C.Y.	90lb	1.57 C.Y.
Metric	525mm x 375mm	889mm	991mm	27.3kg	.765cu m	29.5kg	.910cu m	34.0kg	1.06cu m	40.9kg	1.21cu m	54.4kg	1.36cu m
U.S.	21"x15"	2'-11"	3'-3"	60lb	1.00 C.Y.	65lb	1.18 C.Y.	75lb	1.38 C.Y.	90lb	1.58 C.Y.	100lb	1.77 C.Y.
Metric	600mm x 450mm	965mm	1.14m	27.3kg	.818cu m	31.8kg	1.00cu m	36.3kg	1.17cu m	43.1kg	1.33cu m	49.9kg	1.49cu m
U.S.	24"x18"	3'-2"	3'-9"	60lb	1.07 C.Y.	70lb	1.32 C.Y.	80lb	1.53 C.Y.	95lb	1.74 C.Y.	110lb	1.94 C.Y.
Metric	700mm x 500mm	1.02m	1.30m	31.8kg	.964cu m	36.3kg	1.13cu m	40.9kg	1.29cu m	45.4kg	1.45cu m	52.2kg	1.62cu m
U.S.	28"x20"	3'-4"	4'-3"	70lb	1.26 C.Y.	80lb	1.47 C.Y.	90lb	1.68 C.Y.	100lb	1.90 C.Y.	115lb	2.11 C.Y.
Metric	875mm x 600mm	1.07m	1.35m	45.36	1.16cu m	49.9kg	1.33cu m	54.5kg	1.51cu m	63.5kg	1.69cu m	70.3kg	1.85cu m
U.S.	35"x24"	3'-8"	5'-3"	100lb	1.51 C.Y.	110lb	1.74 C.Y.	120lb	1.97 C.Y.	140lb	2.20 C.Y.	155lb	2.42 C.Y.
Metric	1050mm x 725mm	1.25m	1.90m	52.2kg	1.40cu m	59.0kg	1.58cu m	63.5kg	1.77cu m	70.3kg	1.95cu m	77.2kg	2.17cu m
U.S.	42"x29"	4'-1"	6'-3"	115lb	1.82 C.Y.	130lb	2.06 C.Y.	140lb	2.31 C.Y.	155lb	2.55 C.Y.	170lb	2.83 C.Y.
Metric	1225mm x 825mm	1.35m	2.21m	59.0kg	1.62cu m	65.8kg	1.82cu m	70.3kg	2.02cu m	77.2kg	2.22cu m	84.0kg	2.41cu m
U.S.	49"x33"	4'-5"	7'-3"	130lb	2.12 C.Y.	145lb	2.37 C.Y.	155lb	2.64 C.Y.	170lb	2.90 C.Y.	185lb	3.15 C.Y.
Metric	1425mm x 950mm	1.47m	2.59m	65.8kg	1.93cu m	75.6kg	2.14cu m	79.4kg	2.35cu m	86.2kg	2.57cu m	93.0kg	2.76cu m
U.S.	57"x38"	4'-10"	8'-6"	145lb	2.52 C.Y.	160lb	2.79 C.Y.	175lb	3.07 C.Y.	190lb	3.35 C.Y.	205lb	3.61 C.Y.
Metric	1550mmx1050mm	1.35m	2.90m	84.0kg	2.21cu m	90.8kg	2.38cu m	97.6kg	2.66cu m	107kg	2.89cu m	114kg	3.11cu m
U.S.	64"x43"	5'-3"	9'-6"	185lb	2.89 C.Y.	200lb	3.11 C.Y.	215lb	3.48 C.Y.	235lb	3.77 C.Y.	250lb	4.06 C.Y.
Metric	1775mmx1175mm	1.45m	3.20m	90.8kg	2.49cu m	97.6kg	2.73cu m	107kg	2.96cu m	114kg	3.19cu m	123kg	3.43cu m
U.S.	71"x47"	5'-7"	10'-6"	200lb	3.25 C.Y.	215lb	3.56 C.Y.	235lb	3.86 C.Y.	250lb	4.17 C.Y.	270lb	4.48 C.Y.

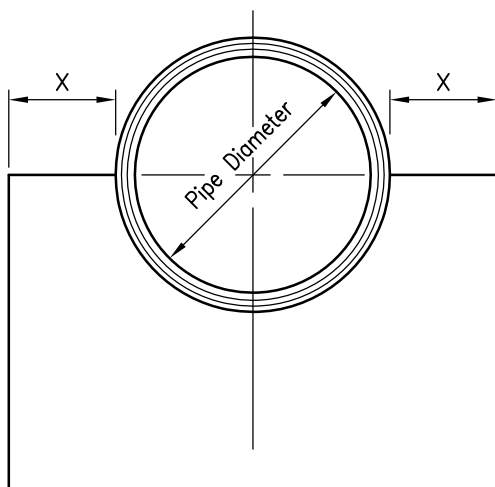
NOTES

- Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250)
- All reinforcing steel #13 (#4) bars. All vertical and horizontal tie bars 460mm (18") maximum spacing.
- When multiple pipes are used, the distance between pipes shall be S/2 (305mm (1') min.). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.

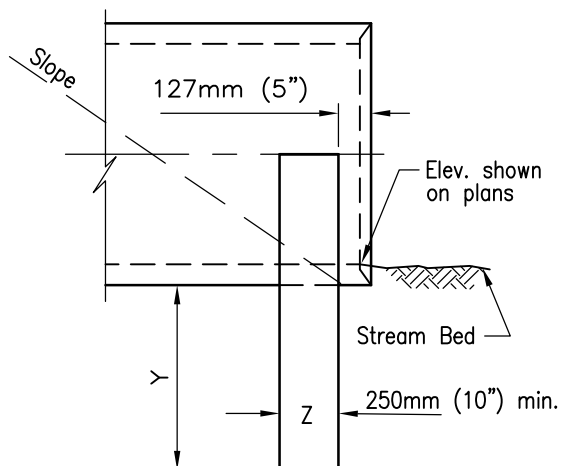
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			<i>T. Stanton</i> 3/10/2003	
Add Metric		T. Stanton	03/03	L TYPE HEADWALLS C.S.P. ARCH PIPE		Chairperson R.C.E. 19246 Date	
Reformatted		T. Stanton	04/06			DRAWING NUMBER D-37	



FACE ELEVATION



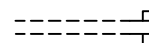
SIDE ELEVATION

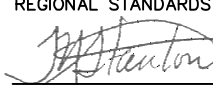
PIPE DIAMETER	X	Y	Z
300mm (12") TO 600mm (24")	310mm (1'-0")	610mm (2'-0")	254mm (10")
525mm (21") TO 900mm (36")	457mm (1'-6")	762mm (2'-6")	305mm (12")
975mm (39") TO 1200mm (48")	610mm (2'-0")	914mm (3'-0")	305mm (12")
1275mm (51") TO 1500mm (60")	762mm (2'-6")	914mm (3'-0")	356mm (14")
1575mm (63") & Larger	914mm (3'-0")	914mm (3'-0")	356mm (14")

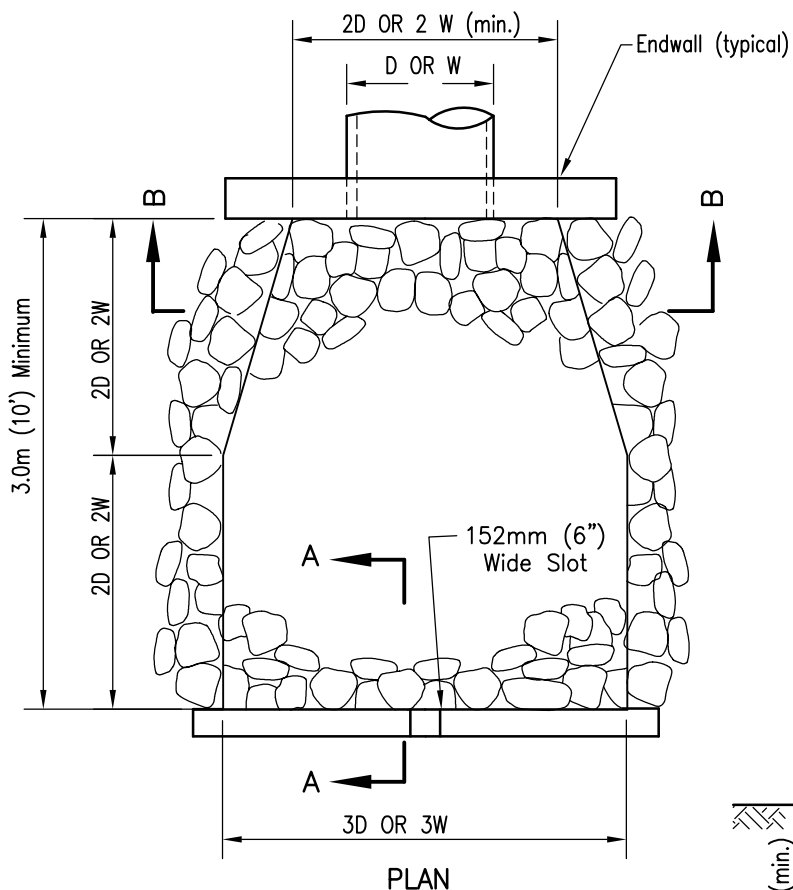
NOTES

1. A curtain wall shall be used in place of a headwall at culvert ends where extension of the culvert is considered imminent or, no fill is retained.
2. Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250) .
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CURTAIN WALL	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER D-38

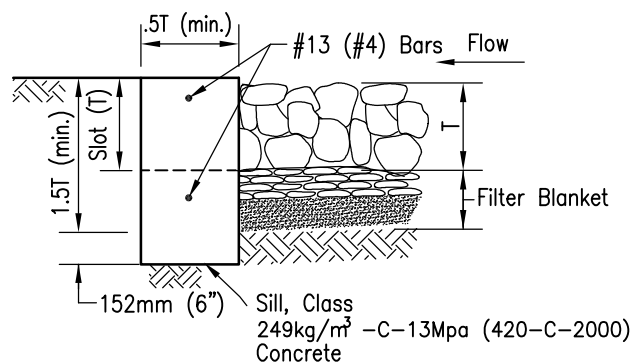


Design Velocity m/sec (ft/sec)*	Rock Classification	T (min)
1.8-3 (6-10)	No. 2 Backing	320mm (1.1ft)
3-3.7 (10-12)	220 kg (1/4 ton)	823mm (2.7ft)
3.7-4.3 (12-14)	450 kg (1/2 ton)	1.1m (3.5ft)
4.3-4.9 (14-16)	900 kg (1 ton)	1.3m (4.4ft)
4.9-5.5 (16-18)	1.8 tonne (2 ton)	1.6m (5.4ft)

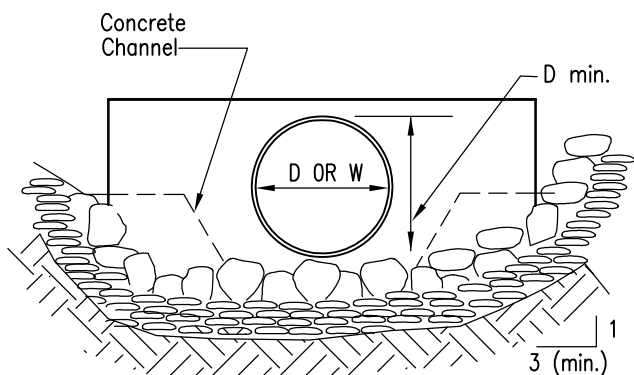
*over 5.5 mps (18 fps) requires special design

D = Pipe Diameter

W = Bottom Width of Channel



SECTION A-A



SECTION B-B

NOTES

- Plans shall specify:
 - Rock Class and thickness (T).
 - Filter material, number of layers and thickness.
- Rip rap shall be either quarry stone or broken concrete (if shown on the plans.) Cobbles are not acceptable.
- Rip rap shall be placed over filter blanket which may be either granular material or filter fabric (woven filter slit film fabric shall not be used).
- See Regional Supplement Amendments for selection of filter blanket.
- Rip rap energy dissipators shall be designated as either Type 1 or Type 2. Type 1 shall be with concrete sill; Type 2 shall be without sill.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Add Rip Rap Table		S. Brady	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

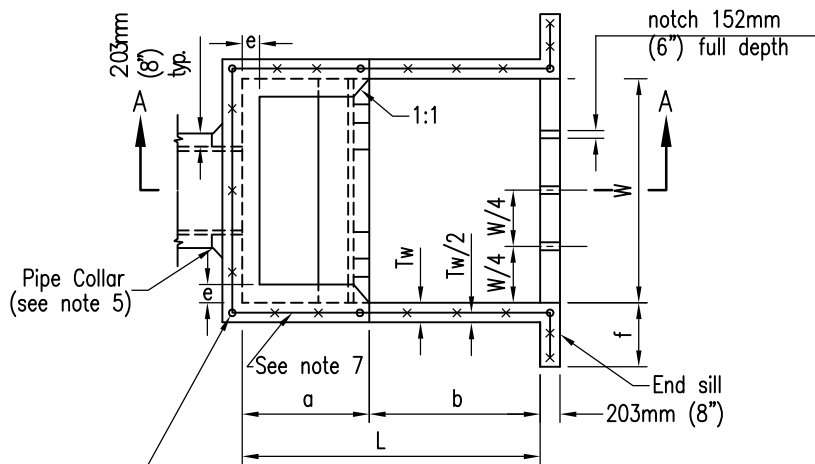
RIP RAP ENERGY DISSIPATER

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 04/27/2006

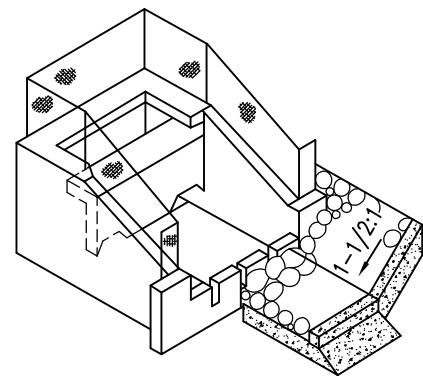
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-40

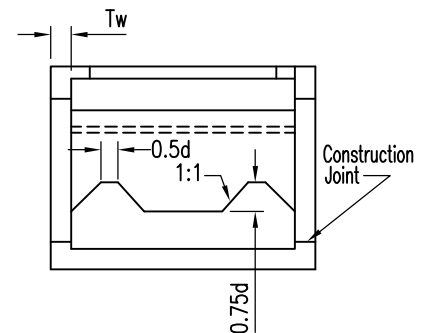


Note: Riprap not shown.
2-#13(#4) rebars horizontal and vertical around fence post (typical).

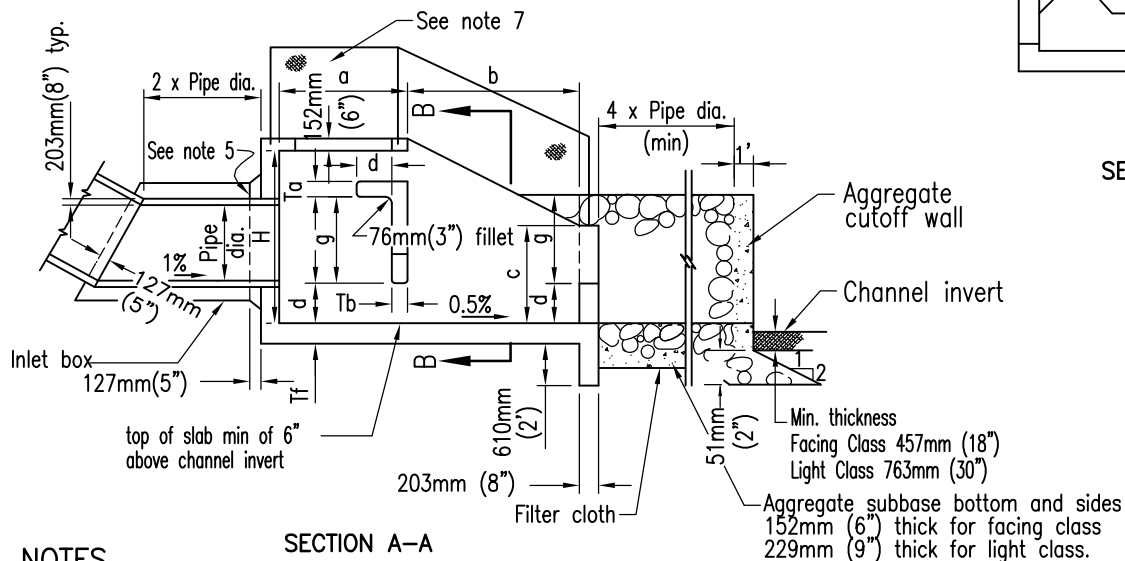
PLAN



PICTORIAL VIEW



SECTION B-B

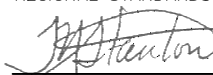


SECTION A-A

NOTES

- Design
Equivalent Fluid Pressure (Earth Loading) = 961 kg/cu m (60 p.c.f.) Maximum Outlet velocity = 10.7m (35')/s
- Concrete shall be 332 kg/M³-C-22Mpa (560-C-3250)
- Reinforcing shall conform to ASTM designation A615 and may be grade 40 or 60. Reinforcing shall be placed with 51mm (2") clear concrete cover unless noted otherwise. Splices shall not be permitted except as indicated on the plans.
- For pipe grades not exceeding 20%, inlet box may be omitted.
- If inlet box is omitted, construct pipe collar as shown.
- Unless noted otherwise, all reinforcing bar bends shall be fabricated with standard hooks.
- Five foot high chain link fencing, embed post 18" deep in walls and encase with class B mortar.
- In Sandy and Silty soil:
 - Riprap and aggregate base cutoff wall required at the end of rock apron.
 - Filter cloth (Polyfilter X or equivalent) shall be installed on native soil base, minimum of 305mm (1 ft.) overlaps at joints.
- Rip rap and subbase classification shall be as shown on plans.

FOR DIMENSIONS, SEE D-41B.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE ENERGY DISSIPATER	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
					DRAWING NUMBER D-41A

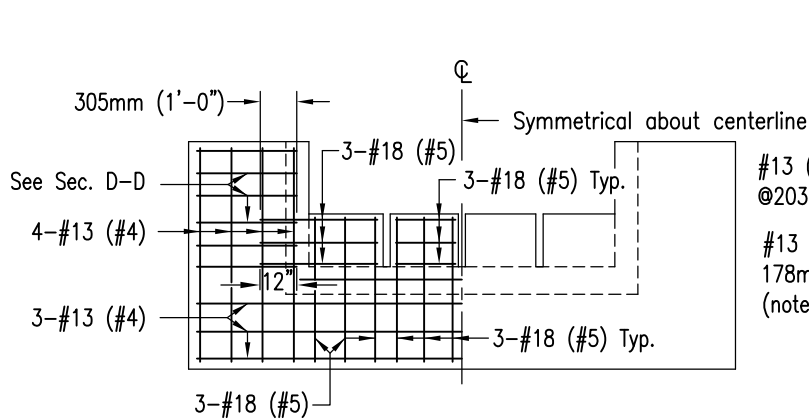
METRIC DIMENSIONS TABLE, FOR STRUCTURE DETAILS SEE D-41A.

Pipe Dia	457mm	610mm	9.14m	11.0m	12.80m	14.63m	16.46m	18.29m	21.95m
Area (sq. m)	.164	.292	.456	.657	.893	1.17	1.48	1.82	2.63
Max. Q (cu m/s)	.594	1.08	1.67	2.41	3.26	4.28	5.41	6.68	9.60
W	1.66m	1.80m	2.13m	2.82m	3.20m	3.58m	3.96	4.34	5.03m
H	1.30m	1.60m	1.90m	2.21m	2.44m	2.74m	2.87m	3.28m	3.73m
L	2.24m	2.74m	3.25m	3.76m	4.27m	4.78m	5.28m	5.79m	6.71m
a	991mm	1.19m	1.40m	1.60m	1.83m	1.80m	2.24m	2.44m	2.82m
b	1.24m	1.55m	1.85m	2.16m	2.44m	2.72m	3.05m	3.35m	3.87m
c	711mm	864mm	1.02m	1.17m	1.35m	1.50m	1.65m	1.80m	2.11m
d	279mm	356mm	406mm	482mm	533mm	610mm	660mm	737mm	838mm
e	152mm	152mm	203mm	203mm	254mm	254mm	305mm	305mm	381mm
f	457mm	610mm	762mm	914mm	914mm	914mm	914mm	914mm	914mm
g	635mm	762mm	914mm	1.07m	1.19m	1.35m	1.50m	1.63m	1.88m
Tf	203mm			254mm		305mm			
Tb	178mm			241mm		267mm			
Tw	178mm			241mm		267mm			
Ta	178mm			203mm					

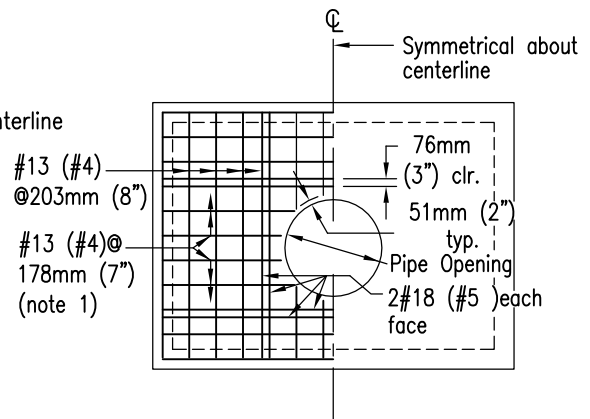
US DIMENSIONS TABLE, FOR STRUCTURE DETAILS SEE D-41A.

Pipe Dia (in)	18	24	30	36	42	48	54	60	72
Area (sq.ft.)	1.77	3.14	4.91	7.07	9.62	12.57	15.90	19.63	28.27
Max. Q (cfs)	21	38	59	85	115	151	191	236	339
W	5'-6"	6'-9"	8'-0"	9'-3"	10'-6"	11'-9"	13'-0"	14'-3"	16'-6"
H	4'-3"	5'-3"	6'-3"	7'-3"	8'-0"	9'-0"	9'-9"	10'-9"	12'-3"
L	7'-4"	9'-0"	10'-8"	12'-4"	14'-0"	15'-8"	17'-4"	19'-0"	22'-0"
a	3'-3"	3'-11"	4'-7"	5'-3"	6'-0"	6'-9"	7'-4"	8'-0"	9'-3"
b	4'-1"	5'-1"	6'-1"	7'-1"	8'-0"	8'-11"	10'-0"	11'-0"	12'-9"
c	2'-4"	2'-10"	3'-4"	3'-10"	4'-5"	4'-11"	5'-5"	5'-11"	6'-11"
d	0'-11"	1'-2"	1'-4"	1'-7"	1'-9"	2'-0"	2'-2"	2'-5"	2'-9"
e	0'-6"	0'-6"	0'-8"	0'-8"	0'-10"	0'-10"	1'-0"	1'-0"	1'-3"
f	1'-6"	2'-0"	2'-6"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"
g	2'-1"	2'-6"	3'-0"	3'-6"	3'-11"	4'-5"	4'-11"	5'-4"	6'-2"
Tf	8"		10"			12"			
Tb	7"		9 1/2"			10 1/2"			
Tw	7"		9 1/2"			10 1/2"			
Ta	7"		8"						

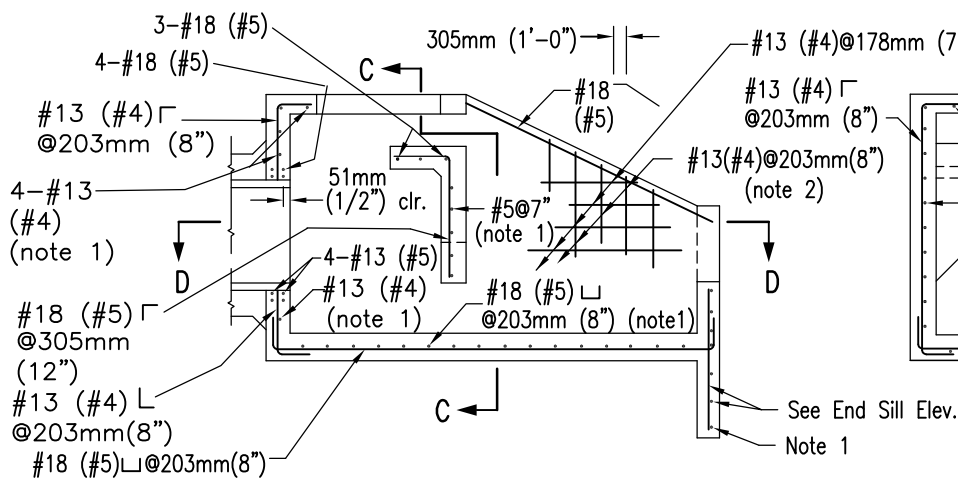
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING CONCRETE ENERGY DISSIPATER	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 3/01/2003 Chairperson R.C.E. 19246 Date DRAWING NUMBER D-41B
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		



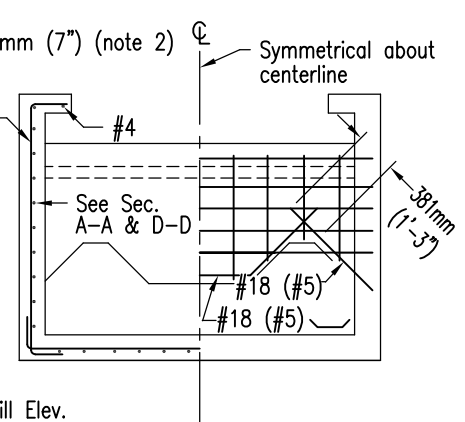
END SILL ELEVATION



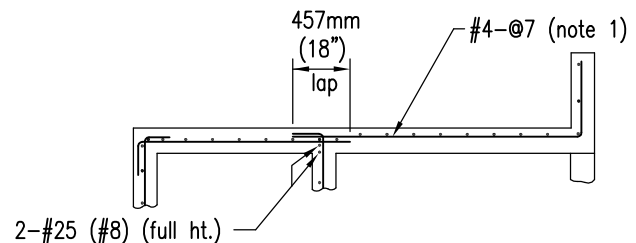
HEADWALL ELEVATION



SECTION A-A



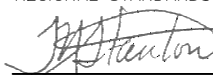
SECTION C-C

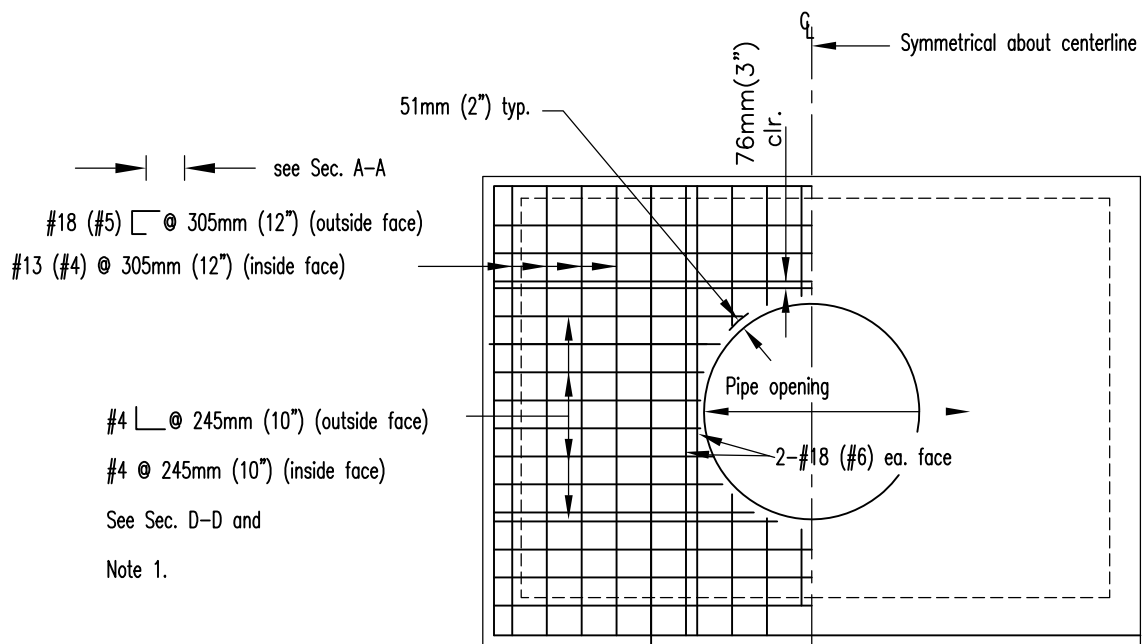


SECTION D-D

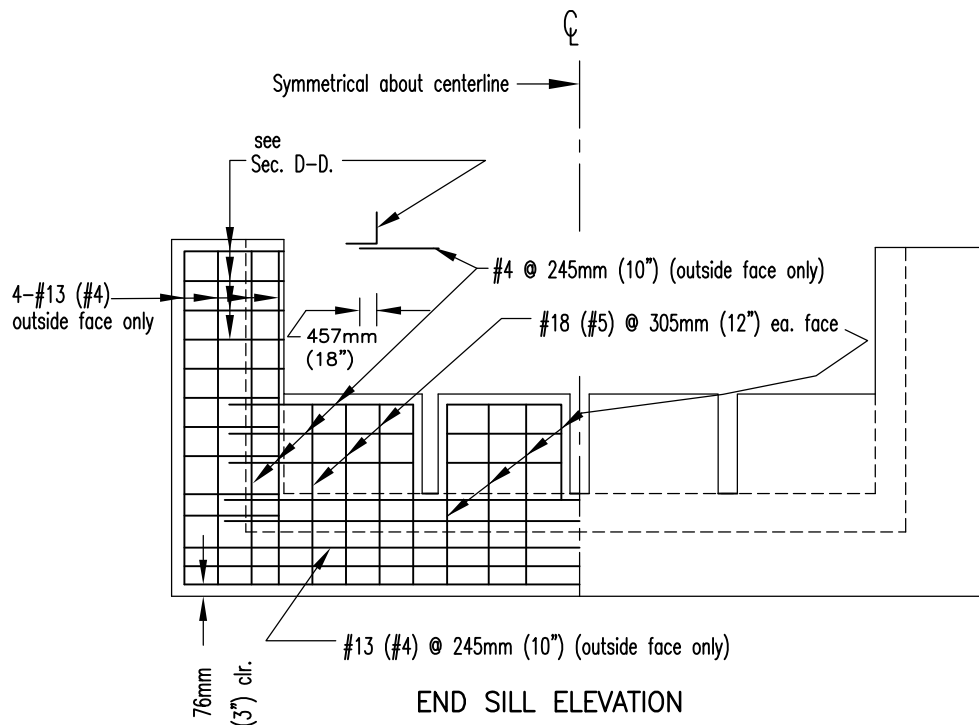
NOTES

1. Place reinforcing, as noted, at center wall (or slab).
2. Match location of reinforcing with that in headwall, end sill and foundation slab.
3. All reinforcing shall be placed with 51mm (2") concrete cover, unless noted otherwise.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 450mm (18") TO 750mm (30") DIAMETER PIPE		 3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
Reformatted		T. Stanton	04/06			
Edited		T. Stanton	02/09			
						DRAWING NUMBER D-42

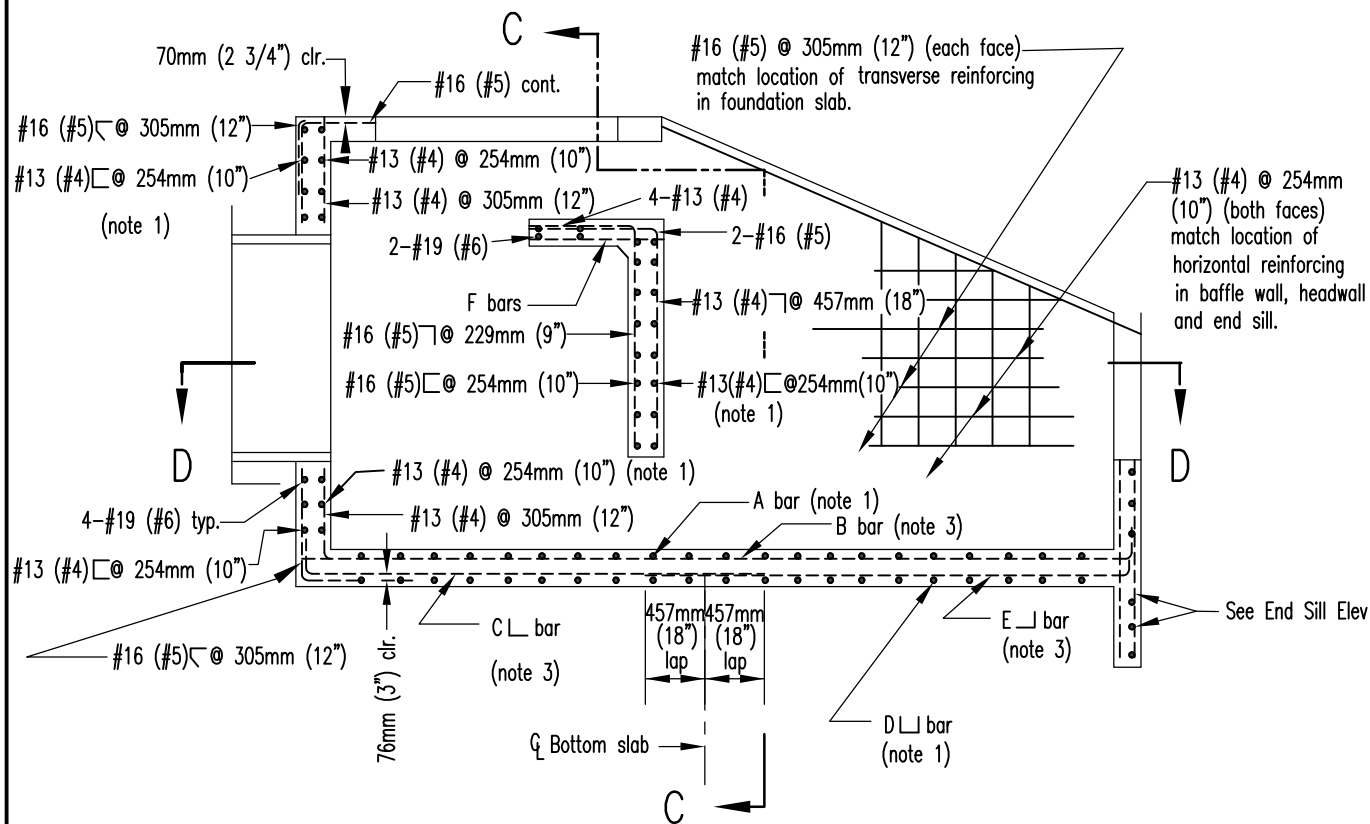


HEADWALL ELEVATION

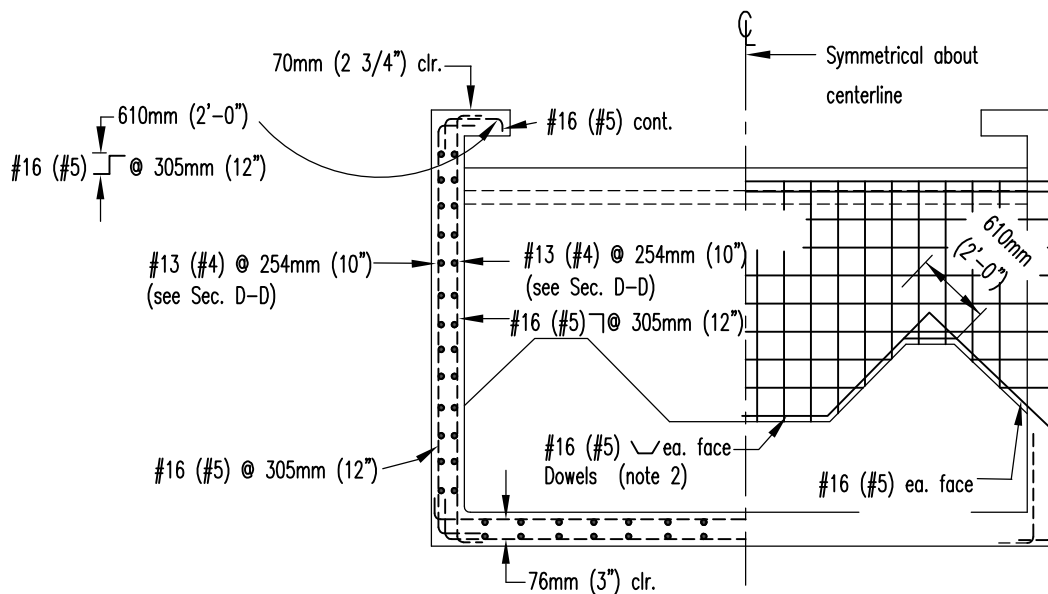


END SILL ELEVATION

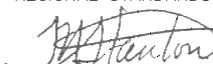
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 900mm (36") TO 1800mm (72") DIAMETER PIPE		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER	D-43A

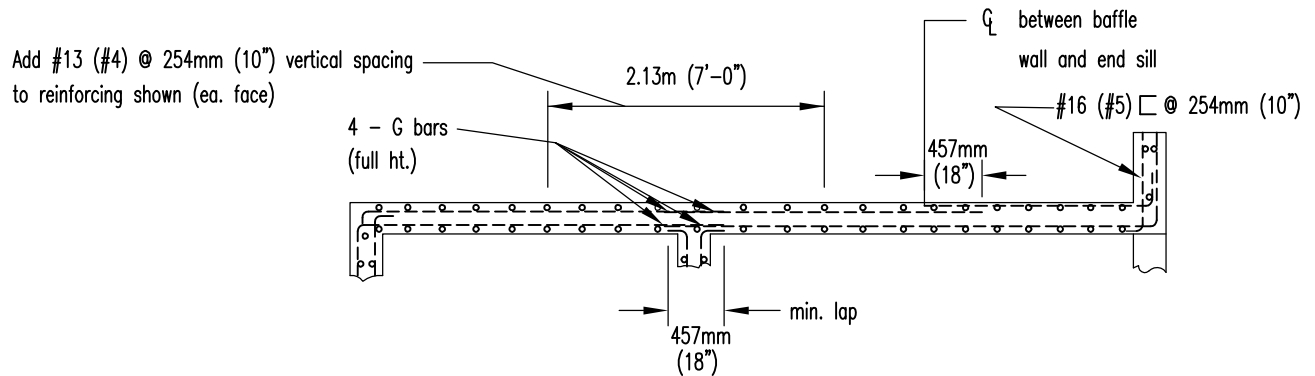


SECTION A-A



SECTION D-D

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 900mm (36") TO 1800mm (72") DIAMETER PIPE		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER	D-43B

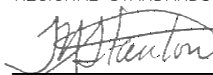


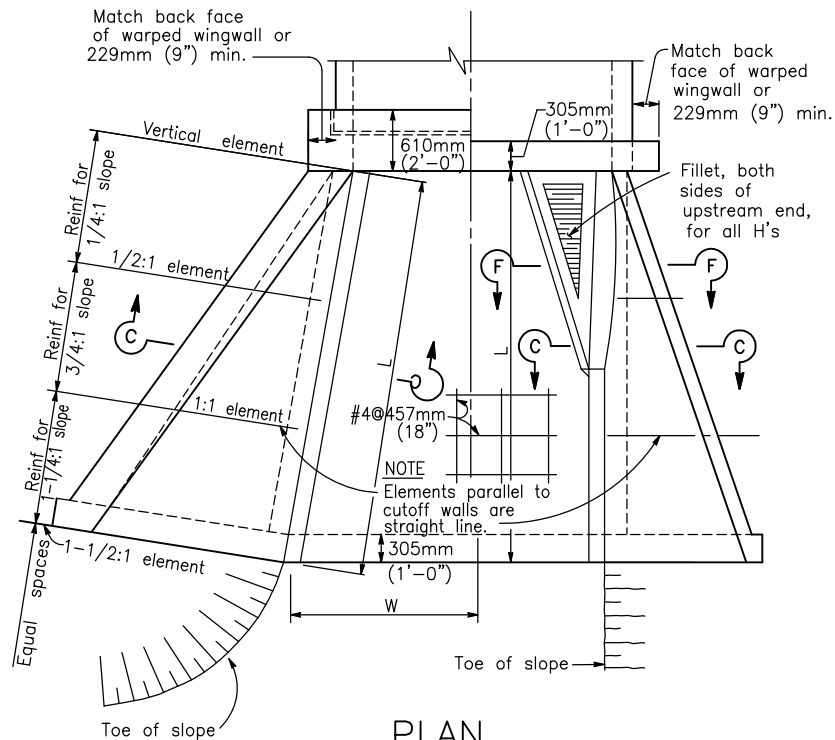
SECTION D-D

Pipe dia. (in.)	914mm (36")	1.07m (42")	1.22m (48")	1.37m (54")	1.52m (60")	1.83m (72")
A bar	#16 (# 5) @ 305mm (12")		#19 (#6) @ 305mm (12")		#22 (#7) @ 305mm (12")	
B bar	#16 (# 5) @ 305mm (12")		#19 (#6) @ 305mm (12")			
C bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")			
D bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")		#19 (#6) @ 305mm (12")	
E bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")			
F bar	#13 (# 4) @ 229mm (9")		#16 (#5) @ 229mm (9")			#19 (#6) @ 229mm (9")
G bar	#22 (# 7)			#36 (# 11)		

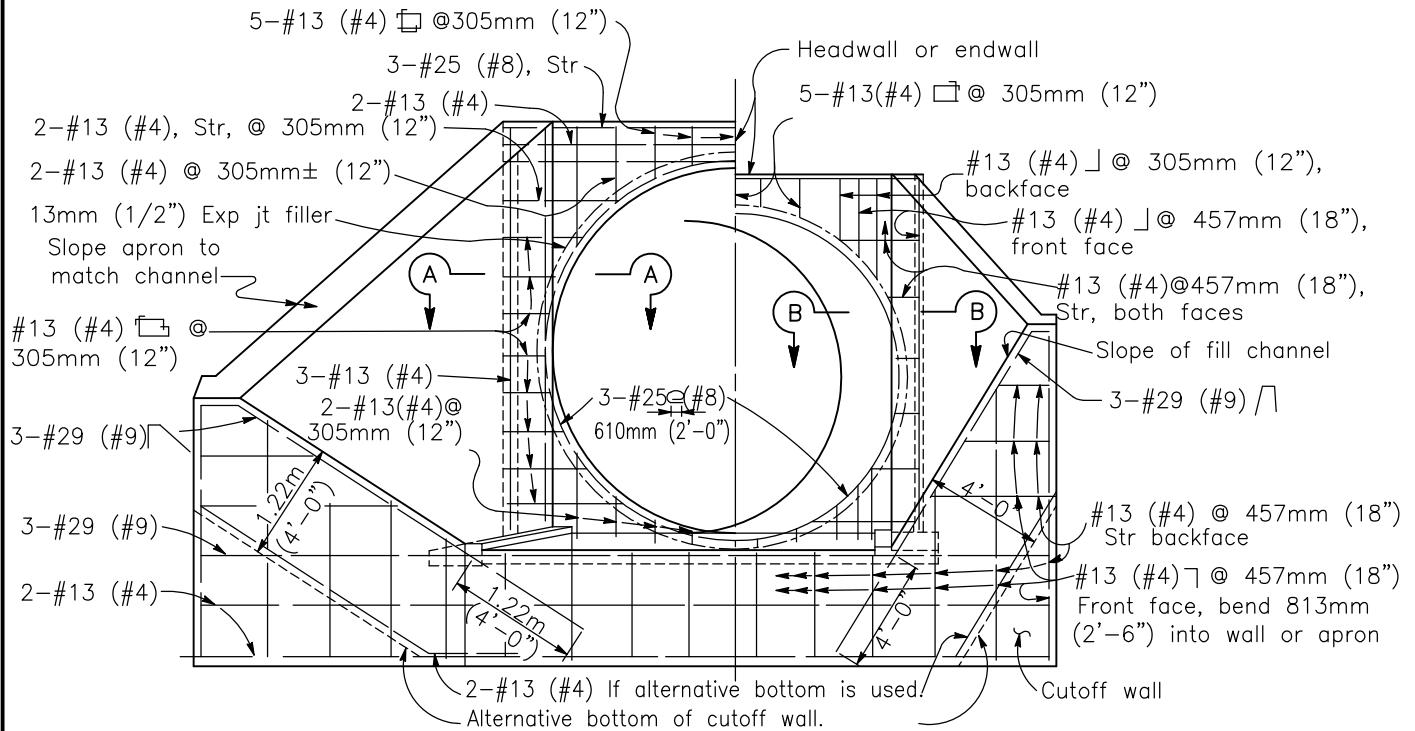
NOTES

1. Match location of sidewall reinforcing.
2. Dowels having same size and spacing as wall reinforcing may be used in lieu of continuous bars at contractors option.
3. Match location of headwall or end sill reinforcing.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 900mm (36") TO 1800mm (72") DIAMETER PIPE		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER D-43C	



PLAN



TYPICAL FOR MAXIMUM H > 3.05m (10')

TYPICAL FOR MAXIMUM H < 3.05m (10')

END ELEVATION

If at upstream end, fillet is not shown

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

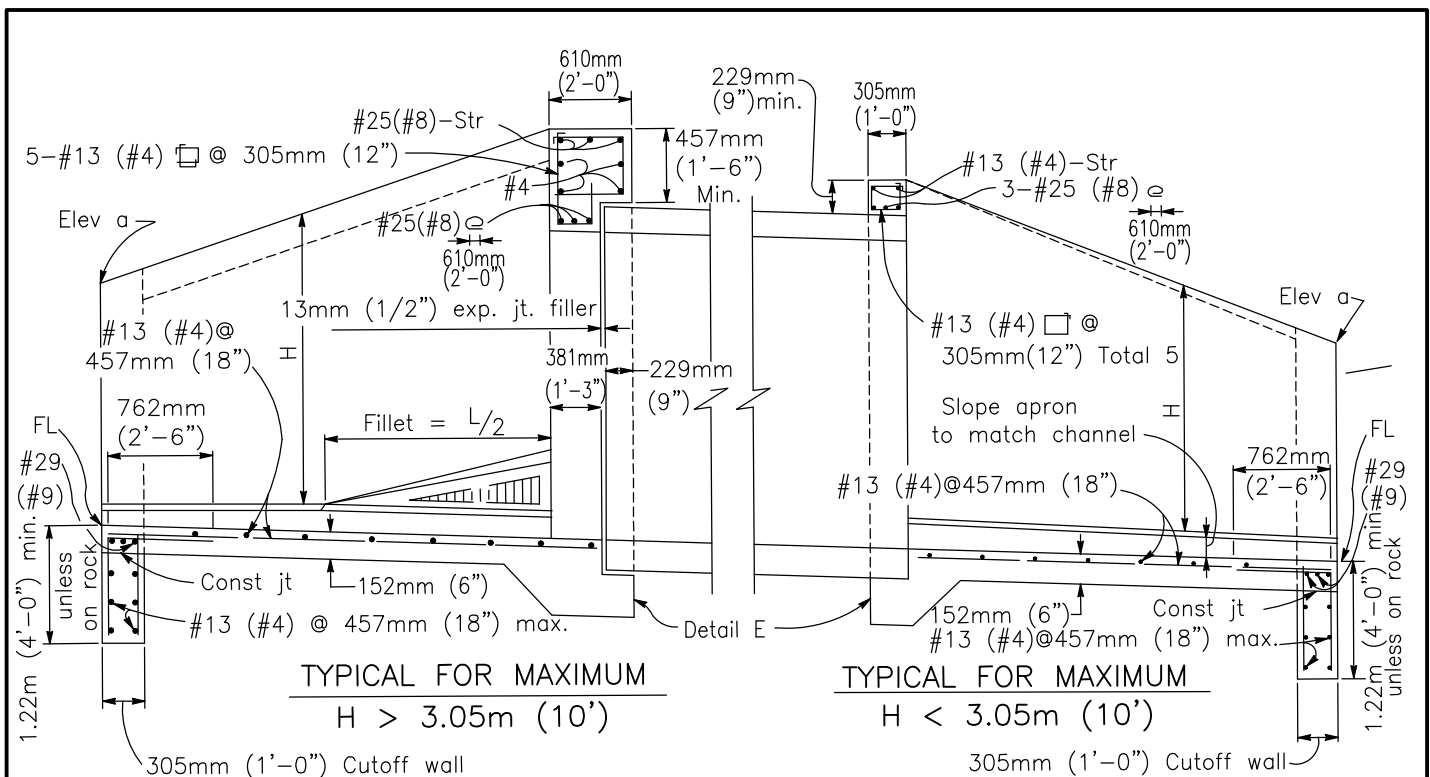
PIPE CULVERT - HEADWALLS,
ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

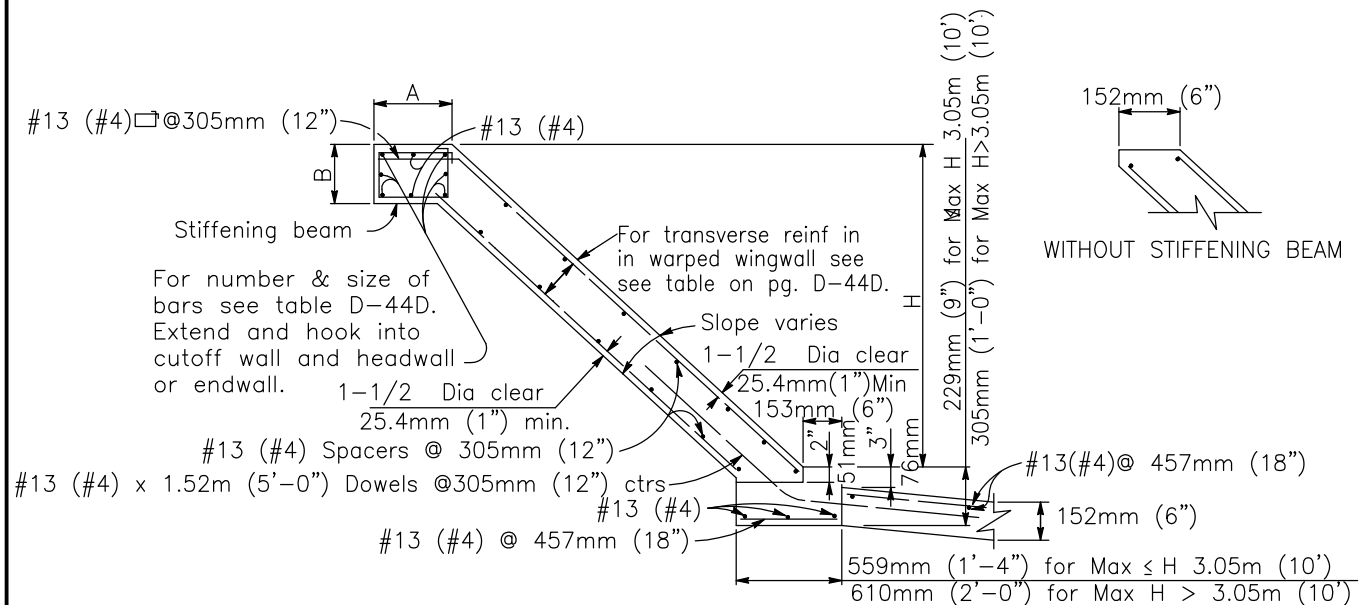
DRAWING
NUMBER D-44A



PART LONGITUDINAL SECTION

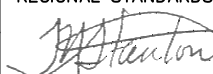
NOTE

RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 483mm(19")± spacing. Size and length provided by manufacturer.



SECTION C-C

Where abrasion is anticipated, increase apron thickness to 178mm (7") minimum to provide 51mm (2") minimum reinforcement coverage.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		 3/10/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
Reformatted		T. Stanton	04/06		
				PIPE CULVERT – HEADWALLS, ENDWALLS & WARPED WINGWALLS	DRAWING NUMBER
					D-44B

152mm (6"), @ Headwall
and @ L/2

Slope varies, 1:1
@ headwall
to flat @ L/2

Fillet, curved to
match pipe

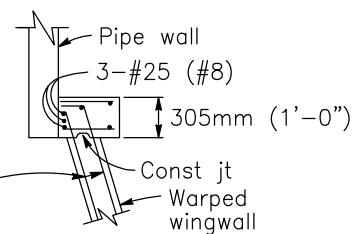
Warped
wingwall

#13 (#4), 64mm
(2-1/2") cl.

#13 (#4) Dowels L @ 305mm (12")
Length varies 152mm (6")
to match fillet transition, 51mm (2") cl.
102mm(4") x 102mm(4")
W1.4 x W1.4
Welded wire fabric

Apron

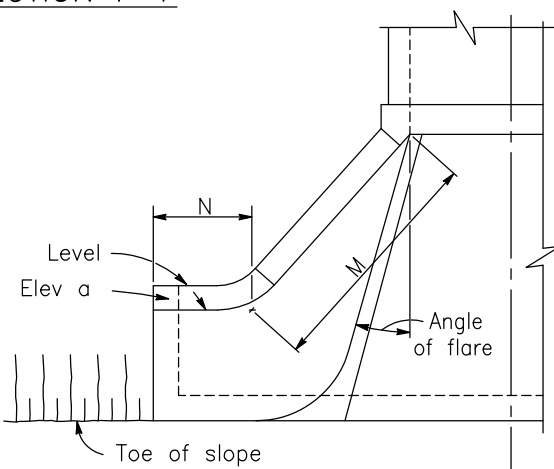
SECTION F-F



Extend wall spacers 51mm± (2") into
headwall or endwall. Rotate if necessary.

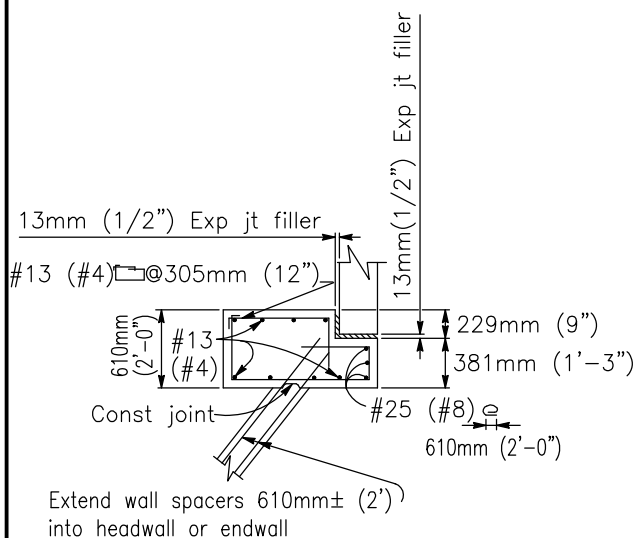
(Near spring-line, eliminate face
extension and hook rear extension
outward, if possible.)

SECTION B-B



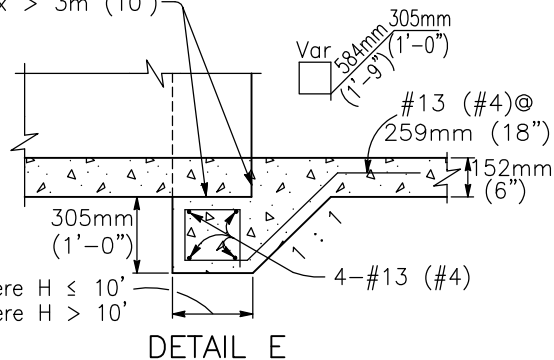
ALTERNATIVE WARPED WINGWALL

Use where additional protection to toe of embankment
is required. If at upstream end, fillet is not shown.



SECTION A-A

13mm (1/2") Exp jt filler,
where H max > 3m (10')



Dim is 1'-0" where H ≤ 10'
Dim is 2'-0" where H > 10'

DETAIL E

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT – HEADWALLS,
ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-44C

WARPED WINGWALLS – US (All measurements in Feet and/or Inches unless otherwise noted)																														
WALL DIMENSIONS AND REINFORCING										STIFFENING BEAM DIMENSIONS AND REINFORCING																				
Element Slope	H	8' or less	10'	12'	14'	16'	18'	20'	H max	12'	14'	16'	18'	20'	25'	30'	35'	40'	or more											
1/4:1	Front face reinf	#4@12	#4@ 7	#5@ 7	#5@ 5	#6@ 6	#7@ 7	#7@ 6	6'	No beam. Place 2-#6 in each face along top of wall.																				
	Rear face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12																						
3/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@10	#4@ 8	#4@ 6	8'	A = 1'-0"																				
	Rear face reinf	#4@12	#4@12	#4@12	#4@10	#4@ 7	#4@ 6	#5@ 8																						
1-1/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	10'	B = 9"																				
	Rear face reinf	#4@12	#4@12	#4@12	#4@10	#4@ 7	#4@ 6	#5@ 8																						
	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12												12'	A = 1'-6"									
	Rear face reinf	#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6																						
D at Cutoff Wall		6"	6"	6"	7-1/2"	8"	9-1/2"	11"	14'	Total 6-#6 B = 1'-0"																				
		#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6																						
D at Culvert		6"	6"	6"	7-1/2"	8"	9-1/2"	11"	16'	Total 6-#7 B = 1'-0"																				
		#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6																						
D at Culvert		6"	6"	6"	8"	9-1/2"	11"	1'-1"	18'	Total 6-#8 B = 1'-6"																				
		#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6																						
D at Culvert		6"	6"	6"	8"	9-1/2"	11"	1'-1"	20'	Total 8-#9																				
		#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6																						

WARPED WINGWALLS – METRIC (All measurements in Millimeters unless otherwise noted)																						
WALL DIMENSIONS AND REINFORCING										STIFFENING BEAM DIMENSIONS AND REINFORCING												
Element Slope	H	2.44m or less	3.05m	3.66m	4.27	4.88m	5.59m	6.10m	H / L max	3.66m	3.27m	4.88m	5.49m	6.10m	7.62m	9.14m	10.7m	12m or more				
1 / 4:1	Front face reinf	#13@305	#13@178	#16@178	#16@127	#19@152	#22@178	#22@152	1.83m	No beam. Place 2-#13 in each face along top of wall.												
	Rear face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	2.43m										A = 305			
3 / 4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@254	#13@203	#13@152	3.05m										B = 229	A = 457		
	Rear face reinf	#13@305	#13@305	#13@305	#13@254	#13@178	#13@152	#16@203	3.66m										Total 6-#19	B = 305	A = 559	
1 – 1 / 4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	4.27m										Total 6-#22	B = 305	A = 610	
	Rear face reinf	#13@203	#13@203	#13@127	#16@152	#19@178	#19@152	#22@152	4.88m										Total 6-#25	B = 457		
D at Cutoff Wall		152	152	152	191	203	241	279mm	5.49m										Total 8-#29			
D at Culvert		152	152	152	203	241	279	330	6.10m													

NOTES:

Walls designed for 610mm (2') surcharge; earth density = 55kg / 0.029 cu m (120 # / cu. ft.); equivalent fluid pressure = 16.4kg / cu m (36 #/cu. ft.) Vary D of warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 3.65m (12'). Dimensions L, W, H, M.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

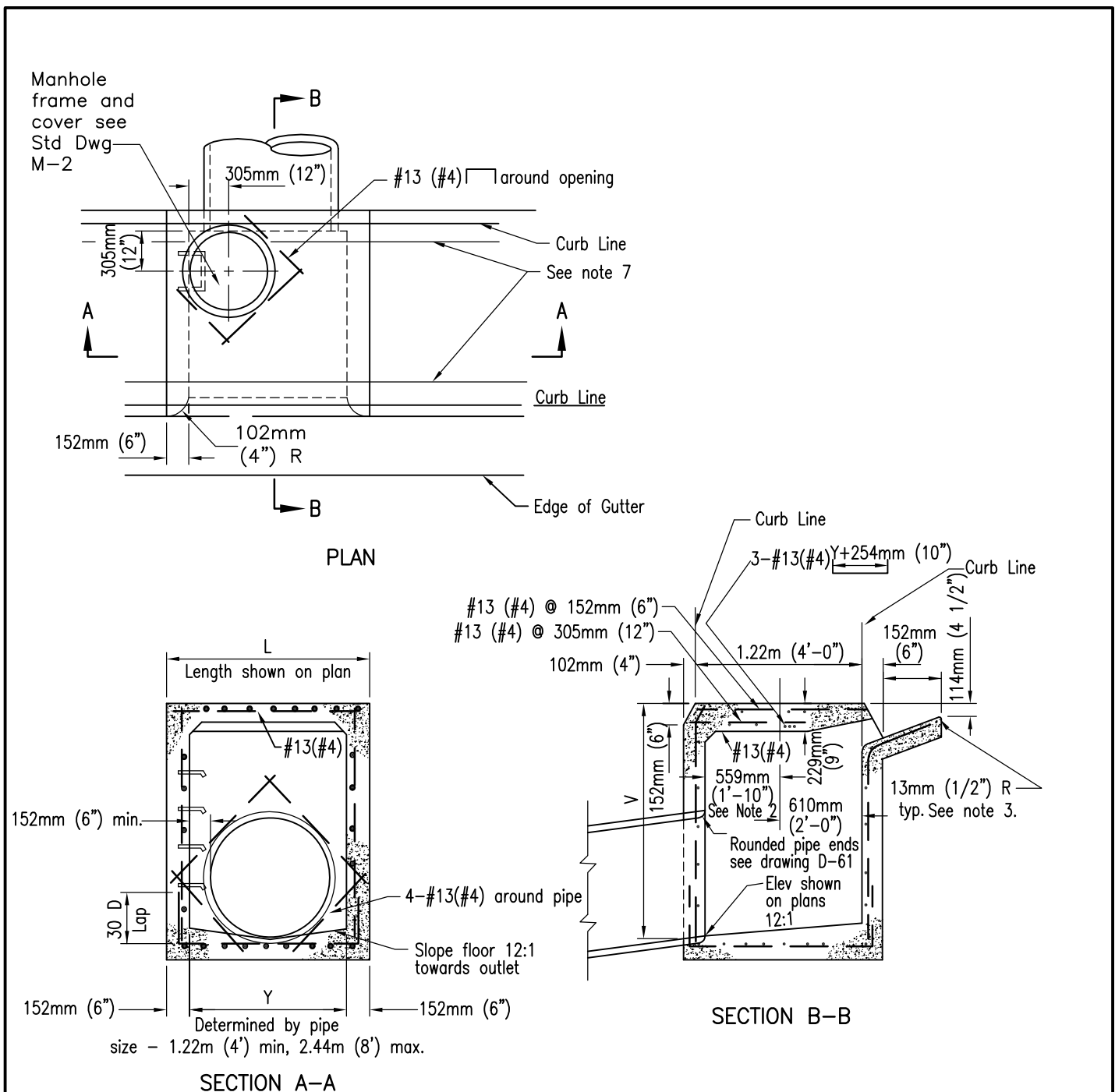
PIPE CULVERT – HEADWALLS,
ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

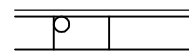
DRAWING
NUMBER D-44D



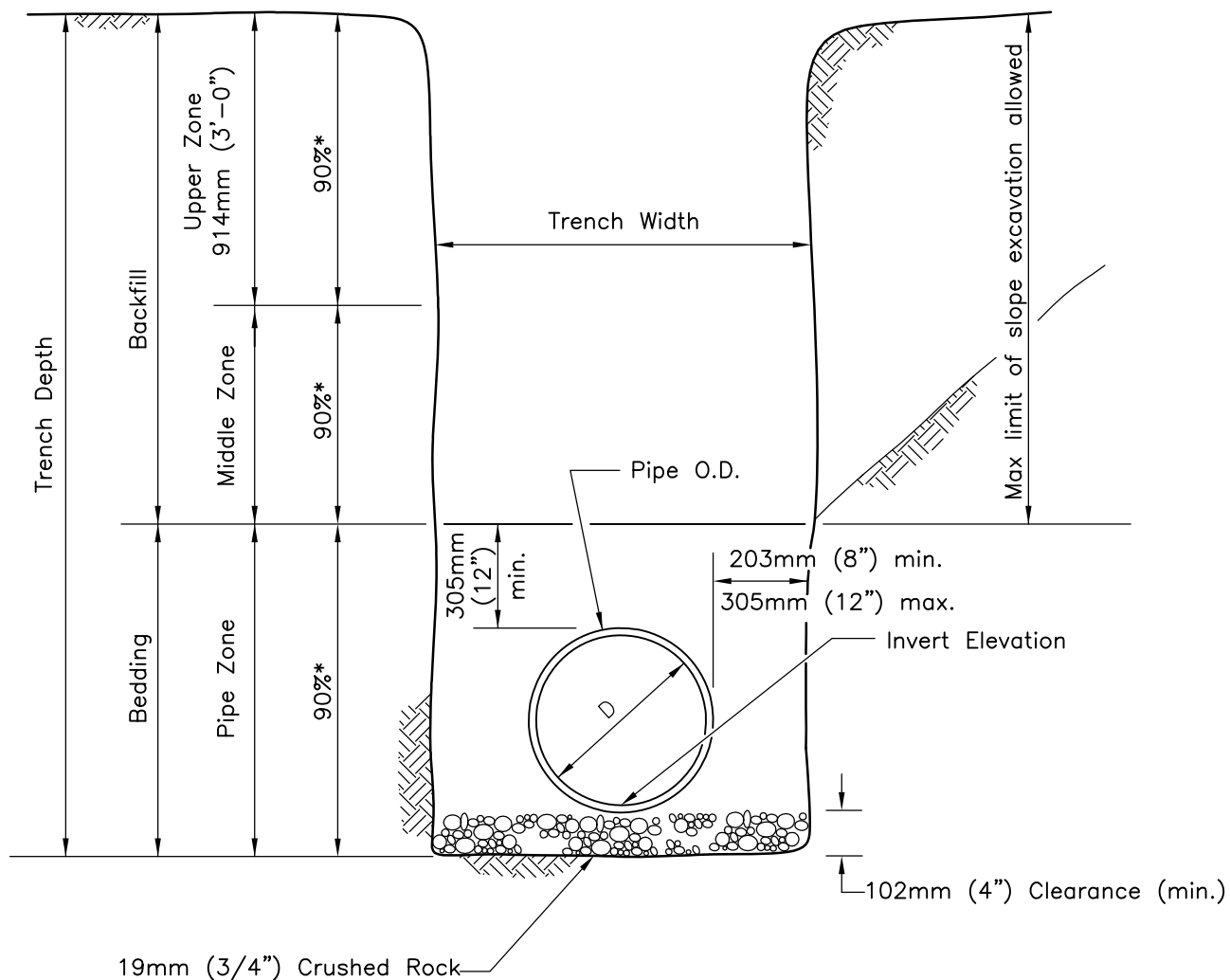
NOTES

1. See Standard Drawings D-11 & D-12 for additional notes and details.
2. Dimension shown becomes 610mm (2'-0") when opening on both sides. Adjust manhole as required.
3. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2")
4. When V exceeds 1.22m (4') steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 6.35mm (1/4") tooled groove in top slab in line with back of adjacent curb.
8. Maintain 38mm (1 1/2") clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS



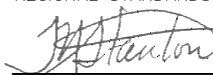
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		H. Hecht	10/82		
Add Metric		T. Stanton	03/03		
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		
				MEDIAN CURB INLET – TYPE J	 3/10/2003 Chairperson R.C.E. 19246 Date

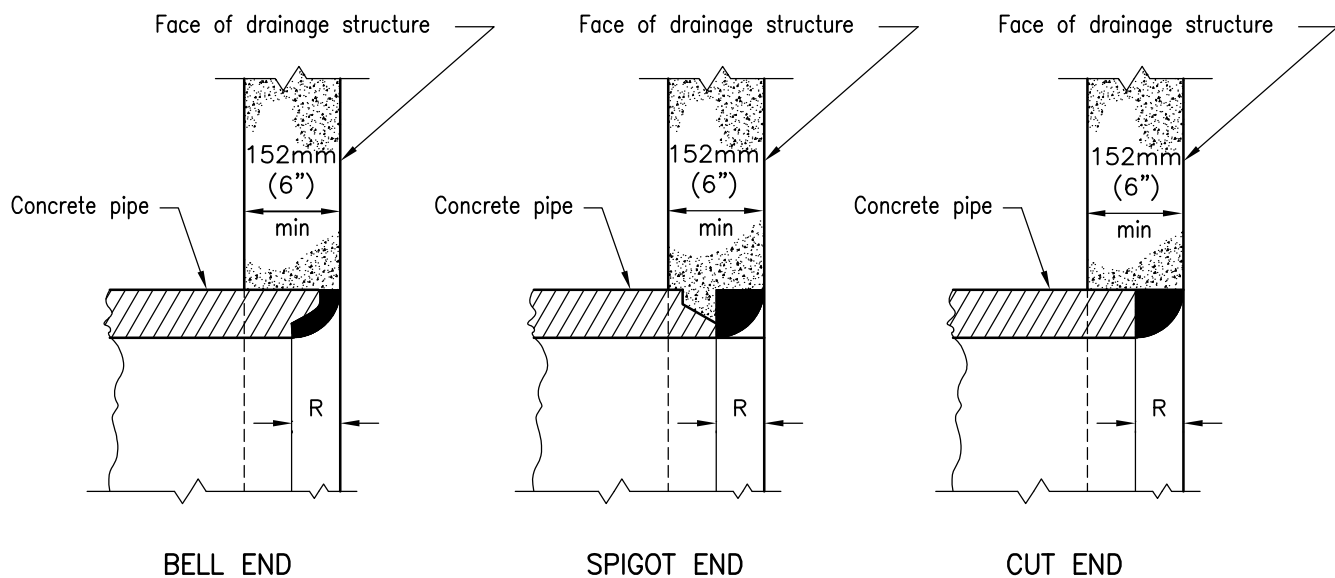


SECTION

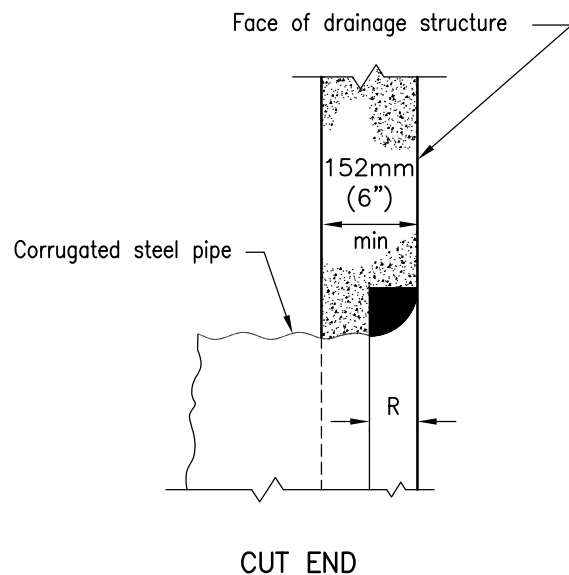
NOTES:

1. For trenching on improved streets see Standard Drawing G-24 or G-25 for resurfacing details.
2. (*) indicates minimum relative compaction.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	2/95		
Add Metric		T. Stanton	03/03	PIPE BEDDING AND TRENCH BACKFILL FOR STORM DRAINS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER D-60



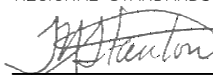
R = Thickness of pipe

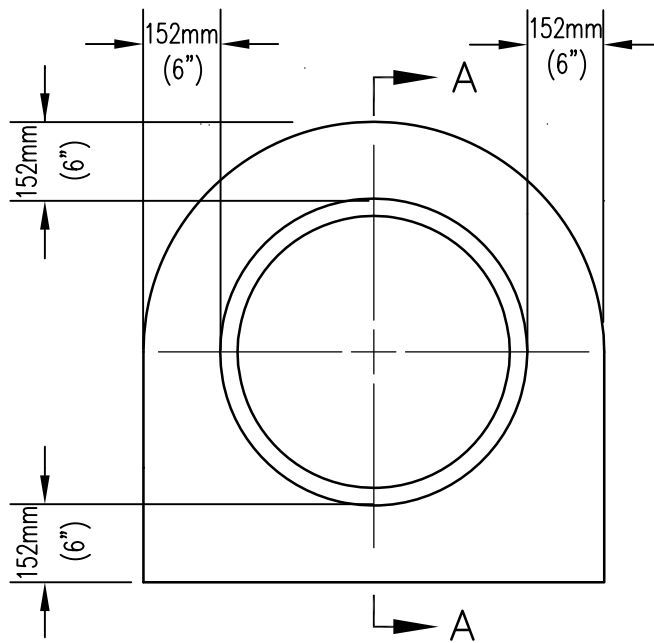


R = $\frac{\text{Inside diameter of pipe}}{10}$

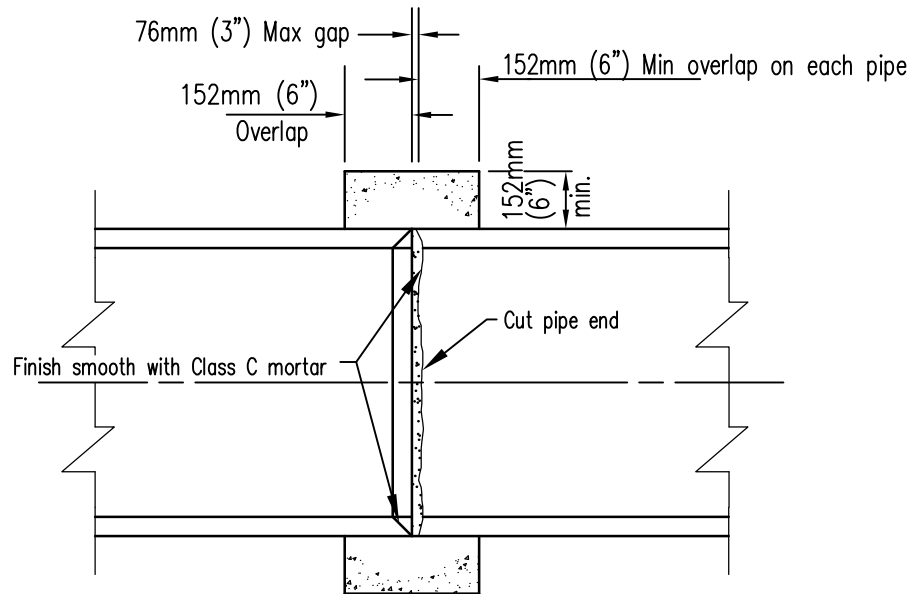
NOTE

The rounded areas may be built up of cement mortar or poured in place with the drainage structure.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	ROUNDED PIPE ENDS IN DRAINAGE STRUCTURES	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-61



ELEVATION

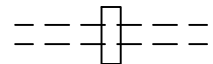


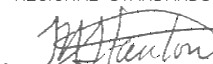
SECTION A-A

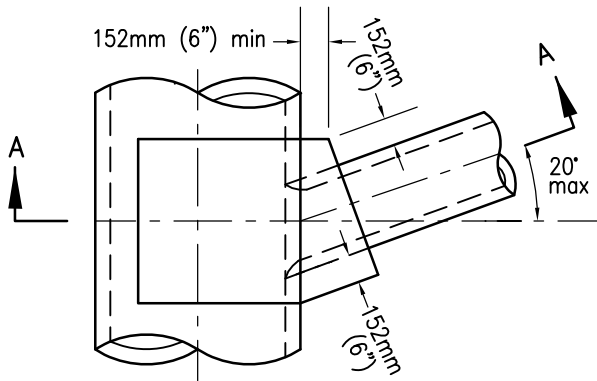
NOTES

1. Pipe collar does not have to be finished if covered.
2. Concrete shall be 332 kg/M^3 —C—22Mpa (560—C—3250)
3. Where gap exceeds 76mm (3") but is not more than 152mm (6") an internal form shall be used.

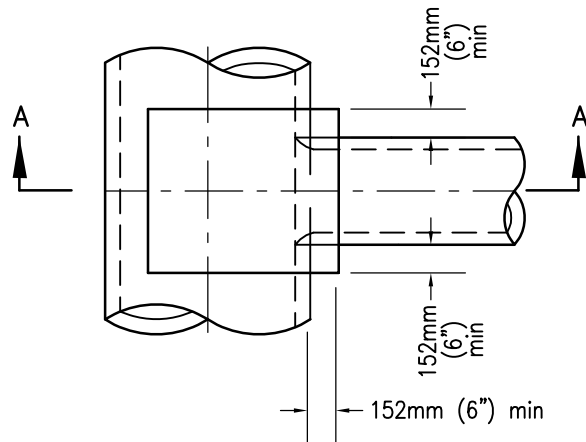
LEGEND ON PLANS



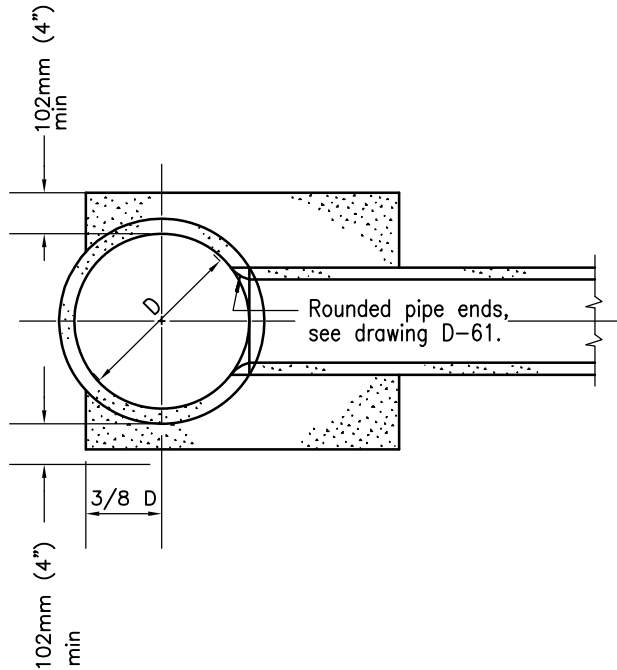
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	PIPE COLLAR	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-62



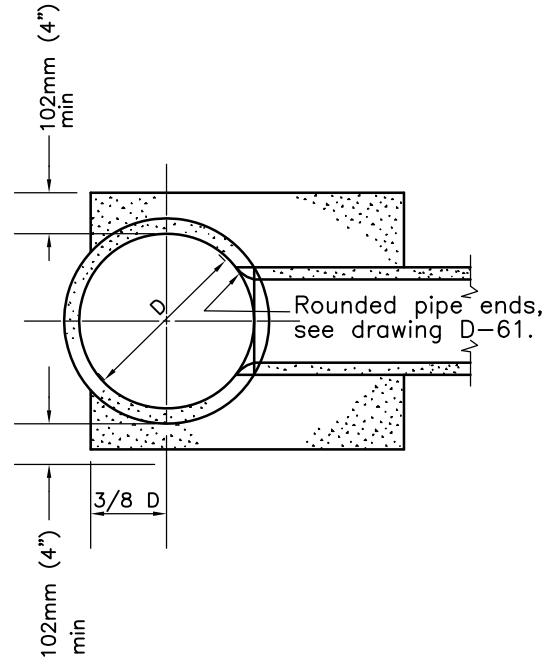
PLAN
SKEWED CONNECTION



PLAN



SECTION A-A

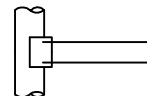


SECTION B-B

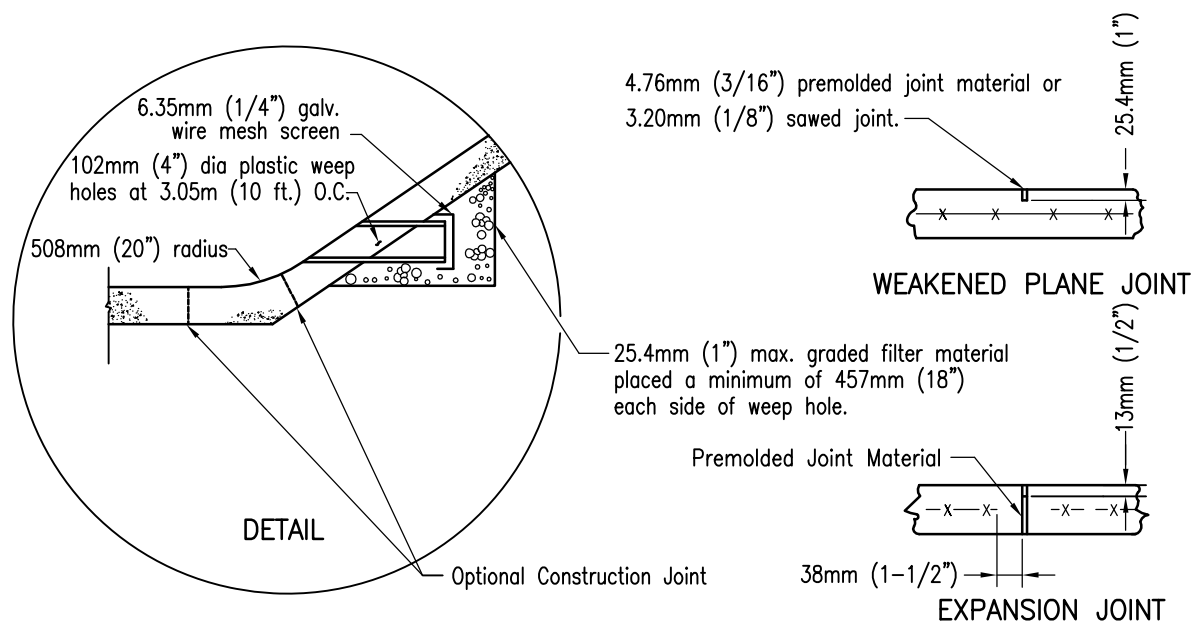
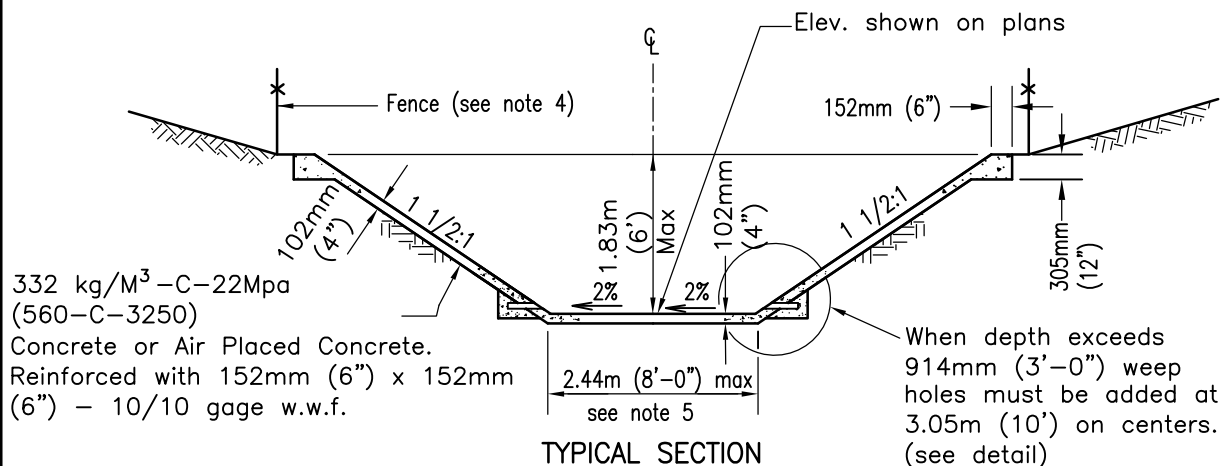
NOTES

1. The end of connecting pipe shall not project into the waterway of the larger pipe.
2. The larger pipe shall not be less than 610mm (24") ID.
3. The smaller pipe shall not be more than 2/3 the size of the larger pipe.
4. Concrete shall be 279kg/M³ -C-14-Mpa (470-C-2000).

LEGEND ON PLANS



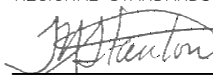
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE LUG	<i>T. Stanton</i> 3/10/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D-63

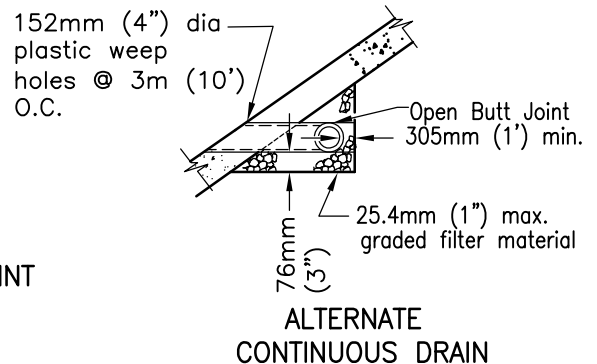
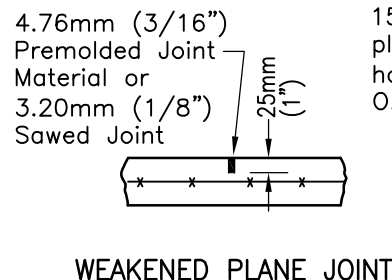
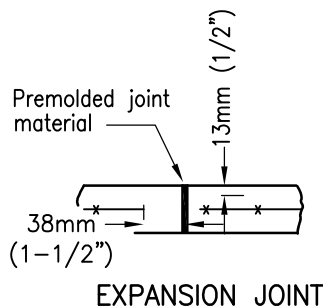
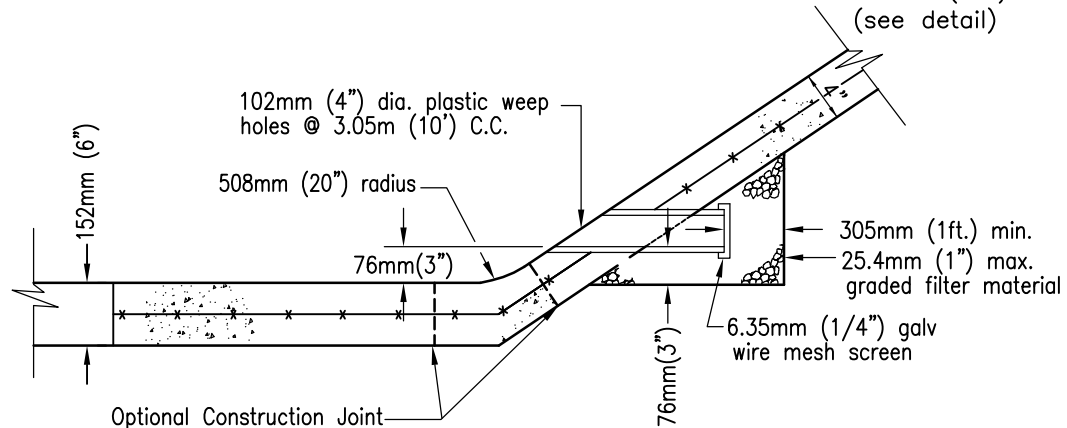
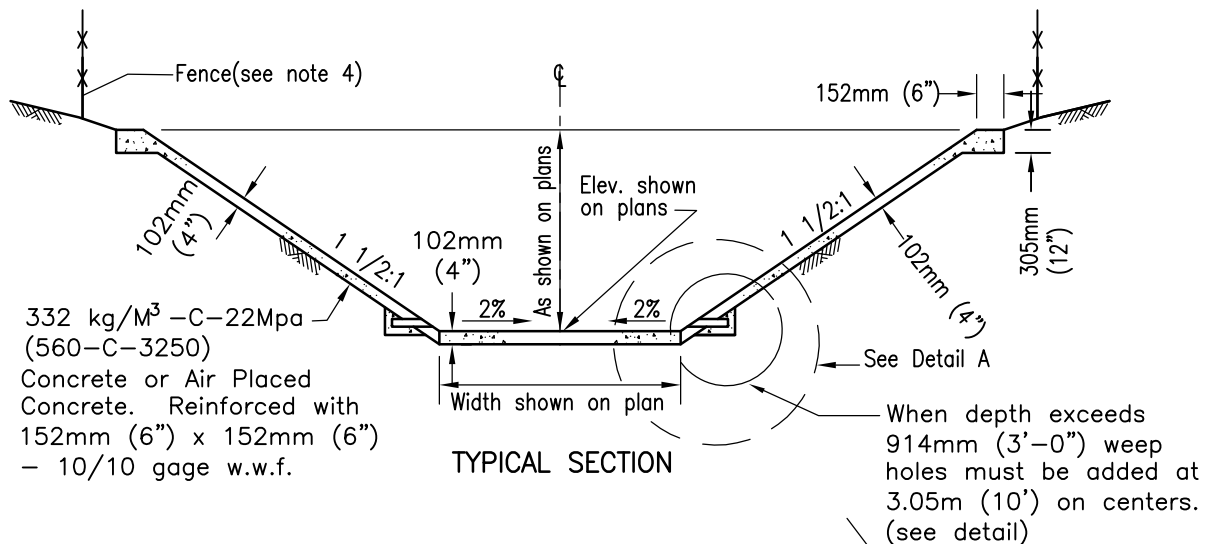


NOTES

1. A.C. or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 3.66m (12') to 4.57m (15'). Expansion joints shall be placed at all changes of section and at ends of curves.
3. Cutoff walls shall be constructed at each end of the channel along the full width of section. See Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. For bottom widths greater than 2.44m (8 feet) see Standard Drawing D-71.
6. Reinforcement shown is minimum.

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	MINOR DRAINAGE CHANNEL	 3/10/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER D-70

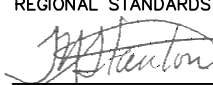


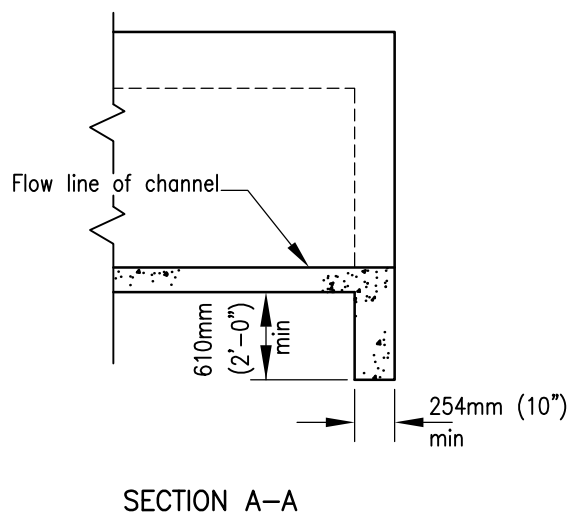
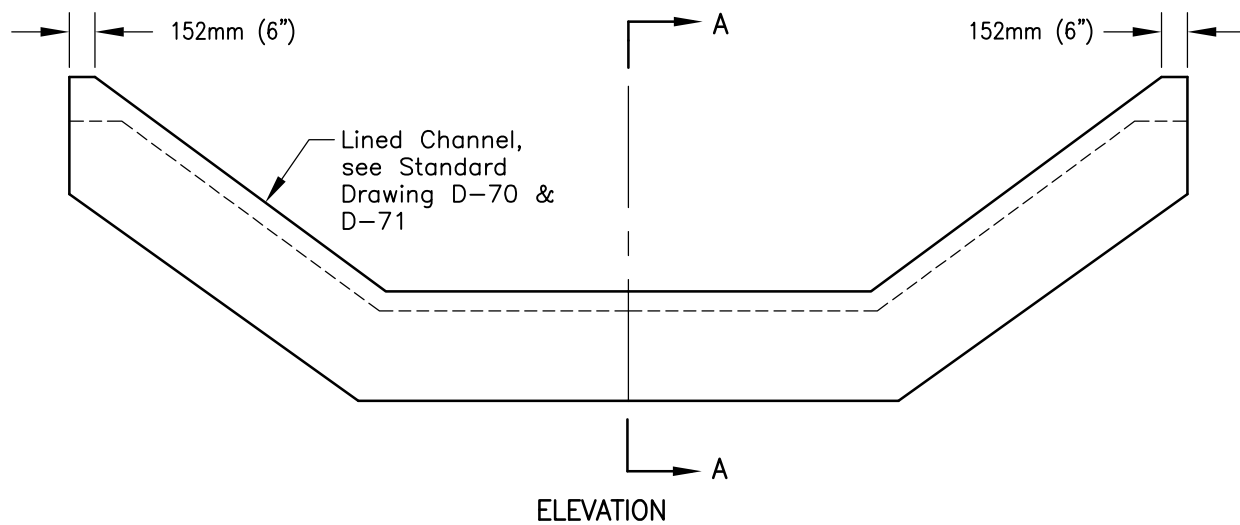
NOTES

1. A.C. or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 3.66m (12') to 4.57m (15'). Expansion joints shall be placed at all changes of section and at ends of curves.
3. Cutoff walls shall be constructed at each end of the channel along the full width of section. See Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. Reinforcement shown is minimum.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	MAJOR DRAINAGE CHANNEL	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-71

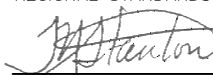


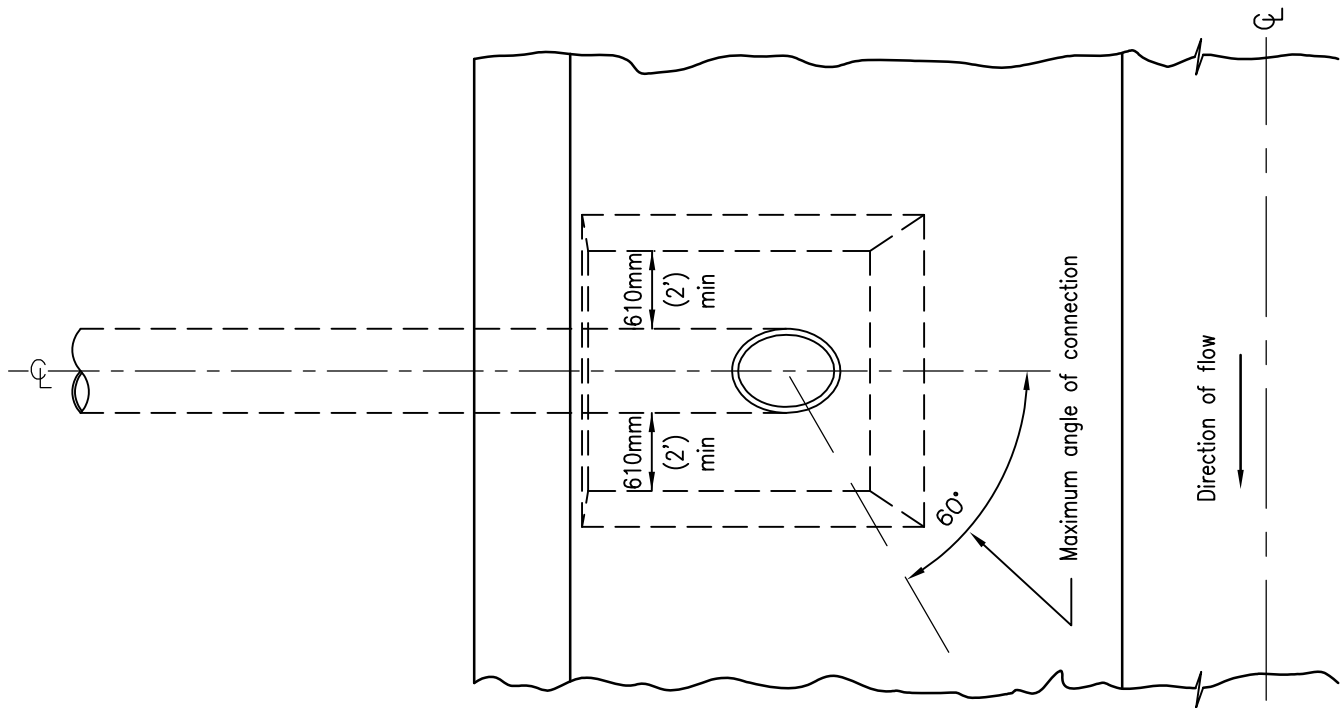
NOTES

1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cut off wall shall be the same as that required in channel.
3. Concrete shall be 332 kg/M³-C-22Mpa (560-C-3250).

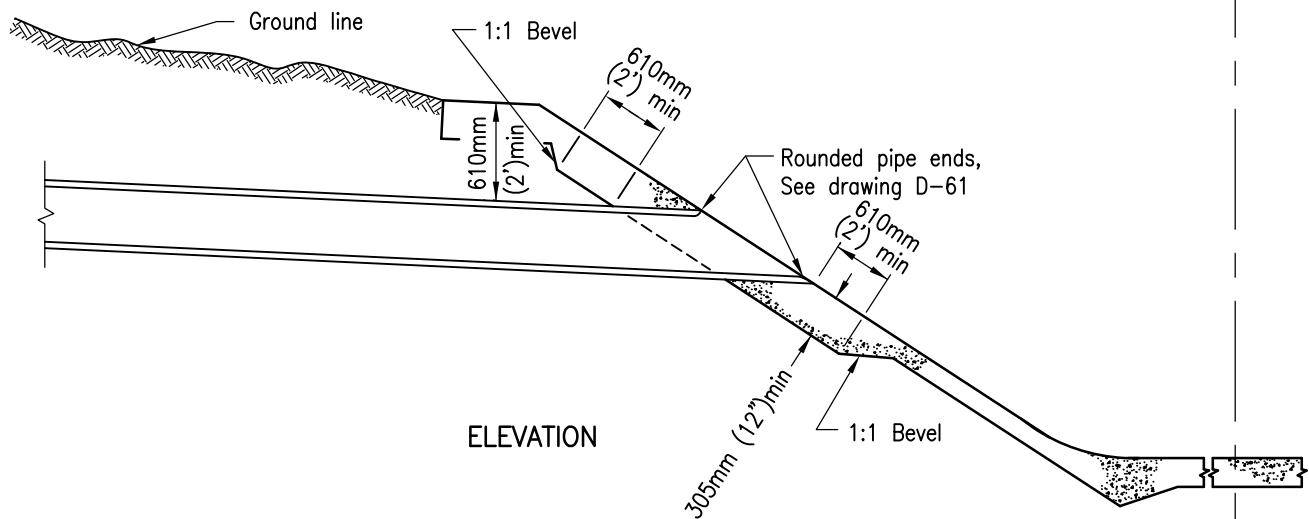
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CUTOFF WALL FOR DRAINAGE CHANNEL	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-72



PLAN

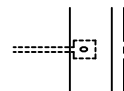


ELEVATION

NOTES:

1. Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250).
2. Pipe shall connect to channel as high as possible.
3. The maximum angle of connection is 60° downstream.
In no case shall a pipe angle upstream.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE TO CHANNEL CONNECTION

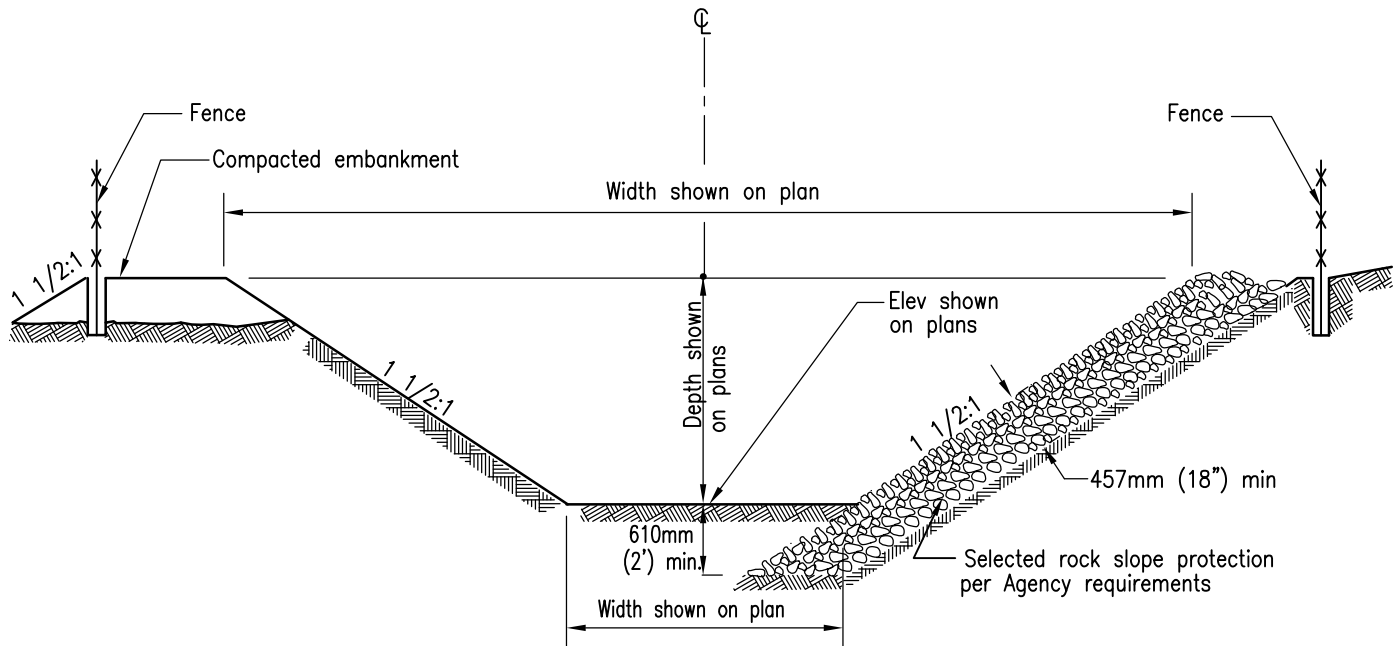
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER

D-73



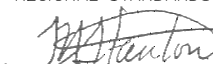
NOTE:

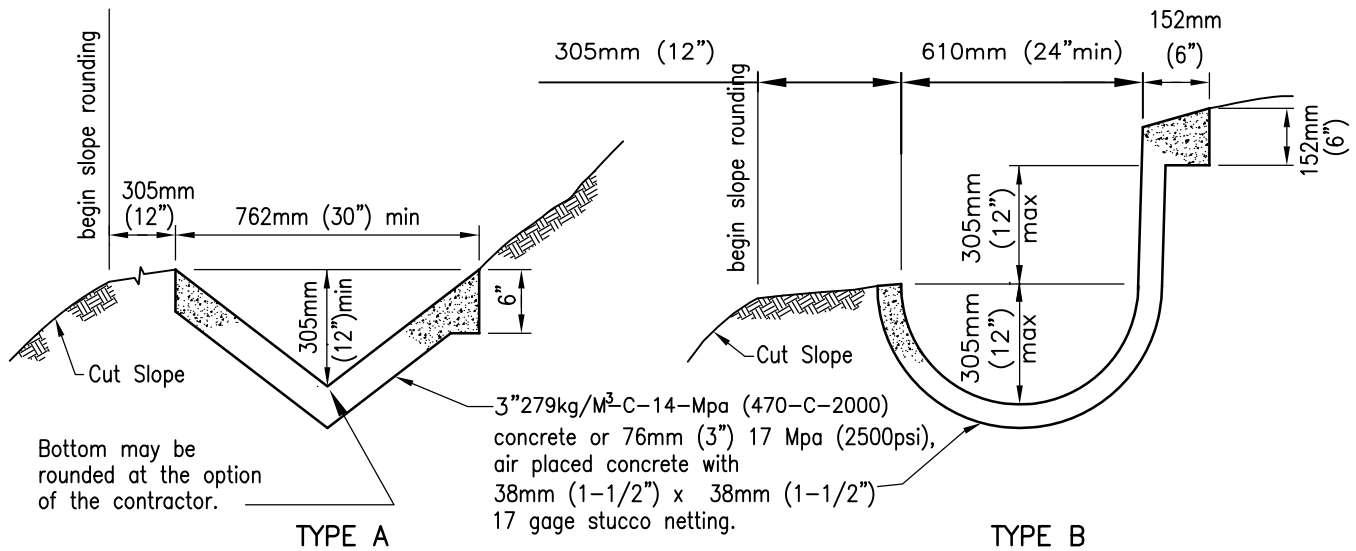
The following shall be as required by Agency:

- a) Low flow channel
- b) Filter blanket
- c) Cutoff wall
- d) Fence

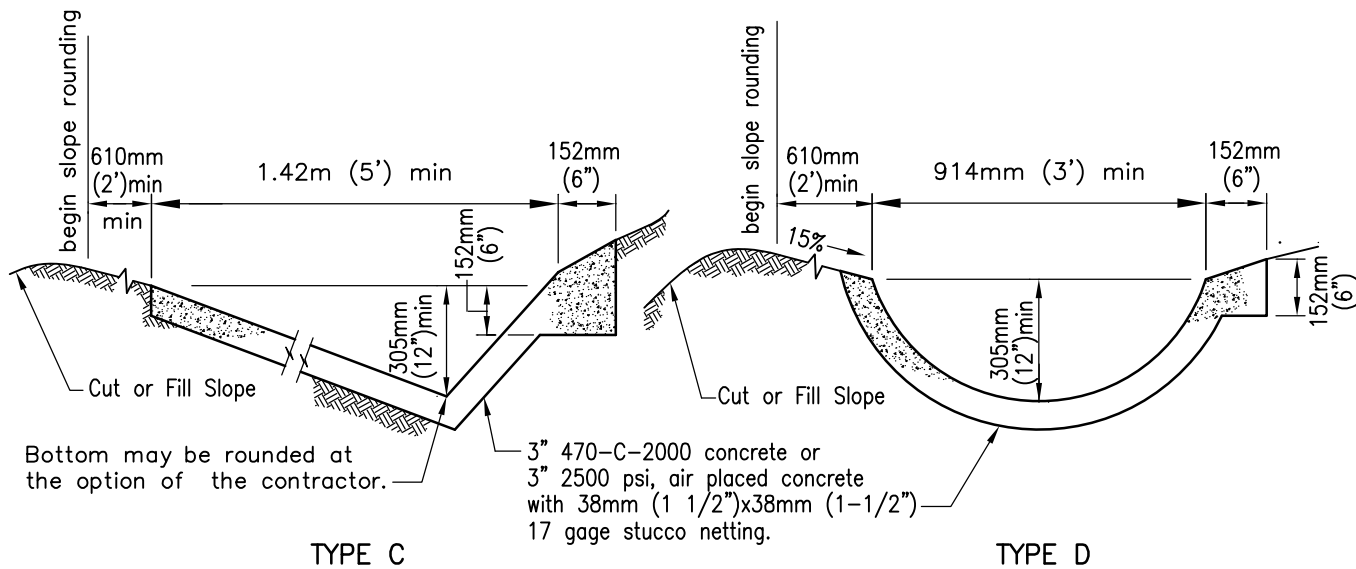
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	GRADED EARTH CHANNEL	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-74



BROW DITCH

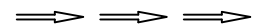


TERRACE DITCH

NOTES

1. Longitudinal slope of lined ditch shall be 2% minimum.
2. Over slope down ditches shall employ 152mm (6") thickened edge section at both sides of ditch.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	DRAINAGE DITCHES	<i>T. Stanton</i> 3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D-75

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76A

METRIC TABLE – SPANS UP TO 1.22M (all measurements in millimeters unless otherwise noted).

SPAN	610			914			1.22m			1.52m		
	457	610	610	610	914	914	610	914	1.22m	610	914	1.22m
HEIGHT												
STRENGTH CLASSIFICATION	A	A	A	A	A	A	A	A	A	A	A	A
MAX FILL OVER TOP	1.68m	965	965	1.68m	711	711	940	711	940	1.27m	305	686
Top Slab	T1	152	152	159	203	178	203	178	203	229	191	203
Bottom Slab	T2	152	152	159	203	178	203	178	203	229	191	203
CONC.	T3	152	152	152	152	152	152	152	152	152	152	152
Size Bar "	13	13	13	13	13	13	16	16	16	16	16	16
Spacing	89	89	89	89	102	127	114	127	114	127	102	102
Length	965	965	1.27m	1.27m	1.3m	1.6m	1.6m	1.6m	1.6m	1.57m	1.9m	1.9m
"d" Dist. Bars	2	2	2	2	2	2	3	3	3	3	3	3
"e" Bars	457	457	457	457	311	457	457	457	432	330	241	457
Spacers	12	12	12	12	12	12	12	12	14	14	14	14
Concrete: cubic meter per lin. ft.	13	13.8	17.6	20.7	23.7	22.2	25.3	27.6	27.6	30.6	32.9	24.5
Reinf. kg per lin. ft.	12.3	13.2	15.5	16.4	20.9	20.0	20.5	21.4	21.8	23.6	29.0	25.9

US TABLE – SPANS UP TO 5' (all measurements in feet and/or inches).

SPAN	2'			3'			4'			5'		
	1'-6"	2'	2'	2'	3'	3'	2'	3'	4'	2'	3'	4'
HEIGHT												
STRENGTH CLASSIFICATION	A	A	A	A	A	A	A	A	A	A	A	A
MAX FILL OVER TOP	66	38	38	66	28	28	37	28	37	50	12	27
Top Slab	T1	6	6	6	1/4	1/4	8	7	8	9	7 1/2	8
Bottom Slab	T2	6	6	6	1/4	1/4	8	7	8	9	7 1/2	8
CONC.	T3	6	6	6	6	6	6	6	6	6	6	6
Size Bar "	4	4	4	4	5	5	5	5	5	5	5	5
Spacing	3 1/2	3 1/2	3 1/2	3 1/2	4	4	5	4 1/2	5	4 1/2	4	4
Length	3-2	3-2	4-2	4-2	4-3	5-3	5-3	5-3	5-3	5-2	6-3	6-3
"d" Dist. Bars	2	2	2	2	2	2	3	3	3	3	3	3
"e" Bars	18	18	18	18	12 1/4	18	18	18	17	13	18	18
Spacers	12	12	12	12	12	12	12	12	14	14	14	14
Concrete: C.Y. per lin. ft.	17	18	23	27	31	29	33	36	40	43	32	37
Reinf. lbs per lin. ft.	27	29	34	36	46	44	45	47	48	52	56	59

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76B

METRIC TABLE – SPAN 1.88m (all measurements in millimeters unless otherwise noted).

SPAN		1.88m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
HEIGHT		2'				3'				4'				5'				6'				7'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A

US TABLE – SPANS 6' (all measurements in feet and/or inches).

SPAN		6'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
HEIGHT		2'				3'				4'				5'				6'				7'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
MAX FILL OVER TOP		10	18	10	18	10	18	10	18	25	9	18	25	36	9	17	25	36	45	9	17	25	36	45	9	17	25	36	45																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
CONC.	Top Slab	8	1/4	8	1/4	8	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	8	1/4	1/4	11	12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	Bottom Slab	6	3/4	8	6	3/4	8	6	3/4	8	9	3/4	7	1/4	8	1/4	10	11	1/4	7	1/4	8	1/4	10	1/2	11	1/4	12	1/4	7	1/4	8	1/4	10	1/2	11	1/4	12	1/4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	Sidewalls	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	

NOTE:

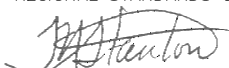
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76C

METRIC TABLE – SPAN 2.13m (all measurements in millimeters unless otherwise noted).

For Imperial table (7' Span) – see drawing D76D

SPAN		2.13m															
HEIGHT		914			1.22m			1.52m			1.83m			2.14			
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	C	A	B	C	A	B	C	
MAX FILL OVER TOP		406	660	406	660	406	660	406	660	889	406	660	889	406	660	889	
CONC.	Top Slab	T ₁	184	210	184	210	184	210	184	210	248	184	210	248	184	210	248
	Bottom Slab	T ₂	191	222	191	222	191	222	191	222	267	191	222	267	191	222	267
	Sidewalls	T ₃	152	178	152	178	152	178	152	178	216	152	178	216	152	178	216
			16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
Reinforcing Steel	"a"		229	178	229	178	229	178	229	178	229	178	229	178	229	178	229
			203m	206m	203m	206m	203m	206m	203m	206m	208m	203m	206m	203m	206m	208m	208m
	"b"		16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
			229	178	229	178	229	178	229	178	229	229	178	229	229	178	229
	"X"		381	406	381	406	381	406	381	406	508	381	406	508	381	406	508
			940	965	940	965	940	965	940	965	117m	940	965	117m	940	965	117m
	"c"		16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
			229	178	229	178	229	178	229	178	229	229	178	229	229	178	229
	"Y"		559	584	559	584	559	584	559	584	686	559	584	686	559	584	686
			158m	153m	158m	193m	218m	224m	239m	249m	224m	239m	249m	269m	280m	285m	30m
	"c ₁ "		16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
			229	178	229	178	229	178	229	178	229	229	178	229	229	178	229
QUAN.	"d"		7	4	7	4	7	4	7	4	4	7	4	7	4	4	4
	Top Slab-No. of Bars		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Bottom Slab-No. of Bars		457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
	"e" Bars		24	24	28	28	28	28	28	28	32	32	32	36	36	36	36
	Spacers		36.0	42.9	39.0	45.9	42.1	49.0	59.7	44.4	52.0	64.3	47.4	55.9	68.0	68.0	68.0
	Concrete: cu meters per lin. ft.		48.6	59.0	51.8	62.6	53.6	64.9	76.3	56.7	68.0	80.0	59.9	71.7	83.5	83.5	83.5
	Reinf kg per lin. ft.																

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

US TABLE – SPAN 7' (all measurements in feet and/or inches unless otherwise noted).
For Metric Table (2.13m Span) – see drawing D76C

SPAN		7'											
HEIGHT		3'			4'			5'			6'		
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP		16	26	16	16	26	16	26	35	16	26	35	35
CONC.	Top Slab	T ₁	7 1/4	8 1/4	7 1/4	8 1/4	7 1/4	8 1/4	7 1/4	8 1/4	7 1/4	8 1/4	7 1/4
	Bottom Slab	T ₂	7 1/2	8 3/4	7 1/2	8 3/4	7 1/2	8 3/4	7 1/2	8 3/4	7 1/2	8 3/4	7 1/2
	Sidewalls	T ₃	6	7	6	7	6	7	8 1/2	6	7	8 1/2	6
"a"	Size Bar "	5	5	5	5	5	5	5	5	5	5	5	5
	Spacing	9	7	9	7	9	7	9	7	9	7	9	7
	Length	6-8	6-9	6-8	6-9	6-8	6-9	6-8	6-9	6-8	6-9	6-8	6-9
"b"	Size Bar "	5	5	5	5	5	5	5	5	5	5	5	5
	Spacing	9	7	9	7	9	7	9	7	9	7	9	7
	Dimension "X"	1-3	1-4	1-3	1-4	1-3	1-4	1-3	1-4	1-3	1-4	1-3	1-4
"c"	Length	3-1	3-2	3-1	3-2	3-1	3-2	3-1	3-2	3-1	3-2	3-1	3-2
	Size Bar "	5	5	5	5	5	5	5	5	5	5	5	5
	Spacing	9	7	9	7	9	7	9	7	9	7	9	7
"c ₁ "	Dimension "Y"	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11
	Length	5-2	5-4	6-2	6-4	7-2	7-4	7-10	8-2	8-4	8-10	9-2	9-4
	Size Bar "	5	5	5	5	5	5	5	5	5	5	5	5
"d"	Spacing	9	7	9	7	9	7	9	7	9	7	9	7
	Dimension "Y"	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11	1-10	1-11
	Length	3-8	3-10	3-8	3-10	3-8	3-10	3-8	3-10	3-8	3-10	3-8	3-10
"e"	Top Slab-No. of Bars	7	4	7	4	7	4	7	4	7	4	7	4
	Bottom Slab-No. of Bars	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18
QUAN.		24			28			28			32		
		Spacers			Total Number								
		Concrete: C.Y. per lin. ft.			Chairperson R.C.E. 19246			Date					
		Reinf lbs per lin. ft.			D-76D								

NOTE:
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

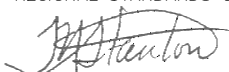
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING SINGLE BOX CULVERT DETAILS No.1	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		A.Kercheval	12/75		 Chairperson R.C.E. 19246	Date 3/10/2003
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
Edited		T. Stanton	02/09			
					DRAWING NUMBER	D-76D

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76E

METRIC TABLE – SPAN 2.44m (all measurements in millimeters unless otherwise noted).

For Imperial table (8' Span) – see drawing D76F

SPAN		2.44m																				
HEIGHT		910mm			1.22m			1.52m			1.83m			2.13m			2.44m					
STRENGTH CLASSIFICATION	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	C			
MAX FILL OVER TOP	4m			6.4m			4m			6.4m			4m			6.4m			9.4m			
CONC.	Top Slab	T ₁	184	216	184	216	184	216	184	216	184	216	184	216	260	184	216	260	184	216		
	Bottom Slab	T ₂	184	241	184	241	184	241	184	241	184	241	184	241	292	184	241	292	184	241		
	Sidewalls	T ₃	165	184	165	184	165	184	165	184	165	184	165	184	248	165	184	248	165	184		
	Size Bar "	"a	16	16	16	16	16	16	16	16	16	16	16	16	19	16	16	16	16	19		
	Spacing		229	178	229	178	229	178	229	178	229	178	229	178	203	229	178	203	229	178		
Reinforcing Steel	Length		2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.40m	2.31m	2.34m	2.40m	2.31m	2.34m		
	Size Bar "	"b	16	16	16	16	16	16	16	16	16	16	16	16	19	16	16	16	16	19		
	Spacing		229	178	229	178	229	178	229	178	229	178	229	178	203	229	178	203	229	178		
	Dimension "X"		457	483	457	483	457	483	457	483	457	483	457	483	508	457	483	508	457	483		
	Length		1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.17m	1.02m	1.04m	1.17m	1.02m	1.04m		
Reinforcing Steel	Size Bar "	"c	16	16	16	16	16	16	16	16	16	16	16	16	19	16	16	16	16	19		
	Spacing		229	178	229	178	229	178	229	178	229	178	229	178	203	229	178	203	229	178		
	Dimension "Y"		610	737	610	737	610	737	610	737	610	737	610	737	813	610	737	813	610	737		
	Length		1.02m	1.17m	1.93m	2.08m	2.24m	2.39m	2.54m	2.69m	2.82m	2.84m	3.10m	3.12m	3.15m	3.30m	3.43m	3.43m	3.30m	3.43m		
	Size Bar "	"c ₁	16	16	16	16	16	16	16	16	16	16	16	16	19	16	16	16	16	19		
Reinforcing Steel	Spacing		9	7	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8	9		
	Dimension "Y"		610	737	610	737	610	737	610	737	610	737	610	737	813	610	737	813	610	737		
	Length		1.14m	1.35m	1.14m	1.35m	1.14m	1.35m	1.14m	1.35m	3-9	1.35m	1.52m	1.14m	1.35m	1.52m	1.14m	1.35m	1.52m	1.14m		
	Top Slab-No. of Bars	"d"	7	5	7	5	7	5	7	5	7	5	5	5	5	7	5	5	5	5		
	Bottom Slab-No. of Bars		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
QUANTITY	"e" Bars	457			457			457			457			457			457			457		
	Spacing	28			32			32			36			40			40					
	Total Number	39.8			50.0			42.9			53.6			46.9			56.6			50.0		
QUANTITY	Concrete: Cubic Meter per lin. ft.	39.8			50.0			42.9			53.6			46.9			56.6			50.0		
	Reinf kg per lin. ft.	53.6			65.8			56.7			69.9			58.6			63.1			61.7		

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

US TABLE – SPAN 8' (all measurements in feet and/or inches unless otherwise noted).

For Metric table (2.44m Span) – see drawing D76E

SPAN		8'																	
HEIGHT		3'			4'			5'			6'			7'			8'		
STRENGTH CLASSIFICATION		A	B		A	B		A	B		A	B		A	B		A	B	
MAX FILL OVER TOP		13	21		13	21		13	21		13	21		13	21		13	21	
CONC.	Top Slab	T ₁	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4
	Bottom Slab	T ₂	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4
	Sidewalls	T ₃	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2
	Size Bar "		5	5		5	5		5	5		5	5		5	5		5	5
Reinforcing Steel	Spacing		9	7		9	7		9	7		9	7		9	7		9	7
	Length		7-7	7-8		7-7	7-8		7-7	7-8		7-7	7-8		7-7	7-8		7-7	7-8
	Size Bar "		5	5		5	5		5	5		5	5		5	5		5	5
	Spacing		9	7		9	7		9	7		9	7		9	7		9	7
	Dimension "X"		1-6	1-7		1-6	1-7		1-6	1-7		1-6	1-7		1-6	1-7		1-6	1-7
	Length		3-4	3-5		3-4	3-5		3-4	3-5		3-4	3-5		3-4	3-5		3-4	3-5
	Size Bar "		5	5		5	5		5	5		5	5		5	5		5	5
	Spacing		9	7		9	7		9	7		9	7		9	7		9	7
	Dimension "Y"		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5
	Length		3-4	3-10		6-4	6-10		7-4	7-10		8-4	8-10		9-4	9-10		10-4	10-11
	Size Bar "		5	5		5	5		5	5		5	5		5	5		5	5
	Spacing		9	7		9	7		9	7		9	7		9	7		9	7
	Dimension "Y"		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5		2-0	2-5
	Length		3-9	4-5		3-9	4-5		3-9	4-5		3-9	4-5		3-9	4-5		3-9	4-5
	Top Slab-No. of		7	5		7	5		7	5		7	5		7	5		7	5
	Bottom Slab-No. of		5	5		5	5		5	5		5	5		5	5		5	5
	Bars		18	18		18	18		18	18		18	18		18	18		18	18
QUAN.	"e" Bars		18	18		18	18		18	18		18	18		18	18		18	18
	Spacing		28			32			32			36			40			40	
	Spacers		28			32			32			36			40			40	
	Total Number		52	65		56	70		60	74		65	79		69	83		73	88
	Concrete: C.Y. per lin. ft.		118	146		125	154		129	139		136	167		143	174		147	179
	Reinf lbs per lin. ft.																		

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76F

METRIC TABLE – SPAN 3.05m (all measurements in millimeters unless otherwise noted).

For Imperial table (10' Span) – see drawing D76H

SPAN		3.05m																	
HEIGHT		1.22m		1.52m		1.83m		2.13m		2.44m		2.74m		3.05m					
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	A	B	A	B	A	B	C			
MAX FILL OVER TOP		2.7m	5.5m	2.7m	5.5m	2.7m	5.5m	2.7m	5.5m	2.4m	5.5m	2.4m	5.5m	2.4m	5.5m	8.5m			
CONC.	Top Slab	T ₁	203	241	210	248	210	248	216	248	216	248	311	216	248	311			
	Bottom Slab	T ₂	222	267	229	272	229	272	235	279	235	279	337	235	279	337			
	Sidewalls	T ₃	184	241	184	241	184	241	184	241	184	241	292	8	241	292			
	Size Bar "	"a"	19	19	19	19	19	19	19	19	19	19	22	19	22	19	22		
Reinforcing Steel	Spacing	279	203	279	203	279	203	279	203	279	203	279	203	279	203	229			
	Length	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.97m			
	Size Bar "	"b"	16	19	16	19	16	19	16	19	16	19	16	19	16	19	19		
	Spacing	279	203	279	203	279	203	279	203	279	203	279	203	279	203	229	229		
Reinforcing Steel	Dimension "X"	610	610	610	610	610	610	610	610	610	610	610	610	610	610	782			
	Length	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.42m			
	Size Bar "	"c"	16	19	16	19	16	19	16	19	16	19	16	19	16	19	19		
	Spacing	279	203	279	203	279	203	279	203	279	203	279	203	279	203	229	229		
Reinforcing Steel	Dimension "Y"	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	1.07m			
	Length	2.11m	2.39m	2.46m	2.69m	2.77m	9-10	10-1	10-10	11-1	11-10	12-3	12-1	12-10	13-3	13-1	13-10	14-3	
	Size Bar "	"c ₁ "	16	19	16	19	16	19	16	19	16	19	16	19	16	19	19	19	
	Spacing	279	203	279	203	279	203	279	203	279	203	279	203	279	203	229	203	229	
Reinforcing Steel	Dimension "Y"	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	1.07m	813	1.02m	1.07m
	Length	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.88m	1.40m	1.73m	1.88m
	Top Slab-No. of Bars	"d"	9	5	9	5	9	5	9	5	9	5	9	5	9	5	9	5	5
	Bottom Slab-No. of Bars	"e"	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
QUAN.	"e" Bars	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
	Spacers	32	34	34	36	36	40	40	40	40	40	44	44	48	48	48	48	48	48
	Concrete: Cu Meter per lin. ft.	57.4	71.9	62.7	85.6	65.8	85.6	70.4	88.0	74.2	92.6	114.7	81.1	96.4	120.1	90.3	101.0	126.2	126.2
	Reinf kg per lin. ft.	64.9	100	67.2	103.5	69.9	106.6	72.6	110.7	74.4	113.4	120.3	77.2	117.5	123.9	80.8	121.2	127.5	127.5

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

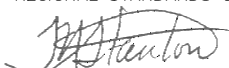
DRAWING
NUMBER D-76G

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76H

US TABLE – SPAN 10' (all measurements in feet and/or inches unless otherwise noted).

For Metric table (3.05m Span) – see drawing D76G

SPAN		10'																				
HEIGHT		4'			5'			6'			7'			8'			9'			10'		
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP		9	18	9	18	9	18	9	18	9	18	9	18	9	18	9	18	9	18	9	18	28
CONC.	Top Slab	T ₁	8	9 1/2	8 1/4	9 3/4	8 1/4	9 3/4	8 1/4	9 3/4	8 1/2	9 3/4	8 1/4	9 3/4	8 1/2	9 3/4	8 1/2	9 3/4	8 1/2	9 3/4	8 1/2	9 3/4
	Bottom Slab	T ₂	8 3/4	10 1/2	9	10 3/4	9	10 3/4	9 1/4	11	9 1/4	11	13 1/4	9 1/4	11	13 1/4	9 1/4	11	13 1/4	9 1/4	11	13 1/4
	Sidewalls	T ₃	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2
Reinforcing Steel	Size Bar "	" _a	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7
	Spacing		11	8	11	8	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8
	Length		9-5	9-8	9-5	9-8	9-5	9-8	9-5	9-8	9-5	9-8	9-5	9-8	9-5	9-8	9-9	9-8	9-9	9-5	9-8	9-9
	Size Bar "	" _b	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6
	Spacing		11	8	11	8	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8
	Dimension "X"		2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-0	2-6	2-0	2-6	2-0	2-0	2-6
	Length		3-10	4-2	3-10	4-2	3-10	4-2	3-10	4-2	3-10	4-2	3-10	4-2	3-10	4-2	4-8	3-10	4-2	4-8	3-10	4-2
	Size Bar "	" _c	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6
	Spacing		11	8	11	8	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8
	Dimension "Y"		2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	3-6	2-8	3-4	3-6	2-8	3-4
	Length		6-11	7-10	8-1	8-10	9-1	9-10	10-1	10-10	11-1	11-10	12-3	12-1	12-10	13-3	13-1	13-10	14-3	13-1	13-10	14-3
	"d"	Size Bar "	" _{c1}	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5
Spacing			11	8	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8	9	9
Dimension "Y"			2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	2-8	3-4	3-6	2-8	3-4	3-6	2-8	3-4
Length			4-7	5-8	4-7	5-8	4-7	5-8	4-7	5-8	4-7	5-8	4-7	5-8	4-7	5-8	6-0	4-7	5-8	6-0	4-7	5-8
Top Slab-No. of Bars			9	5	9	5	9	5	9	5	9	5	9	5	9	5	5	9	5	5	9	5
"e"	Bottom Slab-No. of Bars		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Spacing		18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	Total Number		32	34	36	40	40	40	40	40	40	40	40	44	44	44	48	48	48	48	48	48
QUANT.	Concrete: C.Y. per lin. ft.	75	94	82	108	86	108	92	115	92	115	97	121	150	106	126	157	118	132	165	165	
	Reinf lbs per lin. ft	143	221	148	228	154	235	160	244	164	244	164	250	265	170	259	273	178	267	281	281	

NOTE:
For boxes of height less than that shown in table, use next greater table height slabs,
wall dimensions and reinforcing steel, and make necessary changes in bar lengths,
number of spacers and quantities.

METRIC TABLE – SPAN 3.66m (all measurements in millimeters unless otherwise noted).

For Imperial table (12' Span) – see drawing D76J

SPAN		3.66m																	
HEIGHT		1.83m			2.13m			2.44m			2.74m			3.05m			3.66m		
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	C	
MAX FILL OVER TOP		1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	7.3m	
CONC.	Top Slab	T 1	222	286	222	286	222	286	222	286	222	286	229	286	337	229	286	337	
	Bottom Slab	T 2	222	311	222	311	222	311	222	311	222	311	229	311	375	229	311	375	
	Sidewalls	T 3	191	267	191	267	191	267	191	267	203	267	318	229	267	318	229	267	
	Size Bar "	"a"	19	22	19	22	19	22	19	22	19	22	19	22	19	22	19	22	
	Spacing		279	254	279	254	279	254	279	254	279	254	203	279	254	203	279	254	
Reinforcing Steel	Length		3.38m	4.27m	3.38m	4.27m	3.38m	4.27m	3.38m	4.27m	3.45m	4.27m	3.56m	3.48m	4.27m	3.56m	3.48m	4.27m	
	Size Bar "	"b"	19	22	19	22	19	22	19	22	19	22	19	22	19	22	19	22	
	Spacing		279	254	279	254	279	254	279	254	279	254	203	279	254	203	279	254	
	Dimension "X"		813	914	813	914	813	914	813	914	813	914	914	813	914	813	914	914	
	Length		1.47m	1.70m	1.47m	1.70m	1.47m	1.70m	1.47m	1.70m	1.47m	1.70m	1.70m	1.47m	1.70m	1.47m	1.70m	1.70m	
Reinforcing Steel	Size Bar "	"c"	19	22	19	22	19	22	19	22	19	22	19	22	19	22	19	22	
	Spacing		279	254	279	254	279	254	279	254	279	254	203	279	254	203	279	254	
	Dimension "Y"		1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	
	Length		3.10m	3.15m	3.40m	3.45m	3.71m	3.76m	4.01m	4.06m	4.11m	4.32m	4.37m	4.42m	4.93m	4.98m	5.03m		
	Size Bar "	"c ₁ "	19	22	19	22	19	22	19	22	19	22	19	22	19	22	19	22	
Reinforcing Steel	Spacing		11	10	11	10	11	10	11	10	11	10	8	11	10	8	11	10	
	Dimension "Y"		1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	
	Length		1.80m	1.96m	1.80m	1.96m	1.80m	1.98m	1.80m	1.98m	1.80m	1.98m	2.03m	1.80m	1.98m	2.03m	1.80m	1.98m	
	Top Slab--No. of	"d"	10	6	10	6	10	6	10	6	10	6	6	10	6	10	6	6	
	Bottom Slab--No. of	Bars	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Reinforcing Steel	"e" Bars	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	
	Spacers	Total Number	36		44		44		44		44		44		48		52		
	Concrete: cu m per lin. ft.		76.7	105.5	78.8	110.1	82.6	116.3	90.3	120.6	145.3	99.4	126.2	151.4	107.9	136.1	162.9		
Reinforcing Steel	Reinf ka per lin. ft.		92.1	133.0	96.7	137.9	98.9	141.1	101.2	143.8	175.6	104.8	147.9	180.1	110.3	154.7	188.3		

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76I

US TABLE – SPAN 12' (all measurements in feet and/or inches unless otherwise noted).

For Metric table (3.66m Span) – see drawing D76I

SPAN		12'																		
HEIGHT		6'			7'			8'			9'			10'			12'			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
MAX FILL OVER TOP		5	16	5	16	5	16	5	16	24	5	16	24	5	16	24	5	16	24	
CONC.	Top Slab	T ₁	8	3/4	11	1/4	8	3/4	11	1/4	8	3/4	11	1/4	9	11	1/4	13	1/4	
	Bottom Slab	T ₂	8	3/4	12	1/4	8	3/4	12	1/4	9	12	1/4	14	3/4	9	12	1/4	14	3/4
	Sidewalls	T ₃	7	1/2	10	1/2	7	1/2	10	1/2	7	1/2	10	1/2	8	10	1/2	12	1/2	
			6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7
Reinforcing Steel	Size Bar "		11	10	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8	
	Spacing		11-3	11-6	11-3	11-6	11-3	11-6	11-3	11-6	11-3	11-6	11-3	11-6	11-3	11-6	11-3	11-6	11-8	
	Length		6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7
	Size Bar "		11	10	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8	
	Spacing		2-8	3-0	2-8	3-0	2-8	3-0	2-8	3-0	2-8	3-0	2-8	3-0	2-8	3-0	2-8	3-0	3-0	
	Length		4-10	5-7	4-10	5-7	4-10	5-7	4-10	5-7	4-10	5-7	4-10	5-7	4-10	5-7	4-10	5-7	5-7	
Reinforcing Steel	Size Bar "		6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	
	Spacing		11	10	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8	
	Dimension "Y"		3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	
	Length		10-2	10-4	11-2	11-4	12-2	12-4	13-2	13-4	13-6	14-2	14-4	14-6	16-2	16-4	16-6	16-8	16-8	
	Size Bar "		6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	
	Spacing		11	10	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8	
Reinforcing Steel	Dimension "Y"		3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	3-9	
	Length		5-11	6-5	5-11	6-5	5-11	6-5	5-11	6-5	5-11	6-5	5-11	6-5	5-11	6-5	5-11	6-5	6-8	
	Top Slab-No. of Bars	"d"	10	6	10	6	10	6	10	6	10	6	6	10	6	6	10	6	6	
	Bottom Slab-No. of Bars	"d"	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
QUANTITIES	"e" Bars		18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
	Spacing																			
	Total Number		36		44		44		44		44		44		48		52		52	
QUANTITIES	Spacers		99	138	103	144	108	152	118	158	190	130	165	198	141	178	213	141	178	
	Concrete: C.Y. per lin. ft.																			
	Reinf lbs per lin. ft.		203	293	213	304	218	311	223	317	387	231	326	397	243	341	415	243	341	

NOTES:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

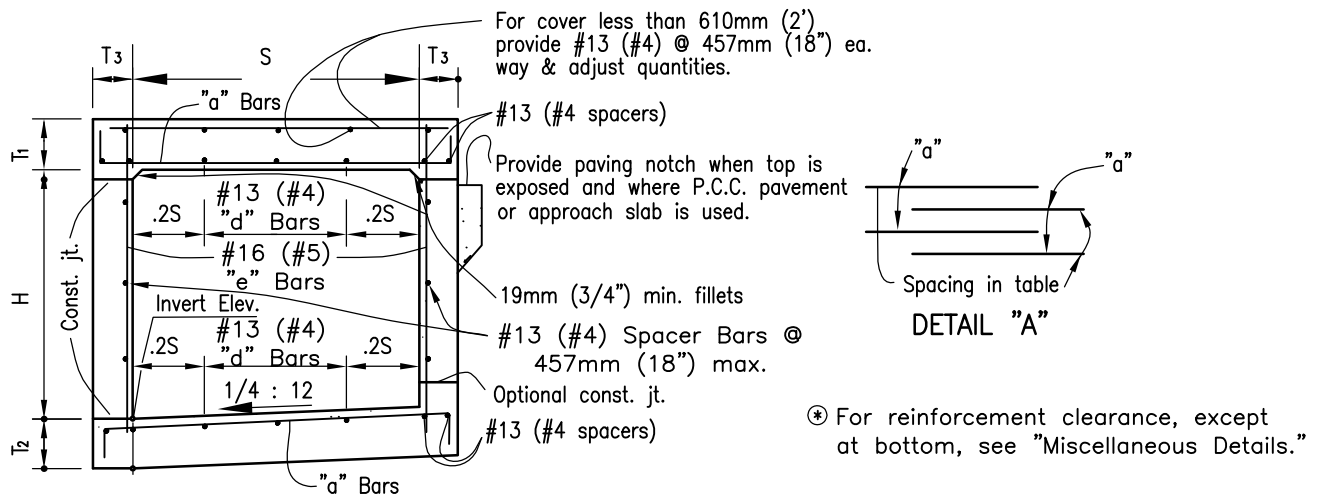
SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

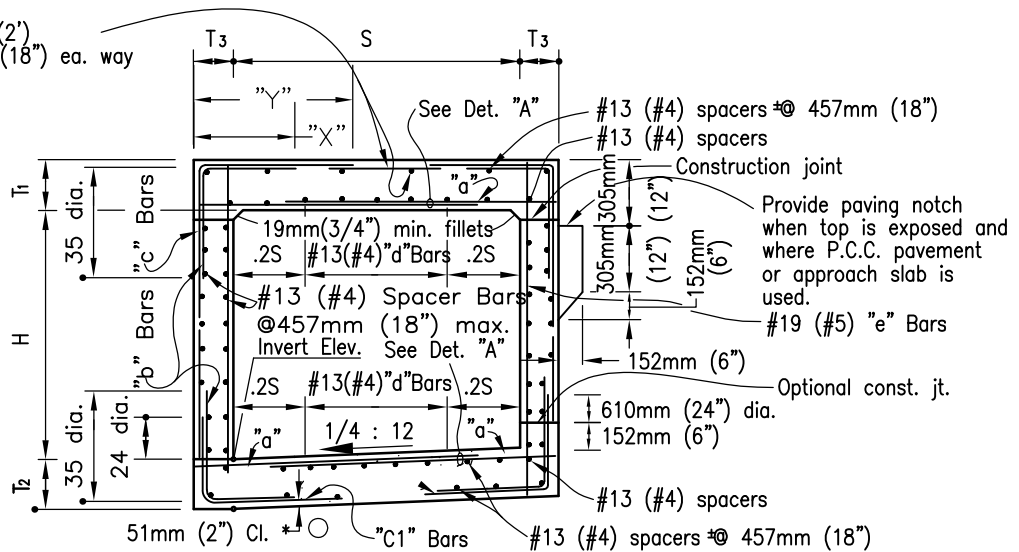
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-76J

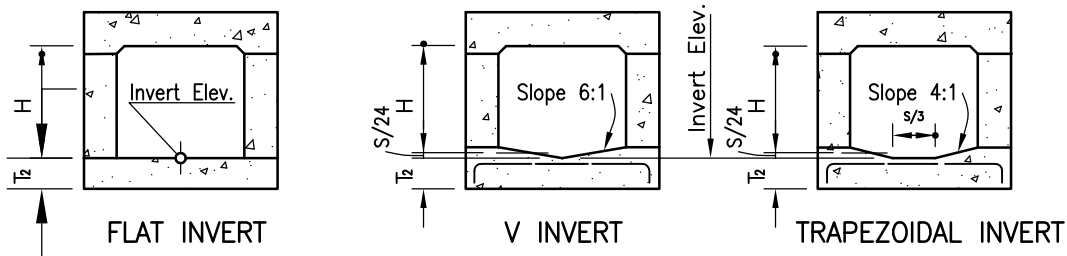


TYPICAL SECTIONS 610mm (2') THRU 1.83m (6') SPANS

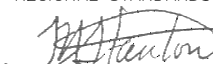
For cover less than 610mm (2') provide #13 (#4) @ 457mm (18\") ea. way & adjust quantities.



TYPICAL SECTIONS 2.13m (7') THRU 3.66m (12') SPANS



ALTERNATIVE INVERTS (When shown)

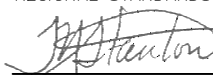
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	SINGLE BOX CULVERT DETAILS NO.2		 3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
						DRAWING NUMBER D-76K

METRIC TABLE – SPAN 1.22m (all measurements in millimeters unless otherwise noted).
For Imperial table (4' Span) – see drawing D77B

SPAN		1.22m												
HEIGHT		610mm				914mm				1.22m				
STRENGTH CLASSIFICATION		A	B	C	A	B	C	D	A	B	C	D		
MAX FILL OVER TOP		3.35m	6.4m	9.75m	3.35m	7.0m	10.4m	14.0m	3.35m	7.0m	10.4m	14.0m		
Conc.	Top Slab	T ₁	165	165	184	165	191	216	165	165	191	216		
	Bottom Slab	T ₂	152	184	216	152	191	216	152	191	216	241		
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	152	152		
Reinforcing Steel	"a" or "b" "b ₁ "	Size Bar #	16	13	13	16	13	13	13	16	13	13	13	
		Spacing	279	279	229	279	267	216	191	279	267	216	191	
		Length	3.12m	3.10m	3.10m	3.12m	3.10m	3.10m	3.10m	3.12m	3.10m	3.10m	3.10m	
Reinforcing Steel	"b" or "c"	Size Bar #	16	16	16	16	16	16	16	16	16	16	16	
		Spacing	279	279	229	279	267	216	191	279	267	216	191	
		Length "b" Length "b ₁ "	2.84m 2.84m	2.84m 9-5	2.90m 2.90m	2.84m 2.84m	2.84m 2.90m	2.92 2.92	2.84m 2.84m	2.90m 2.90m	2.84m 2.84m	2.90m 2.90m	2.92 2.92	
Reinforcing Steel	"c" —	Size Bar #	13	16	16	13	16	16	16	13	16	16	16	
		Spacing	279	279	229	279	267	216	191	279	267	216	191	
		Length	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	
Reinforcing Steel	"d" Dist Bars	Top Slab-Tot. No.	10	6	6	10	6	6	6	10	6	6	6	
		Bottom Slab-Tot. No.	6	6	6	6	6	6	6	6	6	6	6	
		Size Bar #	13	13	13	13	13	13	13	13	13	13	16	
Reinforcing Steel	"e" Bars	Spacing	457	457	457	457	457	406	305	457	305	229	254	
		Spacers	23				26				29			
		Concrete: C.Y. per lin. ft.	0.36	0.39	0.44	0.41	0.44	0.48	0.53	0.45	0.48	0.53	0.57	
Reinforcing Steel	Reinf. lbs per lin. ft.	Reinf. lbs per lin. ft.	37	34	38	38	36	41	46	40	39	45	50	
		Quon.												

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

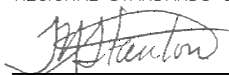
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	DOUBLE BOX CULVERT DETAILS No. 1		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER D-77A	

US TABLE – SPAN 4' (all measurements in feet and/or inches unless otherwise noted).
For Metric Table (1.22m Span) – see drawing D77A

SPAN		4'											
HEIGHT		2'				3'				4'			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	D	A	B	C	D	
MAX FILL OVER TOP		11	21	32	11	23	34	46	11	23	34	46	
Top Slab	T ₁	6 1/2	6 1/2	7 1/4	6 1/2	6 1/2	7 1/4	8 1/2	6 1/2	6 1/2	7 1/4	8 1/2	1/2
Bottom Slab	T ₂	6	7 1/4	8 1/2	6	7 1/4	8 1/2	9 1/2	6	7 1/4	8 1/2	9 1/2	1/2
Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6
Size Bar #		5	4	4	5	4	4	4	5	4	4	4	4
Spacing		11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2	1/2
Length		10-3	10-2	10-2	10-3	10-2	10-2	10-2	10-3	10-2	10-2	10-2	10-2
Size Bar #		5	5	5	5	5	5	5	5	5	5	5	5
Spacing		11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2	1/2
Length "b"		9-4	9-4	9-6	9-4	9-4	9-6	9-7	9-4	9-4	9-6	9-7	
Length "b ₁ "		9-4	9-5	9-6	9-4	9-4	9-6	9-7	9-4	9-4	9-6	9-7	
Size Bar #		4	5	5	4	5	5	5	4	5	5	5	5
Spacing		11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2	1/2
Length		4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6
Top Slab-Tot. No.		10	6	6	10	6	6	6	10	6	6	6	6
Bottom Slab-Tot. No.		6	6	6	6	6	6	6	6	6	6	6	6
Size Bar #		4	4	4	4	4	4	4	4	4	4	4	5
Spacing		18	18	18	18	18	16	12	18	12	9	10	
Spacers	Number	23				26				29			
Concrete: C.Y. per lin. ft.		0.47	0.51	0.57	0.53	0.57	0.63	0.69	0.59	0.63	0.69	0.75	
Reinf :lbs per lin. ft.		81	74	84	84	79	91	101	87	85	99	111	

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

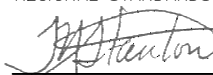
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING DOUBLE BOX CULVERT DETAILS No. 1	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  3/10/2003 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
Edited		T. Stanton	02/09		
				DRAWING NUMBER	D-77B

METRIC TABLE – SPAN 1.52m (all measurements in millimeters unless otherwise noted).
For Imperial table (5' Span) – see drawing D77D

SPAN		1.52m																	
HEIGHT		610mm				914mm				1.22m				1.62m					
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	
MAX FILL OVER TOP		1.83m	11.0m	11.0m	1.83m	7.3m	11.0m	1.83m	7.0m	10.4m	1.83m	7.0m	10.4m	14m	1.83m	7.0m	10.4m	14m	
Reinforcing Steel	Top Slab	T ₁	171	197	235	171	197	235	171	197	235	171	197	235	260	171	197	235	260
	Bottom Slab	T ₂	165	222	260	165	222	260	165	222	260	165	222	260	286	165	222	260	286
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152
	Size Bar #		16	13	13	16	13	13	16	13	13	16	13	13	13	16	13	13	13
	Spacing		254	216	254	254	216	254	254	216	254	254	216	254	229	254	216	267	229
Reinforcing Steel	Length		3.73m	3.71m	3.71m	3.73m	3.71m	3.71m	3.73m	3.71m	3.71m	3.73m	3.71m	3.71m	3.71m	3.73m	3.71m	3.71m	3.71m
	Size Bar #		16	16	19	16	16	19	16	16	19	16	16	19	19	16	16	19	19
	Spacing		254	216	254	254	216	254	254	216	254	254	216	254	229	254	216	267	229
	Length "b" or "b ₁ "		3.48m	3.51m	3.53m	3.48m	3.51m	3.53m	3.48m	3.51m	3.53m	3.48m	3.51m	3.53m	3.54m	3.48m	3.51m	3.53m	3.54m
	Length "b ₁ "		3.45m	3.51m	3.53m	3.45m	3.51m	3.53m	3.45m	3.51m	3.53m	3.45m	3.51m	3.53m	3.54m	3.45m	3.51m	3.53m	3.54m
Reinforcing Steel	Size Bar #		13	16	19	13	16	19	13	16	19	13	16	19	19	13	16	19	19
	Spacing		254	216	254	254	216	254	254	216	254	254	216	254	229	254	216	267	229
	Length		1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m
	Top Slab-Tot. No.		12	6	6	12	6	6	12	6	6	12	6	6	6	12	6	6	6
	Bottom Slab-Tot. No.		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	Size Bar #		13	13	13	13	13	13	13	13	13	13	13	13	16	13	13	16	19
	Bars		457	457	457	457	457	457	457	457	406	457	305	254	267	457	216	229	229
	Spacing																		
	Spacers		23			26			29										32
	Concrete: C.Y. per lin. ft.		0.44	0.53	0.61	0.48	0.57	0.66	0.53	0.61	0.68	0.75	0.57	0.66	0.74	0.80			
Reinforcing Steel	Reinforcing Steel		45	45	49	47	47	51	48	49	54	60	49	53	57	67			

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	DOUBLE BOX CULVERT DETAILS No. 1		 3/10/2003	
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-77C	

US TABLE – SPAN 5' (all measurements in feet and/or inches unless otherwise noted).
For Metric Table (1.52m Span) – see drawing D77C

SPAN		5'																				
HEIGHT		2'			3'			4'			5'											
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D								
MAX FILL OVER TOP		6	36	36	6	24	36	6	23	34	46	6	23	34	46							
Conc.	Top Slab	T ₁	6	3/4	7	3/4	9	1/4	6	3/4	7	3/4	9	1/4	10	1/4						
	Bottom Slab	T ₂	6	1/2	8	3/4	10	1/4	6	1/2	8	3/4	10	1/4	11	1/4						
	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6	6	6						
Reinforcing Steel	"a" └───┘	Size Bar #	5	4	4	5	4	4	5	4	4	5	4	4	4	4						
		Spacing	10	8	1/2	10	10	8	1/2	10	10	8	1/2	10	9	10	8	1/2	10	1/2	9	
		Length	12-3	12-2	12-2	12-3	12-2	12-2	12-2	12-3	12-2	12-2	12-2	12-3	12-2	12-2	12-2	12-3	12-2	12-2	12-2	
	"b" └───┘ or "b" "b ₁ " └───┘	Size Bar #	5	5	6	5	5	6	5	5	6	5	5	6	5	5	6	5	5	6	6	
		Spacing	10	8	1/2	10	10	8	1/2	10	10	8	1/2	10	9	10	8	1/2	10	1/2	9	
		Length	11-5	11-6	11-7	11-5	11-6	11-7	11-5	11-6	11-7	11-5	11-6	11-7	11-8	11-5	11-6	11-7	11-8	11-7	11-8	
	"c" └───┘	Length	11-4	11-6	11-7	11-4	11-6	11-7	11-4	11-6	11-7	11-4	11-6	11-7	11-8	11-4	11-6	11-7	11-8	11-7	11-8	
		Size Bar #	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	6	
		Spacing	10	8	1/2	10	10	8	1/2	10	10	8	1/2	10	9	10	8	1/2	10	1/2	9	
	"d" Dist Bars	Length	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	5-6	
		Top Slab-Tot. No.	12	6	6	12	6	6	12	6	6	12	6	6	12	6	6	12	6	6	6	
		Bottom Slab-Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
"e" Bars	Size Bar #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	6		
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18		
Spacers	Number	23			26			29			32											
Quan.	Concrete: C.Y. per lin. ft.	0.58	0.69	0.80	0.63	0.75	0.86	0.69	0.80	0.89	0.98	0.74	0.86	0.97	1.04	1.04	1.04	1.04	1.04	1.04		
	Reinf. :lbs per lin. ft.	99	100	109	103	104	112	106	109	119	133	109	116	126	148	148	148	148	148	148		

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/10/2003	
Add Metric		T. Stanton	03/03	DOUBLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-77D	
Edited		T. Stanton	02/09				

METRIC TABLE – SPAN 1.83m (all measurements in millimeters unless otherwise noted).

For Imperial table (6' Span) – see drawing D77F

SPAN		1.83m																
HEIGHT		914mm				1.22m				1.52m				1.83m				
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D	
MAX FILL OVER TOP		1.22m	6.1m	10.4m	1.22m	6.1m	10.4m	1.22m	5.79m	10m	13.1m	1.22m	5.8m	10m	13.1m			
Reinforcing Steel	Top Slab	T ₁	184	210	267	184	210	267	184	210	267	305	184	210	267	305		
	Bottom Slab	T ₂	184	241	292	184	241	292	184	241	292	324	184	241	292	324		
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	152	152	152	152	152	152	191	
	"a" └───┘	Size Bar #	16	13	13	16	13	13	16	13	13	13	13	16	13	13	13	
		Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267		
Reinforcing Steel	"b" or "b ₁ " └───┘	Length	4.34m	4.32m	4.32m	4.34m	4.32m	4.32m	4.34m	4.32m	4.32m	4.34m	4.32m	4.34m	4.32m	4.32m	4.47m	
		Size Bar #	16	19	19	16	19	19	16	19	19	22	16	19	19	22		
		Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267		
	"c" ───	Length	4.11m	4.11m	4.17m	4.11m	4.11m	4.17m	4.11m	4.11m	4.17m	4.19m	4.11m	4.11m	4.17m	4.17m	4.32m	
		Size Bar #	4.09m	4.14m	4.17m	4.09m	4.14m	4.17m	4.09m	4.11m	4.17m	4.19m	4.11m	4.11m	4.17m	4.17m	4.32m	
Reinforcing Steel	"d" Dist Bars	Size Bar #	13	19	19	13	19	19	13	19	19	22	13	19	19	22		
		Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267		
		Length	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	2.03m	
	"e" Bars	Top Slab—Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6	6	
		Bottom Slab—Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Reinforcing Steel	"f" Bars	Size Bar #	13	13	13	13	13	13	13	13	16	13	16	13	16	19	19	
		Spacing	457	457	406	457	356	216	457	254	241	178	457	279	229	152		
		Spacers Number	30				33				36				36			
	Concrete: cu m per lin. ft.	Concrete: cu m per lin. ft.	0.59	0.69	0.83	0.63	0.73	0.86	.67	.77	.91	.99	.82	.96	.82	.96	1.12	
		Reinf: kgs per lin. ft.	55	54	67	57	56	70	58	59	74	79	59	62	80	80	91	

NOTE:

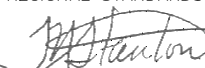
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/01/2003

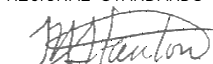
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77E

US TABLE – SPAN 6' (all measurements in feet and/or inches unless otherwise noted).
For Metric Table (1.83m Span) – see drawing D77E

SPAN		6'															
HEIGHT		3'			4'			5'			6'						
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D			
MAX FILL OVER TOP		4	20	34	4	20	34	4	19	33	43	4	19	33	43		
Conc.	Top Slab	T ₁	7 1/4	8 1/4	10 1/2	7 1/4	8 1/4	10 1/2	7 1/4	8 1/4	10 1/2	12	7 1/4	8 1/4	10 1/2	12	
	Bottom Slab	T ₂	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2	12 3/4	7 1/4	9 1/2	11 1/2	12 3/4	
	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6	6	7 1/2	
			5	4	4	5	4	4	5	4	4	5	4	4	5	4	4
Reinforcing Steel	"a" └───┘	Spacing		9 1/2	11	8 1/2	9 1/2	11	8 1/2	9 1/2	11	8 1/2	10 1/2	9 1/2	11	8 1/2	10 1/2
		Length		14-3	14-2	14-2	14-3	14-2	14-2	14-3	14-2	14-2	14-2	14-3	14-2	14-2	14-8
	"b" └───┘	Size Bar #		5	6	6	5	6	6	5	6	6	7	5	6	6	7
	or "b" └───┘	Spacing		9 1/2	11	8 1/2	9 1/2	11	8 1/2	9 1/2	11	8 1/2	10 1/2	9 1/2	11	8 1/2	10 1/2
		Length "b"		13-6	13-6	13-8	13-6	13-6	13-8	13-6	13-6	13-8	13-6	13-6	13-8	13-6	14-2
		Length "b ₁ "		13-5	13-7	13-8	13-5	13-7	13-8	13-5	13-7	13-8	13-5	13-7	13-8	13-6	14-2
	"c" ───	Size Bar #		4	6	6	4	6	6	4	6	6	7	4	6	6	7
		Spacing		9 1/2	11	8 1/2	9 1/2	11	8 1/2	9 1/2	11	8 1/2	10 1/2	9 1/2	11	8 1/2	10 1/2
		Length		6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6	6-8
	"d" Dist Bars	Top Slab-Tot. No.		12	6	6	12	6	6	12	6	6	6	12	6	6	6
	Bottom Slab-Tot. No.		6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Reinforcing Steel	"e" Bars	Size Bar #		4	4	4	4	4	4	4	4	5	4	5	6	6	
		Spacing		18	18	16	18	14	8 1/2	18	10	9 1/2	7	18	11	9	6
	Spacers	Number		30	30	30	33	33	33	36	36	36	36	36	36	36	36
Quon.	Concrete: C.Y. per lin. ft.	0.77	0.90	1.08	0.82	0.96	1.13	0.88	1.01	1.19	1.30	0.93	1.07	1.25	1.47	1.47	
	Reinf. :lbs per lin. ft	121	119	147	125	124	155	128	131	164	175	129	137	177	201	201	

NOTE:
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/10/2003	
Add Metric		T. Stanton	03/03	DOUBLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-77F	
Edited		T. Stanton	02/09				

METRIC TABLE – SPAN 2.44m (all measurements in millimeters unless otherwise noted).

For Imperial table (8' Span) – see drawing D77H

SPAN		2.44m																		
HEIGHT		1.22m			1.52m			1.83m			2.13m			2.44m						
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D			
MAX FILL OVER TOP		914mm	4.27m	7.62m	914mm	4.27m	7.62m	914mm	4.27m	7.62m	914mm	4.27m	7.62m	11.3m	914mm	4.27m	7.62m	11.3m		
Reinforcing Steel	Top Slab	T	216	241	305	216	241	305	216	241	305	216	241	311	216	241	311	362		
	Bottom Slab	T ₂	191	267	324	191	267	324	191	267	324	191	273	13	15	191	273	13	15	
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	152	178	178	203	178	178	203	216	216	
	"a" └───┘	Size Bar #	19	13	13	19	13	13	19	13	13	19	13	13	13	19	13	13	13	13
		Spacing	305	241	267	305	241	254	305	241	254	292	241	254	216	292	241	254	216	216
Reinforcing Steel	Length		5.59m	5.54m	5.54m	5.59m	5.54m	5.54m	5.59m	5.54m	5.54m	5.66m	5.61m	5.61m	5.69m	5.66m	5.61m	5.69m	5.74m	5.74m
	Size Bar #	"b"	19	19	22	19	19	22	19	19	22	19	19	22	22	19	19	22	22	22
	"b" └───┘ or "b" └───┘ "b" 																			

NOTE:

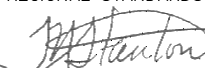
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77G

US TABLE – SPAN 8' (all measurements in feet and/or inches unless otherwise noted).
For Metric Table (2.44m Span) – see drawing D77G

SPAN		8'											
HEIGHT		4'			5'			6'			7'		
STRENGTH CLASSIFICATION	MAX FILL OVER TOP	A	B	C	A	B	C	A	B	C	A	B	C
		3	14	25	3	14	25	3	14	25	3	14	25
Conc.	Top Slab	T ₁	8 1/2	9 1/2	12	8 1/2	9 1/2	12	8 1/2	9 1/2	12	8 1/2	9 1/2
	Bottom Slab	T ₂	7 1/2	10 1/2	12 3/4	7 1/2	10 1/2	12 3/4	7 1/2	10 1/2	12 3/4	7 1/2	10 1/2
	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	Size Bar #	6	4	4	6	4	4	6	4	4	6	4	4
	Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10
	Length	18-4	18-2	18-2	18-4	18-2	18-2	18-4	18-2	18-2	18-7	18-5	18-8
	Size Bar #	6	6	7	6	6	7	6	6	7	6	6	7
	Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10
	Length "b"	17-7	17-8	17-9	17-7	17-8	17-9	17-7	17-8	17-9	17-10	17-10	18-3
	Length "b ₁ "	17-5	17-8	17-9	17-5	17-8	17-9	17-5	17-8	17-9	17-10	17-10	18-7
	Size Bar #	4	6	7	4	6	7	4	6	7	4	6	7
	Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10
	Length	8-6	8-6	8-6	8-6	8-6	8-6	8-6	8-6	8-6	8-7	8-7	8-9
Reinforcing Steel	Top Slab-Tot. No.	16	8	8	16	8	8	16	8	8	16	8	8
	Bottom Slab-Tot. No.	8	8	8	8	8	8	8	8	8	8	8	8
	Size Bar #	4	4	5	4	4	5	4	4	5	4	4	5
	Spacing	18	18	10 1/2	18	12	10	18	11 1/2	10	14	9 1/2	7 1/2
	Spacers	41	155	200	44	172	218	188	229	185	199	248	284
Quan.	Concrete: C.Y. per lin. ft.	1.08	1.30	1.55	1.14	1.37	1.61	1.19	1.42	1.66	1.32	1.56	1.83
	Reinf :lbs per lin. ft.	169	175	200	172	181	218	173	188	229	185	199	248

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/10/2003	
Add Metric		T. Stanton	03/03	DOUBLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-77H	
Edited		T. Stanton	02/09				

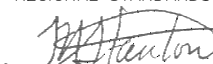
METRIC TABLE – SPAN 3.05m (all measurements in millimeters unless otherwise noted).

For Imperial table (10' Span) – see drawing D77J

SPAN		3.05m																	
HEIGHT		1.52m			1.83m			2.13m			2.44m			3.05m					
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C			
MAX FILL OVER TOP		610mm	5.18m	9.14m	610mm	5.18m	9.14m	610mm	5.18m	9.14m	610mm	4.88m	8.84m	11m	610mm	4.88m	8.84m	11m	
Top Slab		T	222	324	406	222	324	406	222	324	406	222	324	406	222	324	406	445	
Bottom Slab		T ₂	210	343	419	210	343	419	210	349	425	222	343	419	191	203	229	419	470
Sidewalls		T ₃	152	152	152	152	152	152	152	165	179	179	179	191	191	203	229	254	
Reinforcing Steel	Size Bar #	19	13	13	19	13	13	19	13	13	19	13	13	19	13	13	13	13	
	Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229	
	Length	6.81m	6.76m	6.76m	6.81m	6.76m	6.76m	6.81m	6.81m	6.83m	6.88m	6.83m	6.88m	6.96m	6.96m	6.91m	6.99m	7.06m	
	Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	25	25	
	Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229	
	Length "b"	6.58m	6.65m	6.71m	6.58m	6.65m	6.71m	6.58m	6.68m	6.78m	6.65m	6.73m	6.81m	6.93m	6.73m	6.81m	6.93m	7.04m	
	Length "b ₁ "	6.53m	6.65m	6.71m	6.53m	6.65m	6.71m	6.53m	6.68m	6.78m	6.63m	6.71m	6.81m	6.93m	6.71m	6.78m	6.91m	7.06m	
	Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	25	25	
	Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229	
	Length	3.20m	3.20m	3.20m	3.20m	3.20m	3.20m	3.20m	3.23m	3.23m	3.23m	3.23m	3.25m	3.25m	3.25m	3.25m	3.28m	3.30m	
Quon.	Top Slab-Tot. No. Bars	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
	Bottom Slab-Tot. No. Bars	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
	Size Bar #	13	13	16	13	13	16	13	13	19	13	16	19	22	13	19	19	22	
	Spacing	457	254	254	457	152	165	356	152	203	279	216	152	152	191	178	140	127	
	Spacers	48			48			51			54			68					
	Concrete: cu m per lin. ft.	1.07	1.57	1.88	1.10	1.58	1.90	1.15	1.67	2.02	1.28	1.74	2.09	2.32	1.47	1.92	2.33	2.61	
	Reinf: kg per lin. ft.	107	115	141	108	124	147	110	127	154	114	126	161	195	127	148	181	216	

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/10/2003	
Add Metric		T. Stanton	03/03	DOUBLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-77I	

US TABLE – SPAN 10' (all measurements in feet and/or inches unless otherwise noted).

For Metric Table (3.05m Span) – see drawing D771

SPAN		10'											
HEIGHT		5'			6'			7'			8'		
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP		2	17	30	2	17	30	2	17	30	2	16	29
Top Slab	T ₁	8 3/4	12 3/4	16	8 3/4	12 3/4	16	8 3/4	12 3/4	16	8 3/4	12 3/4	16
Bottom Slab	T ₂	8 1/4	13 1/2	16 1/2	8 1/4	13 1/2	16 1/2	8 1/4	13 1/2	16 1/2	8 3/4	13 1/2	16 1/2
Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	7 1/2	7 1/2	8
Size Bar #		6	4	4	6	4	4	6	4	4	6	4	4
Spacing		11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10
Length		22-4	22-2	22-4	22-2	22-4	22-2	22-4	22-2	22-4	22-2	22-4	22-2
Size Bar #		6	7	8	6	7	8	6	7	8	6	7	8
Spacing		11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10
Length		21-7	21-10	22-0	21-7	21-10	22-0	21-7	21-10	22-0	21-7	21-10	22-0
Size Bar #		6	7	8	6	7	8	6	7	8	6	7	8
Spacing		11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10
Length		10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
Top Slab-Tot. No.		18	10	10	18	10	10	18	10	10	18	10	10
Bottom Slab-Tot. No.		10	10	10	10	10	10	10	10	10	10	10	10
Size Bar #		4	4	5	4	4	5	4	4	5	4	4	5
Spacing		18	10	10	18	10	10	18	10	10	18	10	10
Number		48	48	48	48	48	48	51	51	51	54	54	54
Concrete: C.Y. per lin. ft.		1.40	2.05	2.46	1.45	2.07	2.48	1.51	2.18	2.64	1.68	2.27	2.74
Reinf :lbs per lin. ft.		236	254	310	238	274	324	243	280	339	252	278	355

NOTE:
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	03/03
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77J

METRIC TABLE – SPAN 3.66M (all measurements in millimeters unless otherwise noted).
For Imperial Table (12' Span) – See Drawing D-77L

SPAN		3.66m											
HEIGHT		1.83m				2.44m				2.74m			
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C	D
MAX FILL OVER TOP		610mm	4.27m	7.9m		610mm	4.27m	7.9m		610mm	4.27m	7.9m	11m
Conc.	Top Slab	T ₁	254	356	445	254	362	445	260	368	451	527	260
	Bottom Slab	T ₂	235	375	457	235	381	464	248	387	476	546	267
	Sidewalls	T ₃	152	152	165	178	178	178	203	203	216	229	241
Reinforcing Steel	Size Bar #	19	13	13	19	13	13	13	19	13	13	13	13
	Spacing	229	292	229	229	229	292	229	229	279	216	229	229
	Length	8.03m	7.98m	8.03m	8.10m	8.05m	8.03m	8.18m	8.13m	8.20	8.26m	8.26m	8.31m
Reinforcing Steel	Size Bar #	19	25	25	19	25	25	25	19	25	25	25	19
	Spacing	229	292	229	229	229	292	229	229	279	216	229	229
	Length	7.82m	7.87m	8.00m	7.90m	7.95m	8.03m	7.98m	8.03m	8.13m	8.05m	8.13m	8.20
Reinforcing Steel	Size Bar #	16	25	25	16	25	25	25	16	25	25	25	16
	Spacing	229	292	229	229	229	292	229	229	279	216	229	229
	Length	3.81m	3.81m	3.84m	3.84m	3.84m	3.86m	3.89m	3.89m	3.89m	3.91m	3.94m	3.96m
Reinforcing Steel	Top Slab-Tot. No.	24	10	10	24	10	10	10	24	10	10	10	10
	Bottom Slab-Tot. No.	10	10	10	10	10	10	10	10	10	10	10	10
	Size Bar #	13	13	16	13	13	13	16	13	16	22	25	19
Reinforcing Steel	Size Bar #	457	203	203	381	152	165	165	305	140	152	229	216
	Spacing	52	52	52	55	55	68	68	68	68	72	72	76
	Number	1.41	1.98	2.42	1.51	2.12	2.51	1.67	2.24	2.74	1.82	2.47	2.95
Quon.	Concrete: cu m per lin. ft.	140	144	182	142	150	188	152	165	209	156	179	235
	Reinft: kg per lin. ft.												

NOTE:

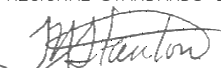
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77K

For Metric Table (3.66m Span) – see drawing D77K

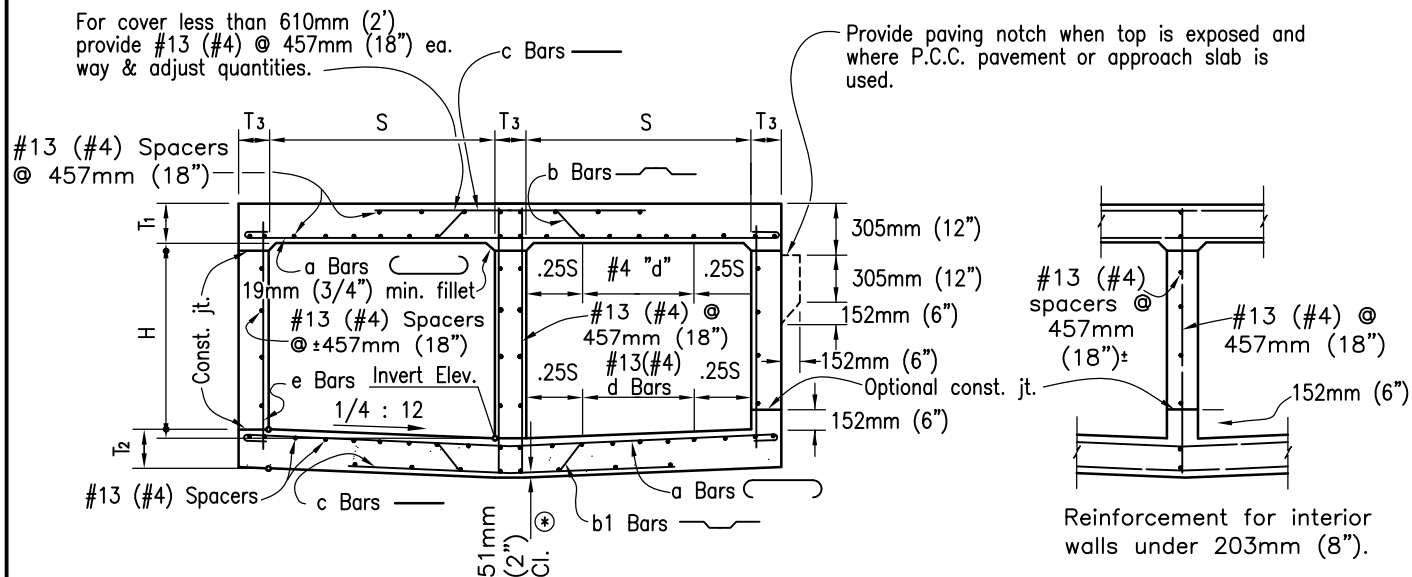
NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

SAN DIEGO REGIONAL STANDARD DRAWINGRECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

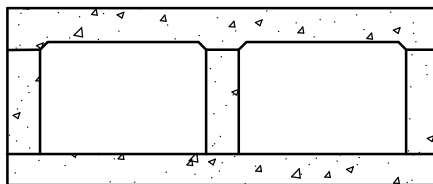
DRAWING NUMBER D-77L



TYPICAL SECTION

(Showing reinforcement for interior walls 203mm (8") and over.)

⊛ For reinforcement clearance, except at bottom, see "Miscellaneous Details."



"FLAT INVERT" ALTERNATIVE

(When shown)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT DETAILS NO. 2

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77M

METRIC TABLE – SPAN 1.22m (all measurements in millimeters unless otherwise noted).

For Imperial table (4' Span) – see drawing D78B

SPAN		1.22m											
HEIGHT		610mm				914mm				1.22m			
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C	
MAX FILL OVER TOP		3m	7.3m	11.6m		3m	7.3m	11.6m		3m	7.3m	11.6m	
Conc.	Top Slab	T ₁	159	159	184	159	159	184		159	159	184	
	Bottom Slab	T ₂	152	178	210	152	178	210		152	178	210	
	Sidewalls	T ₃	152	152	152	152	152	152		152	152	152	
	Size Bar #		16	13	16	16	13	16		16	13	16	
Reinforcing Steel	Spacing		279	286	330	279	286	330		279	286	330	
	Length		4.50m	4.47m	4.50m	4.50m	4.47m	4.50m		4.50m	4.47m	4.50m	
	Size Bar #		16	16	19	16	16	19		16	16	19	
	Spacing		279	286	330	279	286	330		279	286	330	
Reinforcing Steel	Length		4.32m	4.32m	4.34m	4.32m	4.32m	4.34m		4.32m	4.32m	4.34m	
	Size Bar #		13	16	19	13	16	19		13	16	19	
	Spacing		279	286	330	279	286	330		279	286	330	
	Length		2.74m	2.74m	2.74m	2.74m	2.74m	2.74m		2.74m	2.74m	2.74m	
Quon.	Top Slab-Tot. No.		15	9	9	15	9	9		15	9	9	
	Bottom Slab-Tot. No.		9	9	9	9	9	9		9	9	9	
	Size Bar #		13	13	13	13	13	13		13	13	13	
	Spacing		457	457	457	457	457	457		457	457	457	
Quon.	Spacers		34			38				42			
	Concrete: cu m per lin. ft.		0.51	0.54	0.62	0.57	0.60	0.68		0.63	0.66	0.73	
	Reinf: kg per lin. ft.		55	50	60	58	52	63		59	55	67	

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	TRIPLE BOX CULVERT DETAILS No. 1		 3/10/2003	
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-78A	

US TABLE - SPAN 4' (all measurements in feet and/or inches).

For Metric table (1.22m Span) - see drawing D78A

SPAN		4'												
HEIGHT		2'				3'				4'				
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	
MAX FILL OVER TOP		10	24	38	10	24	38	10	24	38	10	24	38	
Conc.	Top Slab	T ₁	6 1/4	1/4	7 1/4	6 1/4	1/4	7 1/4	6 1/4	1/4	7 1/4	6 1/4	1/4	7 1/4
	Bottom Slab	T ₂	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4
	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"a" └───┘	Size Bar #	5	4	5	5	4	5	5	4	5	5	4	5
		Spacing	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
		Length	14-9	14-8	14-9	14-9	14-8	14-9	14-9	14-8	14-9	14-9	14-8	14-9
	"b" or "b ₁ "	Size Bar #	5	5	6	5	5	6	5	5	6	5	5	6
		Spacing	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
		Length "b"	14-2	14-2	14-3	14-2	14-2	14-3	14-2	14-2	14-3	14-2	14-2	14-3
	"c"	Length "b ₁ "	14-0	14-2	14-3	14-0	14-2	14-3	14-0	14-2	14-3	14-0	14-2	14-3
		Size Bar #	4	5	6	4	5	6	4	5	6	4	5	6
		Spacing	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
	"d" Dist Bars	Length	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0
		Top Slab-Tot. No.	15	9	9	15	9	9	15	9	9	15	9	9
"e" Bars	Bottom Slab-Tot. No.	9	9	9	9	9	9	9	9	9	9	9	9	
	Size Bar #	4	4	4	4	4	4	4	4	4	4	4	5	
	Spacing	18	18	18	18	18	18	18	18	18	18	11 1/2	13	
Spacers		34				38				42				
Concrete: C.Y. per lin. ft.		0.67	0.71	0.81	0.75	0.79	0.89	0.82	0.86	0.96	0.82	0.86	0.96	
Reinf :lbs per lin. ft		122	110	133	127	115	138	131	122	147	131	122	147	

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	TRIPLE BOX CULVERT DETAILS No. 1			3/01/2003
Add Metric		T. Stanton	03/03				Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-78B	
Edited		T. Stanton	02/09				

METRIC TABLE – SPAN 1.52m (all measurements in millimeters unless otherwise noted).
For Imperial table (5' Span) – see drawing D78B

SPAN		1.52m											
HEIGHT		610mm				914mm				1.22m			
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C	D
MAX FILL OVER TOP		2.4m	5.2m	7.9m		2.4m	5.2m	7.9m		2.4m	5.2m	7.9m	10.7m
Top Slab	T ₁	171	171	191		171	171	191		171	171	191	216
Bottom Slab	T ₂	159	184	216		159	184	216		159	184	216	241
Sidewalls	T ₃	152	152	152		152	152	152		152	152	152	152
"a" Spacing Length	Size Bar #	16	13	16		16	13	16		16	13	16	19
	Spacing	254	286	330		254	286	330		254	279	330	286
	Length	5.41m	5.38m	5.41m		5.41m	5.38m	5.41m		5.41m	5.38m	5.41m	5.41m
"b" or "b ₁ " Length "b ₁ "	Size Bar #	16	16	19		16	16	19		16	16	19	19
	Spacing	254	286	330		254	286	330		254	279	330	286
	Length	5.26m	5.26m	5.26m		5.26m	5.26m	5.26m		5.26m	5.26m	5.26m	5.31m
"c" Spacing Length	Size Bar #	13	16	19		13	16	19		13	16	19	19
	Spacing	254	286	330		254	286	330		254	279	330	286
	Length	3.35m	3.35m	3.35m		3.35m	3.35m	3.35m		3.35m	3.35m	3.35m	3.35m
"d" Dist	Top Slab–Tot. No.	18	9	9		18	9	9		18	9	9	9
Bars	Bottom Slab–Tot. No.	9	9	9		9	9	9		9	9	9	9
"e"	Size Bar #	13	13	13		13	13	13		13	13	13	13
Bars	Spacing	457	457	457		457	457	457		457	432	286	286
Spacers	Number	34				38				38			42
Concrete: cu m per lin. ft.		0.63	0.66	0.75		0.69	0.73	0.80		0.74	0.78	0.86	0.94
Reinf: kg per lin. ft.		68	57	69		70	59	71		71	62	73	82
Qua.													

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78C

US TABLE - SPAN 5' (all measurements in feet and/or inches).
For Metric table (1.52m Span) - see drawing D78C

SPAN		5'											
HEIGHT		2'				3'				4'			
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C	D
MAX FILL OVER TOP		8	17	26		8	17	26		8	17	26	35
Top Slab	T ₁	6 3/4	6 3/4	7 1/2	6 3/4	6 3/4	6 3/4	7 1/2	6 3/4	6 3/4	6 3/4	7 1/2	8 1/2
Bottom Slab	T ₂	6 1/4	7 1/4	8 1/2	6 1/4	7 1/4	8 1/2	6 1/4	7 1/4	8 1/2	6 1/4	7 1/2	9 1/2
Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6
Size Bar #		5	4	5	5	4	5	4	5	5	4	5	5
Spacing		10	11 1/2	13	10	11 1/2	13	10	11 1/2	13	11 1/2	10	13
Length		17-9	17-8	17-9	17-9	17-8	17-9	17-9	17-8	17-9	17-9	17-8	17-9
Size Bar #		5	5	6	5	5	5	6	5	5	5	5	6
Spacing		10	11 1/2	13	10	11 1/2	13	10	11 1/2	13	11 1/2	10	13
Length "b"		17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-5
Length "b ₁ "		17-0	17-2	17-4	17-0	17-2	17-4	17-0	17-2	17-4	17-0	17-2	17-5
Size Bar #		4	5	6	4	5	6	4	5	6	4	5	6
Spacing		10	11 1/2	13	10	11 1/2	13	10	11 1/2	13	11 1/2	10	13
Length		11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0
Top Slab-Tot. No.	"d" Dist	18	9	9	18	9	9	9	18	9	9	9	9
Bottom Slab-Tot. No.	Bars	9	9	9	9	9	9	9	9	9	9	9	9
Size Bar #	"e"	4	4	4	4	4	4	4	4	4	4	4	4
Spacing	Bars	18	18	18	18	18	18	18	18	17 11/2	11 1/2	18	11 1/2
Spacers	Number	34				38				38			
Concrete: C.Y. per lin. ft.		0.82	0.87	0.98	0.90	0.95	1.05	0.97	1.02	1.13	1.23	1.04	1.11
Reinf :lbs per lin. ft.		150	126	153	155	130	157	136	161	181	161	143	171
Quan.										42			

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
ORIGINAL		Kercheval	12/75	TRIPLE BOX CULVERT DETAILS No. 1				 3/01/2003 Chairperson R.C.E. 19246 Date			
Add Metric		T. Stanton	03/03								
Reviewed		T. Stanton	04/06								
Edited		T. Stanton	02/09								
								DRAWING NUMBER D-78D			

METRIC TABLE – SPAN 1.83m (all measurements in millimeters unless otherwise noted).
For Imperial table (6' Span) – see drawing D78F

SPAN		1.83m															
HEIGHT		914mm				1.22m				1.52m				1.83m			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D
MAX FILL OVER TOP		914	3.96m	7.01m	914	3.96m	7.01m	914	3.96m	7.01m	914	3.96m	7.01m	914	3.96m	7.01m	9.14m
Conc.	Top Slab	T ₁	191	191	210	191	191	210	191	191	210	235	191	191	210	235	235
	Bottom Slab	T ₂	152	197	235	152	197	235	152	197	235	254	152	203	235	260	
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152
		Size Bar #	16	13	13	16	13	13	13	16	13	13	13	13	16	13	13
Reinforcing Steel	Spacing	330	356	292	330	356	292	330	356	292	330	356	292	330	356	292	254
	Length	6.35m	6.32m	6.32m	6.35m	6.32m	6.32m	6.32m	6.35m	6.32m	6.32m	6.32m	6.35m	6.32m	6.32m	6.32m	6.32m
	Size Bar #	16	19	19	16	19	19	19	16	19	19	22	16	19	19	22	22
	Spacing	330	356	292	330	356	292	330	356	292	330	356	292	330	356	292	254
	Length "b"	6.17m	6.17m	6.22m	6.17m	6.17m	6.22m	6.17m	6.22m	6.17m	6.22m	6.25m	6.17m	6.17m	6.22m	6.25m	6.25m
	Length "b ₁ "	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.27m
	Size Bar #	13	19	19	13	19	19	13	19	19	13	19	22	13	19	19	22
	Spacing	330	356	292	330	356	292	330	356	292	330	356	292	330	356	292	254
	Length	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m
	Top Slab—Tot. No.	12	6	6	12	6	6	6	12	6	6	6	6	12	6	6	6
Quon.	Bottom Slab—Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Size Bar #	13	13	13	13	13	13	13	13	13	13	16	16	13	16	19	19
	Spacing	457	457	457	457	457	292	457	292	457	292	305	254	457	203	305	254
	Spacers	30			33			36						36			
Concrete: cu m per lin. ft.		0.80	0.88	0.99	0.86	0.94	1.05	0.91	1.00	1.10	1.19	0.97	1.06	1.16	1.25		
Reinf: kgs per lin. ft.		82	76	89	83	77	91	85	80	95	107	87	85	100	113		

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/10/2003	
Add Metric		T. Stanton	03/03	TRIPLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-78E	

US TABLE – SPAN 6' (all measurements in feet and/or inches).

For Metric table (1.83m Span) – see drawing D78E

SPAN		6'											
HEIGHT		3'				4'				5'			
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C	D
MAX FILL OVER TOP		3	13	23		3	13	23		3	13	23	30
Top Slab	T ₁	7 1/2	7 1/2	8 1/4	7 1/2	8 1/4	7 1/2	8 1/4	7 1/2	8 1/4	7 1/2	8 1/4	9 1/4
Bottom Slab	T ₂	6	7 3/4	9 1/4	6	7 3/4	9 1/4	6	8	9 1/4	10	6	8
Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6
Size Bar #		6	5	5	6	5	5	6	5	5	5	6	5
Spacing		13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14
Length		20-10	20-9	20-9	20-10	20-9	20-9	20-10	20-9	20-9	20-9	20-9	20-9
Size Bar #		6	6	6	6	6	6	6	6	6	6	6	6
Spacing		13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14
Length		20-3	20-3	20-5	20-3	20-3	20-5	20-3	20-3	20-5	20-6	20-3	20-5
Length		20-0	20-2	20-5	20-0	20-2	20-5	20-0	20-2	20-5	20-6	20-0	20-5
Size Bar #		4	6	6	4	6	6	4	6	6	6	4	6
Spacing		13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14
Length		13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0
Top Slab-Tot. No.		18	9	9	18	9	9	18	9	9	9	18	9
Bottom Slab-Tot. No.		9	9	9	9	9	9	9	9	9	9	9	9
Size Bar #		4	4	4	4	4	4	4	4	4	5	4	4
Spacing		18	18	18	18	18	18	18	18	11 1/2	12	10	8
Bars		40	40	40	40	40	40	40	40	52	48	48	48
Quon.		1.05	1.15	1.29	1.12	1.23	1.37	1.19	1.32	1.44	1.55	1.27	1.39
Reinf		181	168	196	183	170	200	187	177	209	235	192	187

Note

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78F

METRIC TABLE – SPAN 2.44m (all measurements in millimeters unless otherwise noted).
For Imperial table (8' Span) – see drawing D78BH

SPAN		2.44m															
HEIGHT		1.22m			1.52m			1.83m			2.13m			2.44m			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D
MAX FILL OVER TOP		610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	8.5m
Top Slab Bottom Slab Sidewalls Conc.	T ₁	210	210	260	210	210	260	210	210	260	210	210	260	210	210	260	286
	T ₂	165	229	279	165	235	279	165	235	279	171	235	11	311	171	235	279
	T ₃	152	152	152	152	152	152	152	152	152	152	152	165	165	178	178	191
	Size Bar #	19	16	16	19	16	16	19	16	16	19	16	16	19	19	16	16
	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	286	286	286	305
Length or "b" "b ₁ "	Length	8.18m	8.15m	8.15m	8.18m	8.15m	8.15m	8.18m	8.15m	8.15m	8.18m	8.15m	8.20m	8.33m	8.28m	8.26m	8.31m
	Size Bar #	19	19	22	19	19	22	19	19	22	19	19	22	22	19	19	22
	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	286	286	286	305
	Length "b"	8.05m	8.05m	8.10m	8.05m	8.05m	8.10m	8.05m	8.05m	8.10m	8.05m	8.05m	8.15m	8.31m	8.15m	8.15m	8.26m
	Length "b ₁ "	12.19m	8.03m	8.10m	12.19m	8.05m	8.10m	12.19m	8.05m	8.10m	7.95m	8.05m	8.15m	8.31m	8.05m	8.15m	8.26m
"c" —	Size Bar #	13	19	22	13	19	22	13	19	22	145	19	22	22	145	19	22
	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	286	286	286	305
	Length	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.21m	5.26m	5.23m	5.26m	5.31m
	Top Slab-Tot. No.	24	12	12	24	12	12	24	12	12	24	12	12	12	24	12	12
	Bottom Slab-Tot. No.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
"e" Bars	Size Bar #	13	13	13	13	13	16	13	16	19	13	19	22	22	13	19	22
	Spacing	457	457	305	457	305	305	457	305	305	286	305	305	286	286	286	305
	Spacers	58	58	58	62	62	62	62	62	62	66	66	66	66	70	70	88
	Concrete: cu m per lin. ft.	1.12	1.28	1.52	1.18	1.35	1.57	1.24	1.41	1.64	1.31	1.46	1.73	1.96	1.45	1.61	1.88
	Reinf: kg per lin. ft.	118	113	137	121	117	141	121	120	145	125	126	152	186	128	134	157

NOTE:

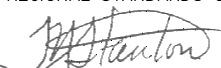
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78G

US TABLE – SPAN 8' (all measurements in feet and/or inches).
For Metric table (2.44m Span) – see drawing D78G

SPAN		8'																											
HEIGHT		4'				5'				6'				7'				8'											
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	A	B	C	D				
MAX FILL OVER TOP		2	11	20	2	11	20	2	11	20	2	11	20	2	11	20	28	2	11	20	28	2	11	20	28				
Conc.	Top Slab	T1	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	11 1/2	8 1/4	8 1/4	10 1/4	11 1/2	8 1/4	8 1/4	10 1/4	11 1/2			
	Bottom Slab	T2	6 1/2	9	11	6 1/2	9	1/4	11	6 1/2	9	1/4	11	6 3/4	9	1/4	11	12 1/4	6 3/4	9	1/4	11	12 1/4	6 3/4	9	1/4	11		
	Sidewalls	T3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6 1/2	6 1/2	7	7	7 1/2	8 1/2	7	7	7 1/2	8 1/2		
Reinforcing Steel	"a" └───┘	Size Bar #	6	5	5	6	5	5	6	5	5	6	5	5	6	5	5	6	6	5	5	6	5	5	6	5	6		
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2		
		Length	26-10	26-9	26-9	26-10	26-9	26-9	26-10	26-9	26-10	26-9	26-9	26-10	26-9	26-10	26-9	26-10	26-9	26-11	27-4	27-2	27-1	27-3	27-1	27-3	27-8		
	"b" └───┘ or "b1"	Size Bar #	6	6	7	6	6	7	6	6	6	7	6	6	7	6	6	7	7	6	6	7	6	6	7	7	7		
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2		
		Length	26-5	26-5	26-7	26-5	26-5	26-7	26-5	26-5	26-7	26-5	26-5	26-7	26-5	26-5	26-5	26-9	27-3	26-9	26-9	27-3	26-9	26-9	27-1	27-7	27-1		
	"c" └───┘	Length "b1"	26-0	26-4	26-7	26-0	26-5	26-7	26-0	26-5	26-7	26-0	26-5	26-7	26-0	26-5	26-7	26-1	26-5	26-9	27-3	26-5	26-9	27-1	27-7	27-1	27-7		
		Size Bar #	4	6	7	4	6	7	4	6	7	4	6	7	4	6	7	4	6	7	4	6	7	4	6	7	7		
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2		
	"d" Dist Bars	Length	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-1	17-3	17-2	17-2	17-3	17-3	17-5	17-5		
		Top Slab-Tot. No.	24	12	12	24	12	12	24	12	12	24	12	12	24	12	12	24	12	24	12	12	24	12	12	12	12		
		Bottom Slab-Tot. No.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
	"e" Bars	Size Bar #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
		Spacing	18	18	12	18	12	12	18	12	12	18	12	12	18	12	12	11 1/2	12	12	11 1/2	11 1/2	12	12	10 1/2	12	10 1/2		
		Bars	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58		
	Spacers		62																										
	Concrete: C.Y. per lin. ft.		1.47	1.67	1.99	1.54	1.76	2.06	1.62	1.84	2.14	1.71	1.91	2.26	2.57	1.90	2.10	2.46	2.79	2.46	2.79	2.46	2.79	2.46	2.79	2.46	2.79		
	Reinf. :lbs per lin. ft.		261	250	301	266	257	310	267	264	320	276	277	336	409	283	295	347	441	347	441	347	441	347	441	347	441		
Quan.																													

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78H

METRIC TABLE – SPAN 3.05m (all measurements in millimeters unless otherwise noted).

For Imperial table (10' Span) – see drawing D78BJ

SPAN		3.05m																	
HEIGHT		1.52m			1.83m			2.13m			2.44m			3.05m					
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	
MAX FILL OVER TOP		610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	28	610	3.4m	6.1m	28	
Conc.	Top Slab	T ₁	229	254	305	229	254	305	229	254	305	229	254	305	362	229	260	318	368
	Bottom Slab	T ₂	191	273	330	191	273	330	191	273	330	197	279	330	381	203	279	343	381
	Sidewalls	T ₃	152	152	152	152	152	152	152	152	165	178	178	191	216	203	216	229	254
	"a"	Size Bar #	19	19	19	19	19	19	19	19	19	19	19	19	22	19	19	19	22
		Spacing	267	330	254	254 1/4	330	254	267	330	254	267	330	254	279	267	330	254	279
Reinforcing Steel	Length	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.11m	10.11m	10.16m	10.26m	10.21m	10.26m	10.31m	10.41m
	"b" or "b ₁ "	Size Bar #	19	22	22	19	22	22	19	22	22	19	22	22	25	19	22	22	25
		Spacing	267	330	254	254 1/4	330	254	267	330	254	267	330	254	279	267	330	254	279
		Length "b"	9.91m	9.93m	10.01m	9.91m	9.93m	10.01m	9.91m	9.93m	10.06m	10.01m	10.03m	10.16m	10.31m	9.80m	10.19m	10.31m	10.49m
	Length "b ₁ "	9.80m	9.93m	10.03m	9.80m	9.93m	10.03m	9.80m	9.93m	10.31m	9.91m	10.03m	10.19m	10.31m	10.03m	10.19m	10.31m	10.49m	
Reinforcing Steel	"c"	Size Bar #	16	22	22	16	22	22	16	22	22	16	22	22	16	22	22	25	
		Spacing	267	330	254	267	330	254	267	330	254	267	330	254	279	267	330	254	279
		Length	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.43m	6.45m	6.45m	6.48m	6.53m	6.50m	6.53m	6.55m	6.60m
	"a" Dist Bars	Top Slab—Tot. No.	27	15	15	27	15	15	27	15	15	27	15	15	15	27	15	15	15
		Bottom Slab—Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Reinforcing Steel	"e"	Size Bar #	13	13	16	13	16	19	13	19	22	13	19	22	25	16	19	25	25
		Spacing	457	330	254	457	330	254	330	330	254	267	305	10	279	267	229	254	229
		Spacers	68	68	68	68	68	68	72	72	72	76	76	94	102	102	102	102	102
	Concrete: cu m per lin. ft.	1.51	1.83	2.16	1.57	1.90	2.22	1.63	1.95	2.32	1.79	2.12	2.47	2.90	2.05	2.43	2.85	3.23	
		Reinf kg per lin. ft.	162	169	213	163	172	219	166	177	228	171	182	233	268	191	205	262	287

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75			 3/01/2003	
Add Metric		T. Stanton	03/03	TRIPLE BOX CULVERT DETAILS No. 1		Chairperson R.C.E. 19246 Date	
Reviewed		T. Stanton	04/06			DRAWING NUMBER D-78I	

US TABLE – SPAN 10' (all measurements in feet and/or inches).
For Metric table (3.05m Span) – see drawing D78I

SPAN		10'																	
HEIGHT		5'			6'			7'			8'			10'					
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	
MAX FILL OVER TOP		2	11	20	2	11	20	2	11	20	2	11	20	28	2	11	20	28	
Top Slab	T ₁	9	10	12	9	10	12	9	10	12	9	10	12	14 1/4	9	10 1/4	12 1/2	14 1/2	
Bottom Slab	T ₂	7 1/2	10 3/4	13	7 1/2	10 3/4	13	7 1/2	10 3/4	13	7 3/4	11	13	15	8	11	13 1/2	15	
Sidewalls	T ₃	6	6	6	6	6	6	6	6	6 1/2	7	7 1/2	8 1/2	8	8 1/2	9	10	10	
Reinforcing Steel	Size Bar #	6	6	6	6	6	6	6	6	6	6	6	6	7	6	6	6	7	
	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11	
	Length	32-10	32-10	32-10	32-10	32-10	32-10	32-10	32-10	32-10	33-2	33-2	33-4	33-8	33-6	33-8	33-10	34-2	
	Size Bar #	6	7	7	6	7	7	6	7	7	6	7	7	8	6	7	7	8	
Reinforcing Steel	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11	
	Length "b"	32-6	32-7	32-10	32-6	32-7	32-10	32-6	32-7	32-10	32-6	32-7	32-10	32-11	33-4	33-11	32-2	33-5	
	Length "b ₁ "	32-2	32-7	32-11	32-2	32-7	32-11	32-2	32-7	32-11	32-2	32-7	32-11	32-2	33-5	33-11	32-2	33-5	
	Length "b ₁ "	32-2	32-7	32-11	32-2	32-7	32-11	32-2	32-7	32-11	32-2	32-7	32-11	32-2	33-5	33-11	32-2	33-5	
Reinforcing Steel	Size Bar #	5	7	7	5	7	7	5	7	7	5	7	7	8	5	7	7	8	
	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11	
	Length	21-0	21-0	21-0	21-0	21-0	21-0	21-0	21-0	21-0	21-1	21-2	21-2	21-3	21-5	21-4	21-5	21-6	
	Top Slab-Tot. No.	27	15	15	27	15	15	27	15	15	27	15	15	15	15	27	15	15	
Reinforcing Steel	Bottom Slab-Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
	Size Bar #	4	4	5	4	5	6	4	6	7	4	6	7	8	5	6	8	8	
	Bars	18	13	10	18	13	10	13	13	10	10 1/2	12	10	11	10 1/2	9	10	9	
	Spacers	68			68			72			76			94			102		
Reinforcing Steel	Concrete: C.Y. per lin. ft.	1.98	2.40	2.82	2.06	2.48	2.90	2.13	2.55	3.03	2.34	2.77	3.23	3.78	2.68	3.18	3.73	4.22	
	Reinf. :lbs per lin. ft.	358	372	470	359	379	482	367	391	502	377	402	514	594	421	453	577	632	

NOTE:

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78J

METRIC TABLE – SPAN 3.66m (all measurements in millimeters unless otherwise noted).

For Imperial table (12' Span) – see drawing D78B

SPAN		3.66m																														
HEIGHT		1.83m				2.13m				2.44m				2.74m				3.05m				3.66m										
STRENGTH CLASSIFICATION	MAX FILL OVER TOP	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D			
		610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	610			
Conc.	Top Slab	T ₁	260	286	356	260	286	356	260	286	356	260	286	356	260	286	356	260	286	356	260	286	356	260	286	356	260	286	356	451		
	Bottom Slab	T ₂	210	305	388	216	305	375	216	305	375	216	305	375	222	318	394	222	318	394	222	318	394	222	318	394	222	318	394	464		
	Sidewalls	T ₃	152	152	165	152	152	178	178	178	191	203	203	229	254	203	203	229	254	203	203	229	254	203	203	229	254	203	203	305		
Reinforcing Steel	"a"	Size Bar #	22	19	22	22	19	22	22	19	22	22	19	22	22	19	22	22	19	22	22	19	22	22	19	22	22	19	22	25		
		Spacing	305	11	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	286		
		Length	11.91m	11.84m	11.96m	11.91m	11.84m	12.01m	12.01m	11.94m	12.07m	12.12m	12.04m	12.22m	12.45m	12.12m	12.04m	12.22m	12.45m	12.12m	12.04m	12.22m	12.45m	12.12m	12.04m	12.22m	12.45m	12.12m	12.04m	12.37m	12.65m	
	"b"	Size Bar #	22	22	25	22	22	25	22	22	25	22	22	25	22	22	25	22	22	25	22	22	25	22	22	25	22	22	25	29		
		Spacing	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	286		
		Length	11.76m	11.81m	11.96m	11.76m	11.81m	12.01m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	11.86m	11.91m	12.07m	12.40m	12.65m	
	"b ₁ "	Length	11.66m	11.76m	11.94m	11.66m	11.81m	12.01m	11.66m	11.81m	12.01m	11.76m	11.91m	12.07m	11.76m	11.91m	12.07m	11.89m	12.04m	12.24m	12.45m	11.89m	12.04m	12.24m	12.45m	11.89m	12.04m	12.24m	12.45m	11.99m	12.42m	12.65m
		Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	19	22	25	29		
		Spacing	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	305	279	286	286		
	"c"	Length	7.62m	7.62m	7.65m	7.62m	7.62m	7.67m	7.67m	7.70m	7.72m	7.72m	7.77m	7.82m	7.72m	7.72m	7.77m	7.82m	7.72m	7.72m	7.77m	7.82m	7.72m	7.72m	7.77m	7.82m	7.72m	7.72m	7.77m	7.85m	7.92m	
Top Slab-Tot. No.		36	15	15	36	15	15	36	15	15	36	15	15	36	15	15	36	15	15	36	15	15	36	15	15	36	15	15	15			
Bottom Slab-Tot. No.		15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15			
Bars	Size Bar #	13	13	19	13	13	19	13	13	19	13	13	19	13	13	19	13	13	19	13	13	19	13	13	19	13	13	19	22	29		
	Spacing	457	178	286	305	146	286	305	140	229	254	267	279	286	305	267	279	286	305	267	279	286	305	267	279	286	305	229	279	229		
	Spacers	Number	76			80			84					104			110									116						
Quan.	Concrete: cu m per lin. ft.	1.99	2.43	2.92	2.06	2.49	3.04	2.20	2.64	3.16	2.39	2.90	3.52	4.17	2.47	2.97	3.61	4.32	2.77	3.27	4.01	2.77	3.27	4.01	2.77	3.27	4.01	4.72				
	Reinf. kg per lin. ft.	222	229	285	225	234	289	229	239	297	243	264	326	396	249	275	338	426	261	288	360	261	288	360	261	288	360	440				

NOTE:

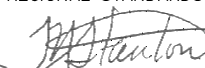
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78K

US TABLE – SPAN 12' (all measurements in feet and/or inches).
For Metric table (3.66m Span) – see drawing D78I

SPAN		12'																									
HEIGHT		6'				7'				8'				9'				10'				12'					
STRENGTH CLASSIFICATION		A	B	C		A	B	C		A	B	C		A	B	C		A	B	C		A	B	C		D	
MAX FILL OVER TOP		2	10	18		2	10	18		2	10	18		2	11	20	30		2	11	20	30		2	11	20	30
Conc.	Top Slab	T ₁	10 1/4	11 1/2	14	10 1/4	11 1/2	14		10 1/4	11 1/2	14		10 1/4	11 1/2	14		10 1/4	11 1/2	14		10 1/4	11 1/2	14		10 1/4	
	Bottom Slab	T ₂	8 1/4	12	14 1/2	8 1/2	12	14 3/4	8 1/2	12	14 3/4	8 1/2	12	14 3/4	8 3/4	12 1/2	15 1/2	18 1/4	8 3/4	12 1/2	15 1/2	18 1/4	9	12 3/4	15 3/4	17 3/4	
	Sidewalls	T ₃	6	6	6 1/2	6	6	7	7	7	7 1/2	8	8	9	10	8	8	9	10 1/2	9	10 1/2	9	9	10 1/2	12		
Reinforcing Steel	Size Bar #	7	6	7		7	6	7		7	6	7		7	6	7		7	6	7		7	6	7		8	
	Spacing	12	11	11 1/2		12	11	11 1/2		12	11	11 1/2		12	10 1/2	11	11 1/2		12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2	
	Length "b"	38-7	38-9	39-3		38-7	38-9	39-5	38-11	39-1	39-7	39-3	39-6	40-2	40-10	39-3	39-6	40-2	41-0	39-7	39-10	40-4	39-7	39-10	40-4	41-6	
	Length "b ₁ "	38-3	38-7	39-2		38-3	38-9	39-5	38-7	39-1	39-7	39-0	39-6	40-2	40-10	39-0	39-6	40-2	41-0	39-4	39-10	40-4	39-10	40-4	41-6		
	Size Bar #	6	7	8		6	7	8		6	7	8		6	7	8		6	7	8		6	7	8		9	
	Spacing	12	11	11 1/2		12	11	11 1/2		12	11	11 1/2		12	10 1/2	11	11 1/2		12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2	
	Length	25-0	25-1	25-0		25-0	25-0	25-2	25-2	25-2	25-2	25-3	25-4	25-4	25-6	25-8	25-4	25-6	25-9	25-6	25-9	25-6	25-6	25-9	26-0		
	Top Slab-Tot. No.	36	15	15		36	15	15		36	15	15		36	15	15		36	15	15		36	15	15		15	
	Bottom Slab-Tot. No.	15	15	15		15	15	15		15	15	15		15	15	15		15	15	15		15	15	15		15	
	Size Bar #	4	4	6		4	4	6		4	4	6		4	6	7		8	5	7		8	6	7		9	
Bars	18	7	11 1/2		12	5 3/4	11 1/2		12	5 1/2	9		10	10 1/2	11	11 1/2		12	10 1/2	11	11 1/2	12	9	11		9	
Spacing					80																						
Spacers	Number	76								84					104											116	
Concrete: C.Y. per lin. ft.		2.60	3.18	3.82		2.70	3.26	3.98		2.88	3.45	4.13		3.13	3.79	4.61		5.45	3.23	3.89	4.72		5.65	3.62	4.28	5.24	6.18
Reinf :lbs per lin. ft		489	505	628		497	516	637		505	527	654		536	582	719		872	548	606	745		939	575	636	793	963

NOTE:

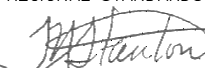
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

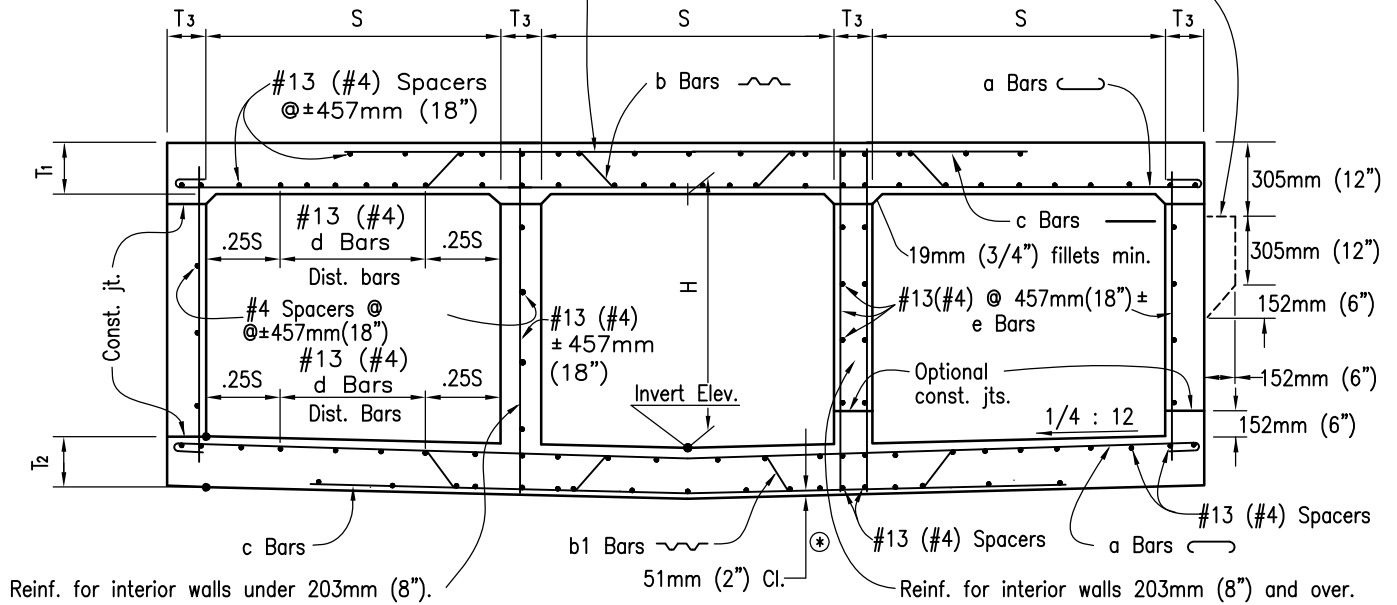
 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-78L

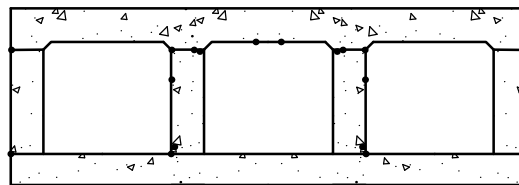
For cover less than 610mm (2'), extend c bars full length, top slab only. Provide additional #13 (#4) @ 457mm (18")± and adjust quantities.

Provide paving notch when top is exposed and where P.C.C. pavement or approach slab is used.



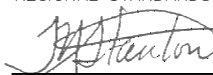
TYPICAL SECTION

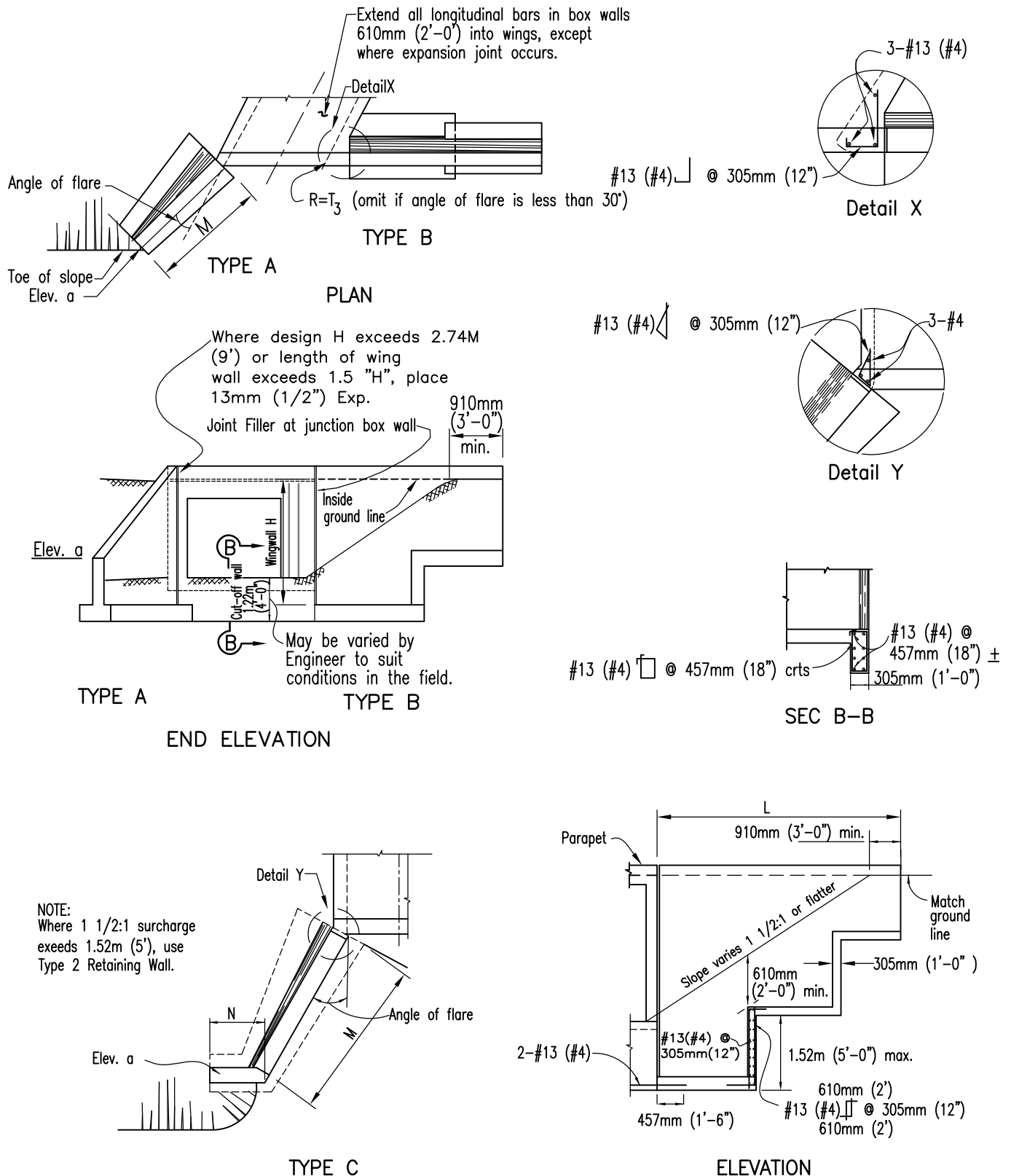
⊛ For reinforcement clearance, except at bottom, see "Miscellaneous Details."

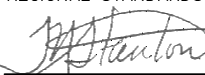


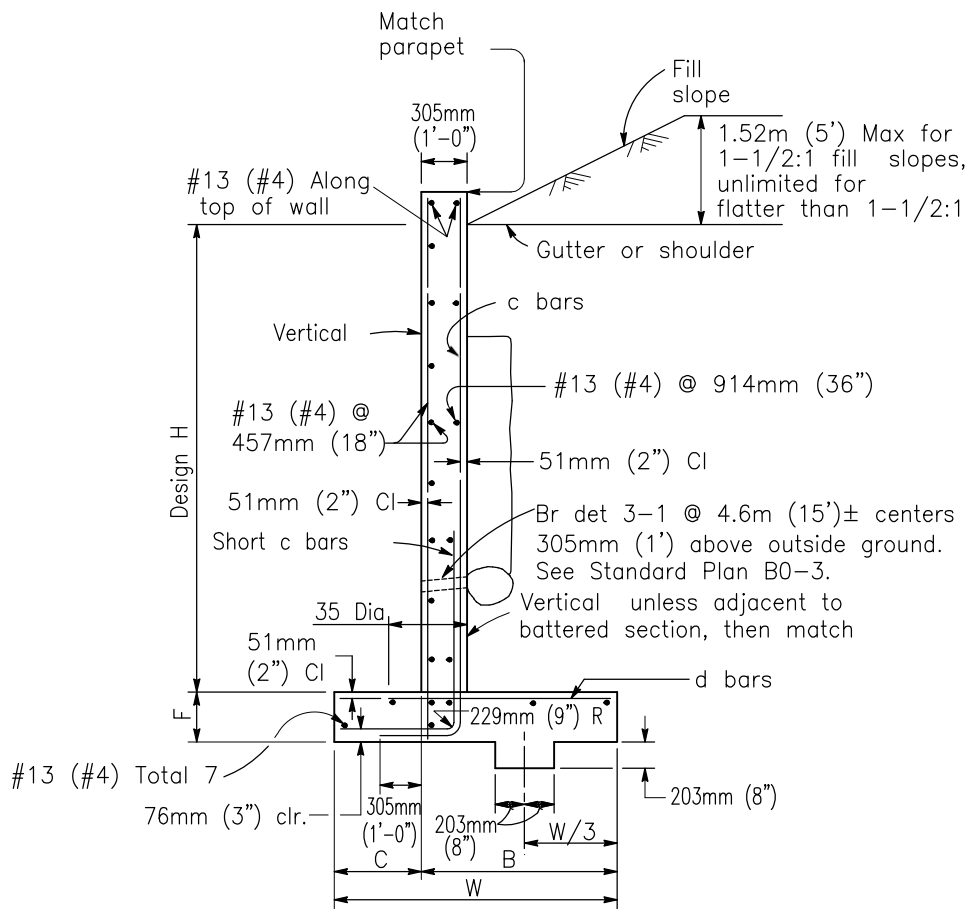
FLAT INVERT ALTERNATIVE

(When shown)

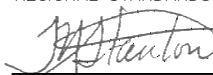
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	TRIPLE BOX CULVERT DETAILS NO.2		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER D-78M	

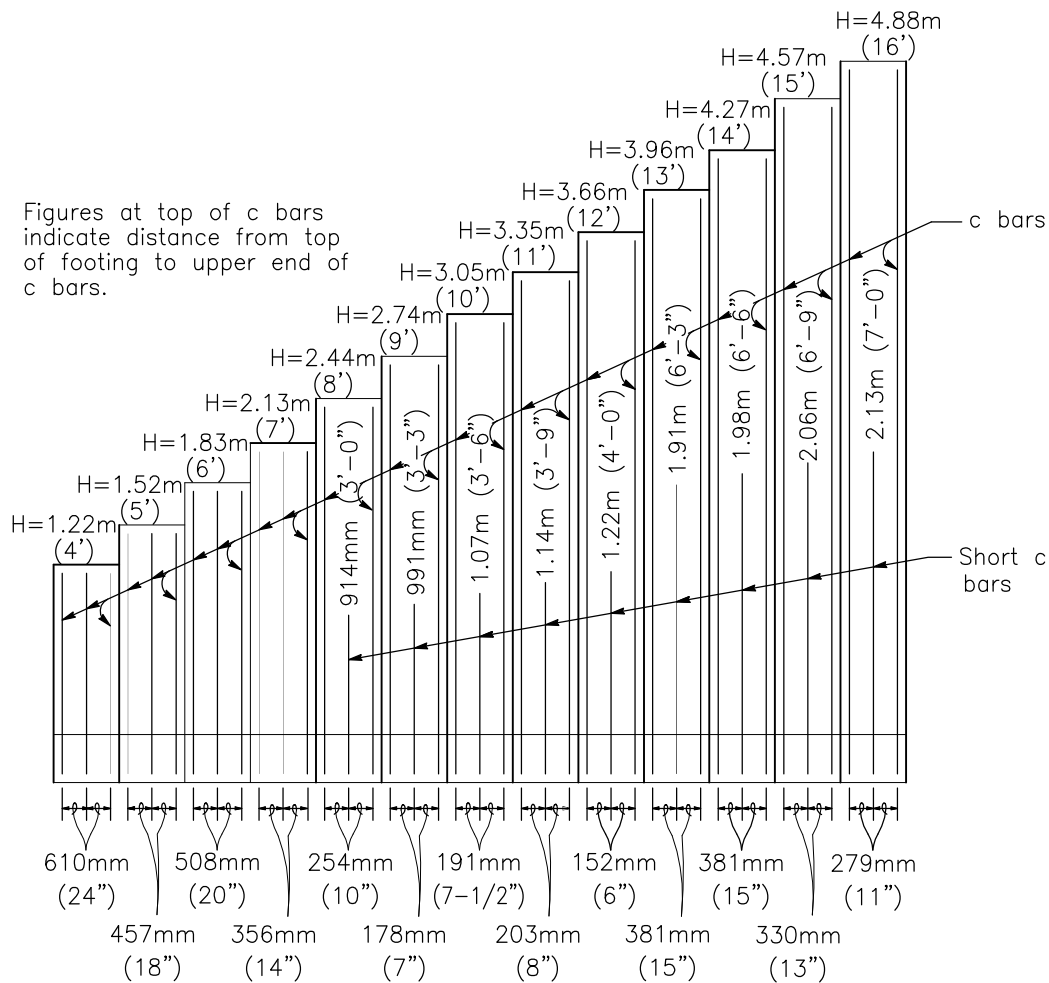


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	BOX CULVERT WINGWALL TYPES A, B & C DETAILS NO. 1	 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-79A

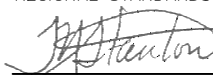


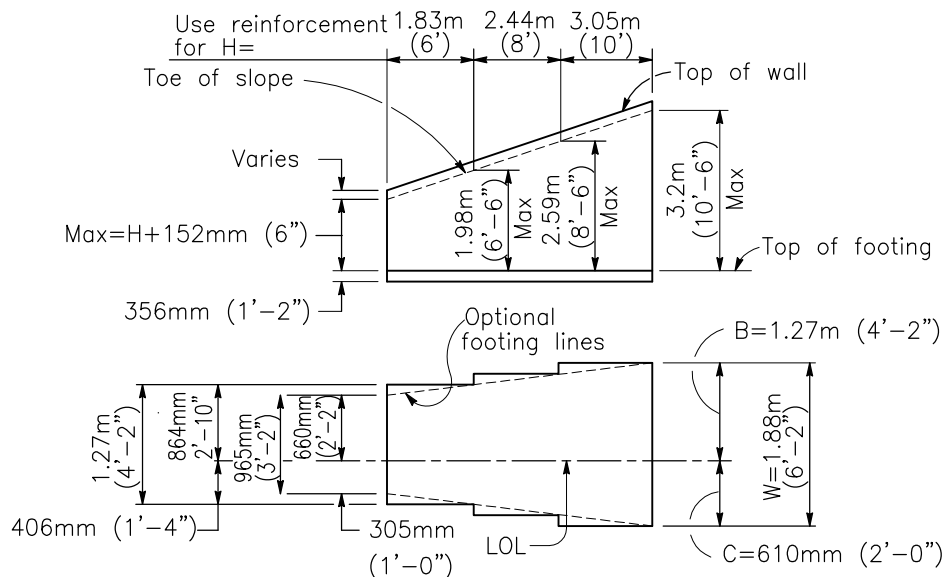
TYPICAL SECTION
H=1.22m (4') Thru 3.66m (12')

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75				
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
				BOX CULVERT WINGWALL TYPES A, B & C DETAILS NO. 2		 3/01/2003 Chairperson R.C.E. 19246 Date	
						DRAWING NUMBER D-79B	



TYPICAL LAYOUT EXAMPLE 1

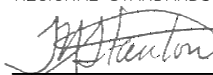
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	BOX CULVERT WINGWALL TYPES A, B & C DETAILS NO. 4		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER	D-79D



TYPICAL LAYOUT EXAMPLE 2

NOTES:

- Unit Stresses: $f_s = 138 \text{ Mpa}$ (20,000 psi), $f_c = 8.3 \text{ Mpa}$ (1,200 psi), $n = 10$
Maximum Toe Pressure = 144Kpa (1-1/2 Tons/sq. ft).
Elevations, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field.
- Walls designed for 610mm (2') liveload surcharge, 1-1/2:1 sloping surcharge not to exceed 1.52m (5') in elevation plus 610mm (2') liveload surcharge, or unlimited 2:1 surcharge. Dimensions H, L, M, N, Elevation a and Angle of flare (as apply) are shown on the plans.
- Wall height may be exceeded by 152mm (6") before going to next greater H. Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	BOX CULVERT WINGWALL TYPES A, B & C DETAILS NO. 5		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
Edited		T. Stanton	02/09				
						DRAWING NUMBER	D-79E

REINFORCED CONCRETE WINGWALLS – METRIC

H	1.22m	1.52m	1.83m	2.13m	2.44m	2.74m	3.05m	3.35m	3.66m	3.96m	4.27m	4.57m	4.88m
W	965mm	1.12m	1.27m	1.42m	1.57m	1.73m	1.88m	2.03m	2.18m	2.34m	2.49m	2.64m	2.79m
C	305mm	356mm	406mm	457mm	508mm	559mm	610mm	660mm	711mm	762mm	813mm	864mm	914mm
B	660mm	762mm	864mm	965mm	1.07m	1.17m	1.27m	1.37m	1.47m	1.57m	1.68m	1.78m	1.88m
F	1' - 2"												
Batter	None												
S	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm	305mm
c Bars (mm)	#13@625	#13@457	#16@508	#16@356	#16@254	#16@178	#19@191	#22@203	#22@152	#29@381	#32@381	#32@330	#32@279
d Bars (mm)	#13@625	#13@457	#16@508	#16@356	#16@254	#19@356	#22@381	#25@16	#22@305	#25@381	#29@381	#32@330	#29@279
Conc cu m/lf	0.25	0.30	0.34	0.38	0.43	0.47	0.52	0.56	0.61	0.78	0.85	0.91	0.97
Reinf #/lf	13	16	19	25	30	37	49	62	76	73	90	104	125

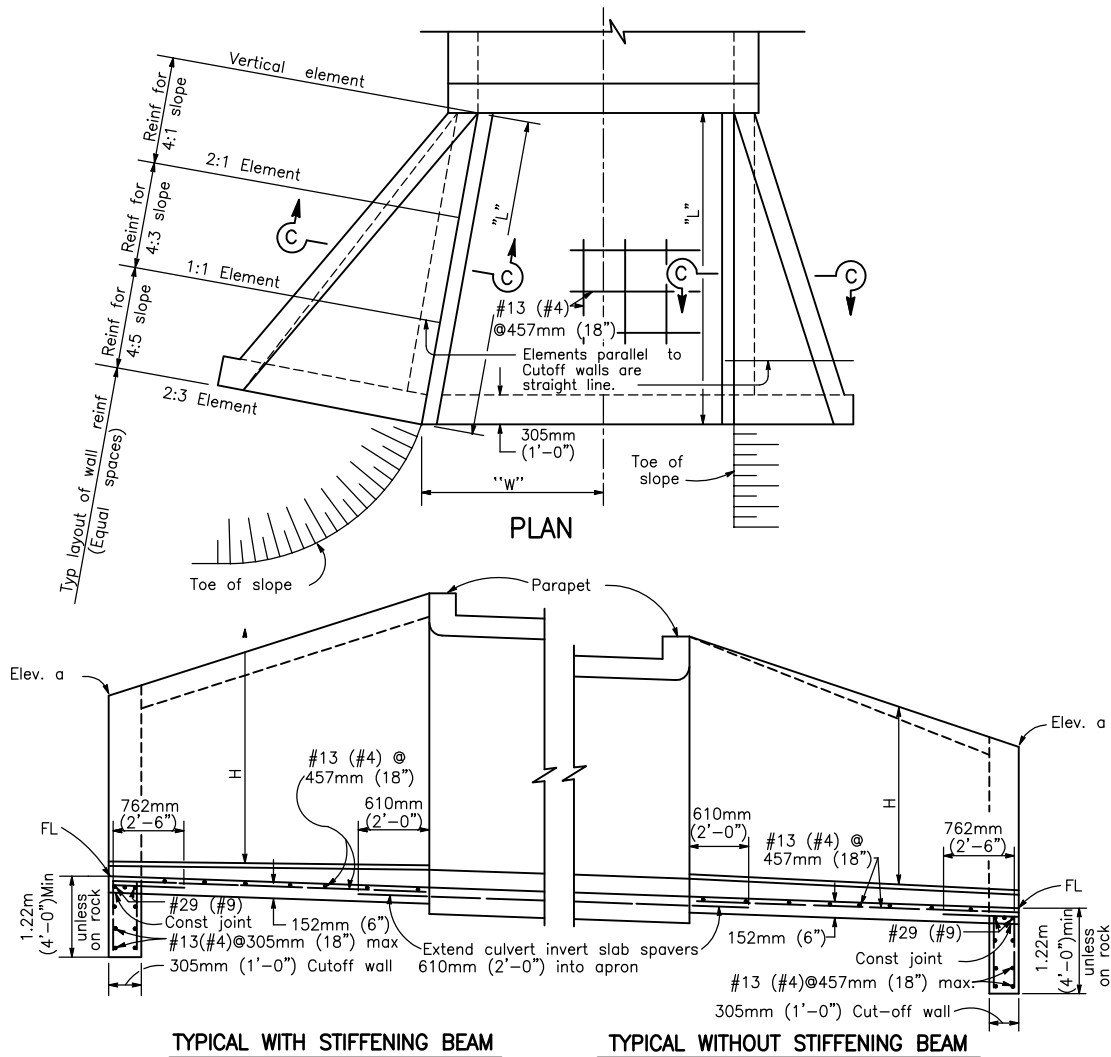
NOTE: Quantities do not include that portion above the design H limit.

REINFORCED CONCRETE WINGWALLS – US

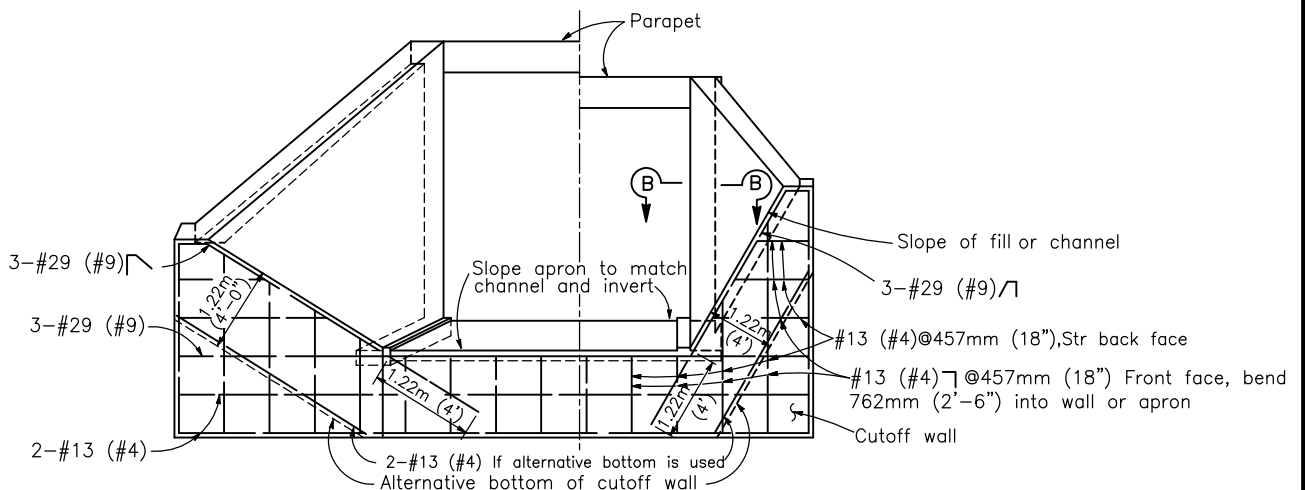
H	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
W	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"	5'-8"	6'-2"	6'-8"	7'-2"	7'-8"	8'-2"	8'-8"	9'-2"
C	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	3'-0"
B	2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"
F	1' - 2"												
Batter	None												
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6 1/2"	1'-7 1/2"	1'-8"
c Bars	#4@24	#4@18	#5@20	#5@14	#5@10	#5@7	#6@7 1/2	#7@8	#7@6	#9@15	#10@15	#10@13	#10@11
d Bars	#4@24	#4@18	#5@20	#5@14	#5@10	#6@14	#7@15	#8@16	#7@12	#8@15	#9@15	#10@13	#9@11
Conc cu yd/lf	0.32	0.38	0.44	0.49	0.55	0.61	0.67	0.73	0.79	1.02	1.10	1.18	1.26
Reinf #/lf	13	16	19	25	30	37	49	62	76	73	90	104	125

NOTE: Quantities do not include that portion above the design H limit.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING BOX CULVERT WINGWALL TYPES A, B & C DETAILS NO. 6	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>[Signature]</i> 3/10/2003 Chairperson R.C.E. 19246 Date DRAWING NUMBER D-79F
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
Edited		T. Stanton	02/09		

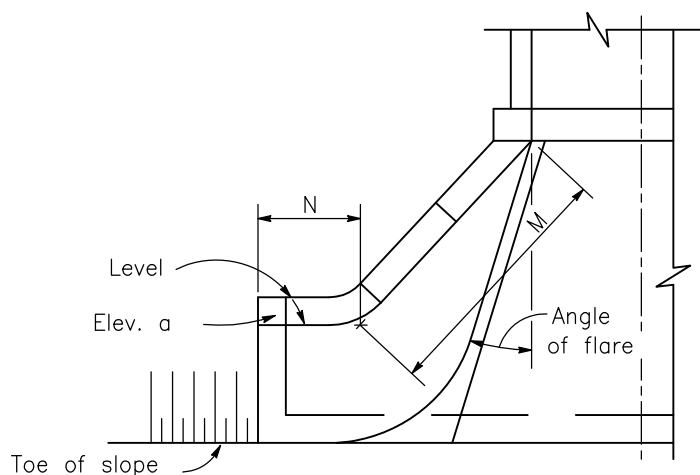
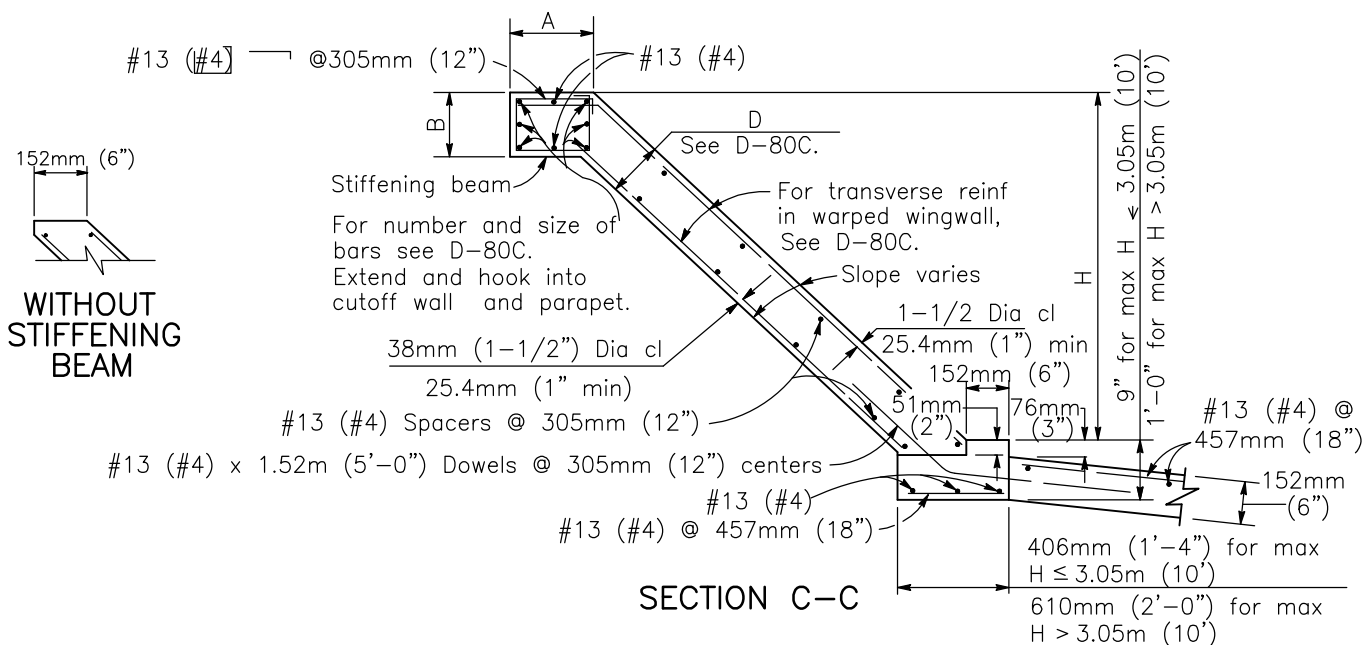


PART LONGITUDINAL SECTION



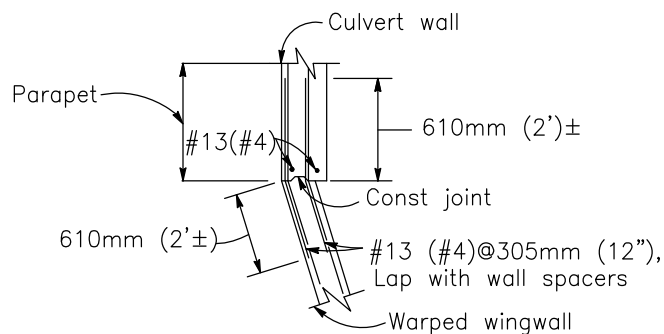
END ELEVATION

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	BOX CULVERT WARPED WINGWALL DETAILS NO. 1	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75			
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
						DRAWING NUMBER D-80A



ALTERNATIVE WARPED WINGWALL

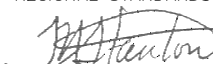
Use where additional protection to toe of embankment is required.



SECTION B-B

NOTES:

1. Walls designed for 610mm (2') surcharge; earth density = 3.40 cu m (120 #/cu. ft.); equivalent fluid pressure = 1.0 cu m (36 #/cu. ft.)
2. Vary D of warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 3.66m (12').
3. Where abrasion is anticipated increase apron thickness to 178mm (7") minimum to provide 51mm (2") minimum reinforcement coverage.
4. Dimensions L, W, H, M, N, Elevation a, Angle of flare, and end Slope (as apply) are shown on the plans.
5. Concrete shall be 332 kg/M³-C-22Mpa (560-C-3250).

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		A.Kercheval	12/75	BOX CULVERT WARPED WINGWALL DETAILS No. 2		 T. Stanton Chairperson R.C.E. 19246 Date 3/10/2003	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
						DRAWING NUMBER D-80B	

WARPED WINGWALLS – U.S. MEASUREMENT TABLE ONLY

WALL DIMENSIONS AND REINFORCING										STIFFENING BEAM DIMENSIONS AND REINFORCING																	
Element Slope	H	2.44m or less	3.05	12'	14'	16'	18'	20'	L	H max	3.66m	4.27m	4.88m	5.49m	6.10m	7.62m	9.14m	10.7m	12.2m or more								
1/4:1	Front face reinf	#13@305	#13@178	#16@178	#16@127	#19@152	#22@178	#22@152	No beam. Place 2-#6 in each face along top of wall.	1.83m	Total 6-#19	B= 305mm	A= 457mm	B= 229mm	A= 305mm	Total 6-#22	B=305mm	A=610mm	B=457MM								
	Rear face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305		3.05m										Total 8-#29							
3/4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@254	#13@203	#13@152	3.66m	Total 6-#22											B= 305mm	A= 457mm	B= 229mm	A= 305mm	Total 6-#22	B=305mm	A=610mm
	Rear face reinf	#13@305	#13@305	#13@305	#13@305	#13@254	#13@178	#16@203	4.27m																		
1-1/4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	4.88m	Total 6-#22	B= 305mm	A= 457mm	B= 229mm	A= 305mm	Total 6-#22	B=305mm	A=610mm	B=457MM									
	Rear face reinf	#13@203	#13@203	#13@127	#16@152	#19@178	#19@152	#22@152	5.49m																		
D at Cutoff Wall	Wall	152	152	152	191	203	241	279	6.10m																		
D at Culvert	Culvert	152	152	152	203	241	279	330																			

WARPED WINGWALLS – U.S. MEASUREMENT TABLE ONLY

WALL DIMENSIONS AND REINFORCING												STIFFENING BEAM DIMENSIONS AND REINFORCING											
Element	H	8' or less	10'	12'	14'	16'	18'	20'	L	12'	14'	16'	18'	20'	25'	30'	35'	40' or more					
Slope									H max.														
1/4:1	Front face reinf	#4@12	#4@ 7	#5@ 7	#5@ 5	#6@ 6	#7@ 7	#7@ 6	6'	No beam. Place 2-#6 in each face along top of													
	Rear face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	8'	wall.													
3/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@10	#4@ 8	#4@ 6	10'	A= 1'-0"													
	Rear face reinf	#4@12	#4@12	#4@12	#4@10	#4@ 7	#4@ 6	#5@ 8	12'	B= 9"													
1-1/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	14'	Total 6-#6													
	Rear face reinf	#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6	16'	B= 1'-0"													
D at Cutoff Wall		6"	6"	6"	7-1/2"	8"	9-1/2"	11"	18'	Total 6-#7													
D at Culvert		6"	6"	6"	8"	9-1/2"	11"	1'-1"	20'	Total 6-#8													
										Total 8-#9													

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT WARPED WINGWALL DETAILS No. 3

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-80C

GENERAL NOTES

QUANTITIES: Quantities are for the sloped invert slab and do not include splices in the longitudinal bars, nor temperature reinforcement for exposed top culvert, nor concrete or reinforcement for parapets or cutoff walls

SPECIAL COVERAGE: Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition

DESIGNATION: Show on plans as span x height—strength classification x length, thus 1.22m x 1.22m—A x 18.3m (4 x 4—A x 60'), followed by alternatives.

ALTERNATIVES: Invert will be sloped unless "Trapezoidal Invert", "Flat Invert" or "V Invert" is included in designation. Ends of culvert will be rounded unless "Square Ends" are designated. Parapets will be as shown unless "___ ft. parapet" is designated in plans. Such designations may be different for inlet and outlet ends.

REINF. PLACEMENT: Main Reinforcement is positioned transverse or, for curved culverts, radial when radial, reinforcing spacing is measured along ϕ .

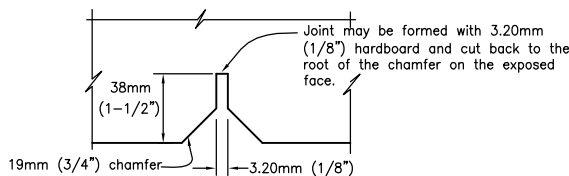
CONSTRUCTION NOTES

CONCRETE: Bottom slab & walls shall be class 332 kg/M³—B—22Mpa (560—B—3250). Top slab shall be class 332 kg/M³—C—22Mpa (560—C—3250).

EXPANSION JOINTS: Bottom Slab—No expansion joints shall be placed.
Top Slab and Walls—When cover is less than span length, place 13mm (1/2") expansion joint filler at 15.2m (50')± centers outside the paved roadway lanes and place bridge detail 3-2 at 9.14m (30')± centers under paved roadway lanes.
When cover is more than span

CONSTRUCTION LOADS: Not permitted until concrete has reached a strength of 20.7Mpa (3,000p.s.i.) or age of 28 days, whichever occurs first, and falsework plans have been submitted by the Contractor, to the Engineer, and approved.

CONSTRUCTION JOINTS: Temporary joints may be permitted if normal (or radial) to C of R.C.B. otherwise, the Contractor is to submit a proposal for consideration.



BRIDGE DETAIL 3-2
(Portion)
See Standard Drawing C-15

DESIGN NOTES

SPECIFICATIONS

DESIGN: AASHTO, dated 1973, with revisions as supplemented by State of California Bridge Planning and Design Manual.

Sections designed for culvert in a trench on hard foundation, or culvert untrenched on yielding foundation, for culverts on piles or rock foundations, special design will be required.

LOADING

LIVE LOAD: For legal highway loads, use HS20-44 or Alternative with 30% impact for all cover depths, no impact on invert.

COVER LESS THAN 610mm (2') — Wheel load distribution on the top slab is $E=0.175S+3.2'$ longitudinally and concentrated along the span. Wheel load distribution on the invert slab is 2.29m (7.5') longitudinally and uniformly over the breath of the culvert.

COVER 610mm (2') OR MORE — Wheel loads distributed uniformly over a square, the sides of which are 1.75 times the depth of cover, but not less longitudinally than E on the top slab, or 2.29m (7.5') on the invert slab when such areas from several wheel concentrations overlap, the total load shall be considered as uniformly distributed over the area defined by the outside limits of the individual areas, but the overall longitudinal dimension shall not exceed the total length of the supporting slab. Neglect live load, on single spans when cover is more than 2.44m (8') and exceeds span, and on multiple spans when cover exceeds distance between exterior walls.

DEAD LOAD: Earth load of 120 pcf and an equivalent fluid pressure of 36 pcf, reduced to 84 pcf and 25 pcf respectively for clear spans of 20' or less.

UNIT STRESSES: $F_s = 138\text{Mpa}$ (20,000 psi), $N = 10$
 $F_c = 8.27\text{Mpa}$ (1,200 psi)

Reinforcement embedment is 38mm (1-1/2) dia. clear, min 25.4mm (1") and in 6.35mm (1/4") increments, except as noted.

Distribution "d" bars expressed as a percent of main positive reinforcement.

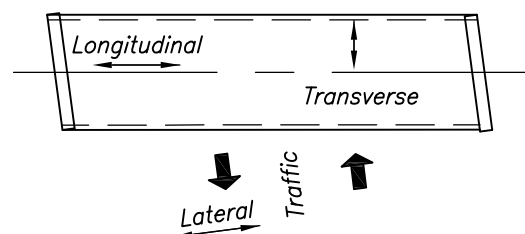
Classification "A" top slab = $\frac{100}{\sqrt{\text{SPAN}}}$, max 50%
(unless traffic longitudinal)

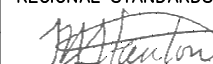
Classification "B" to "E": Top and bottom slabs
#13 (#4) @ 457mm (18") max.

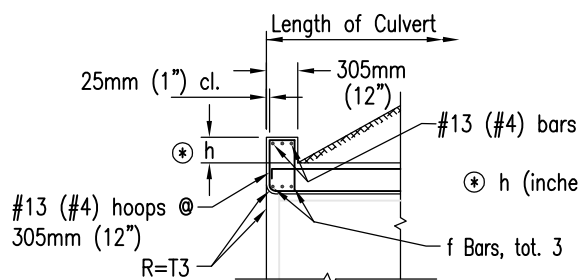
USE OF STANDARD DRAWING

"Strength Classification, symbolized by the letters "A", "B", "C" etc., at the top of the data table is merely a convenient designation for a particular structural section for a culvert of any given opening it is dictated by the cover or depth of fill over the the top slab.

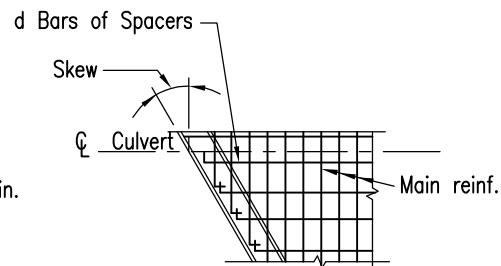
LIVE LOAD & R.C.B. TERMINOLOGY



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		 Chairperson R.C.E. 19246 Date 3/01/2003
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
				BOX CULVERT MISCELLANEOUS DETAILS No. 1	DRAWING NUMBER
					D-81A



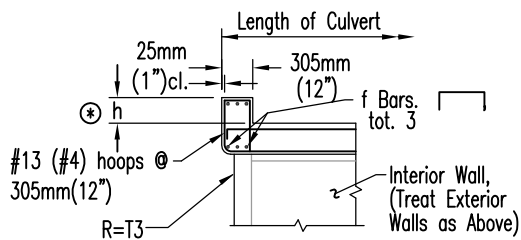
PART SECTION



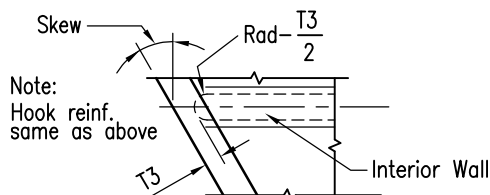
PART PLAN-SKEWED

PARAPET f BAR NOS.	SKEW ANGLE		
SPAN	0° TO 15°	16° TO 30°	31° TO 45°
1.22M (4')	#13 (#4)	#13 (#4)	#13 (#4)
1.83M (6')	#13 (#4)	#13 (#4)	#16 (#5)
2.44M (8')	#13 (#4)	#16 (#5)	#19 (#6)
3.05M (10')	#16 (#5)	#19 (#6)	#22 (#7)
3.66M (12')	#19 (#6)	#22 (#7)	#25 (#8)
4.27M (14')	#22 (#7)	#25 (#8)	#29 (#9)

PARAPET DETAILS FOR SINGLE SPAN CULVERTS

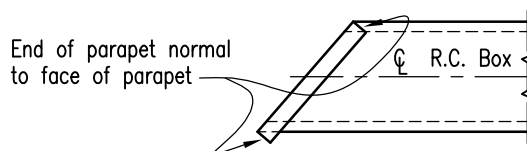


PART SECTION

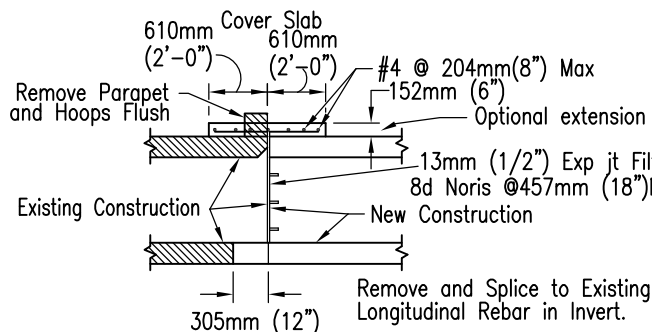


PART PLAN-SKEWED

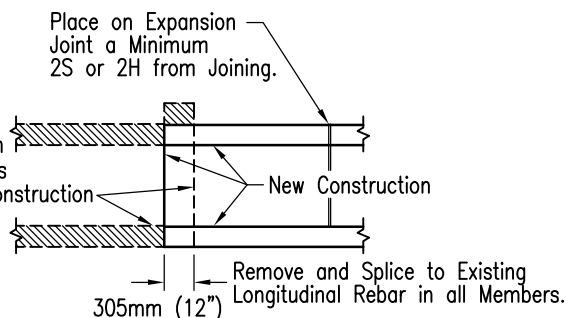
PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS



PAPAPET DETAIL FOR SKEWED CULVERTS W/O WINGWALLS



COVER: 305mm (1') AND GREATER



COVER: EXPOSED TOP AND GREATER

CULVERT EXTENSION
20° SKEW MAXIMUM

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

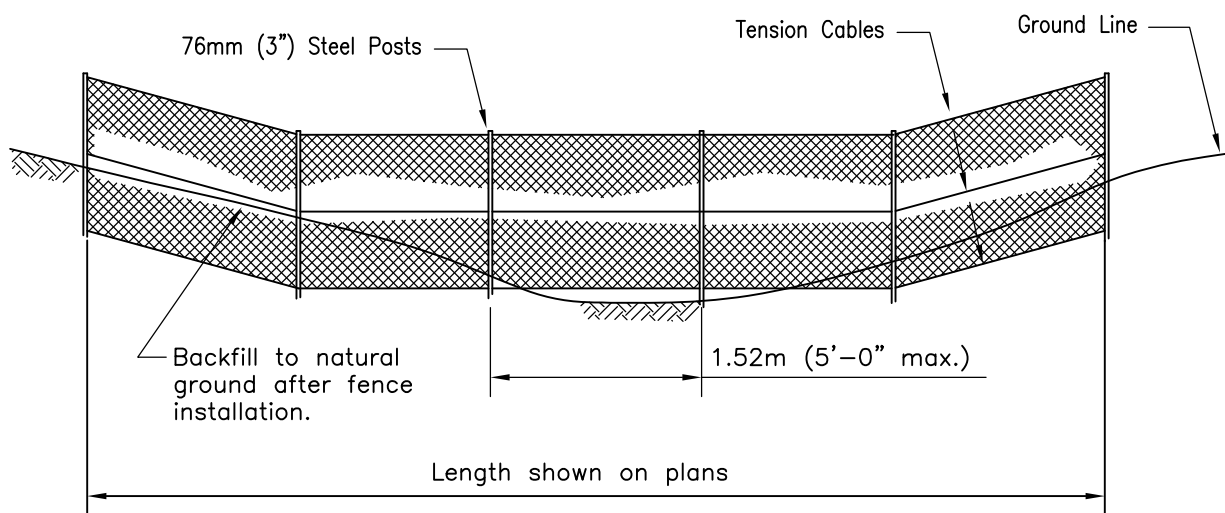
SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT
MISCELLANEOUS DETAILS NO. 2

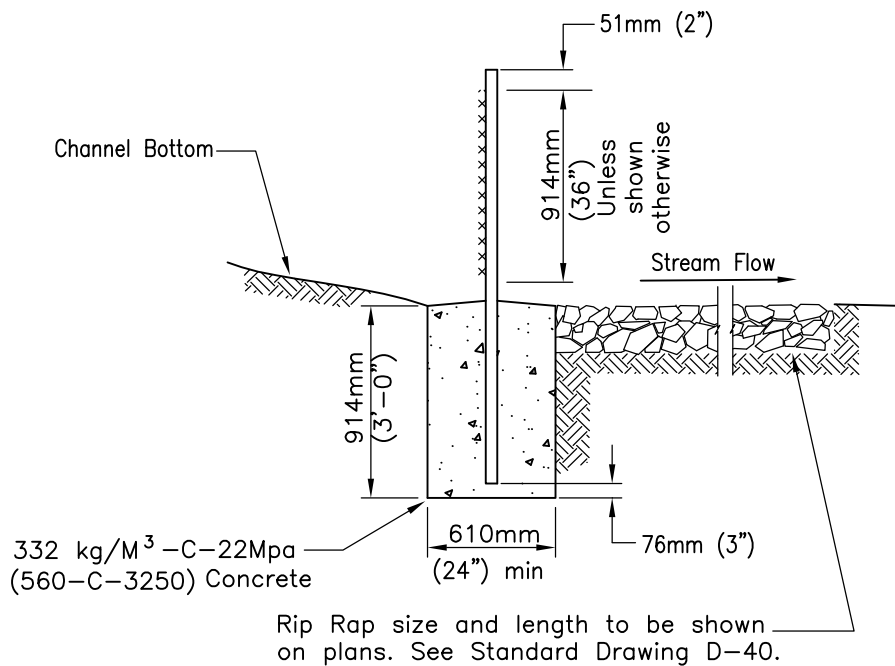
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-81B



ELEVATION

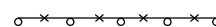


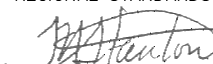
SECTION

NOTES:

1. Fence fabric shall be 51mm (2") mesh, 9 gage galvanized wire, chain link placed on the upstream side of the posts and tension cables.
2. Tension cable shall be 8mm ϕ (5/16") steel at 457mm (18") c/c, secured at ends with cable clamps. Secure fence to cable with No. 12 galvanized steel wire looped at 152mm (6") c/c.
3. Posts shall be 76mm ϕ (3") steel pipe, 2.63kg (5.79 lb/ft). Fill with mortar after placing.
4. Fence fabric shall be secured to posts with 9 gage wire clips at 229mm (9") c/c.

LEGEND ON PLANS

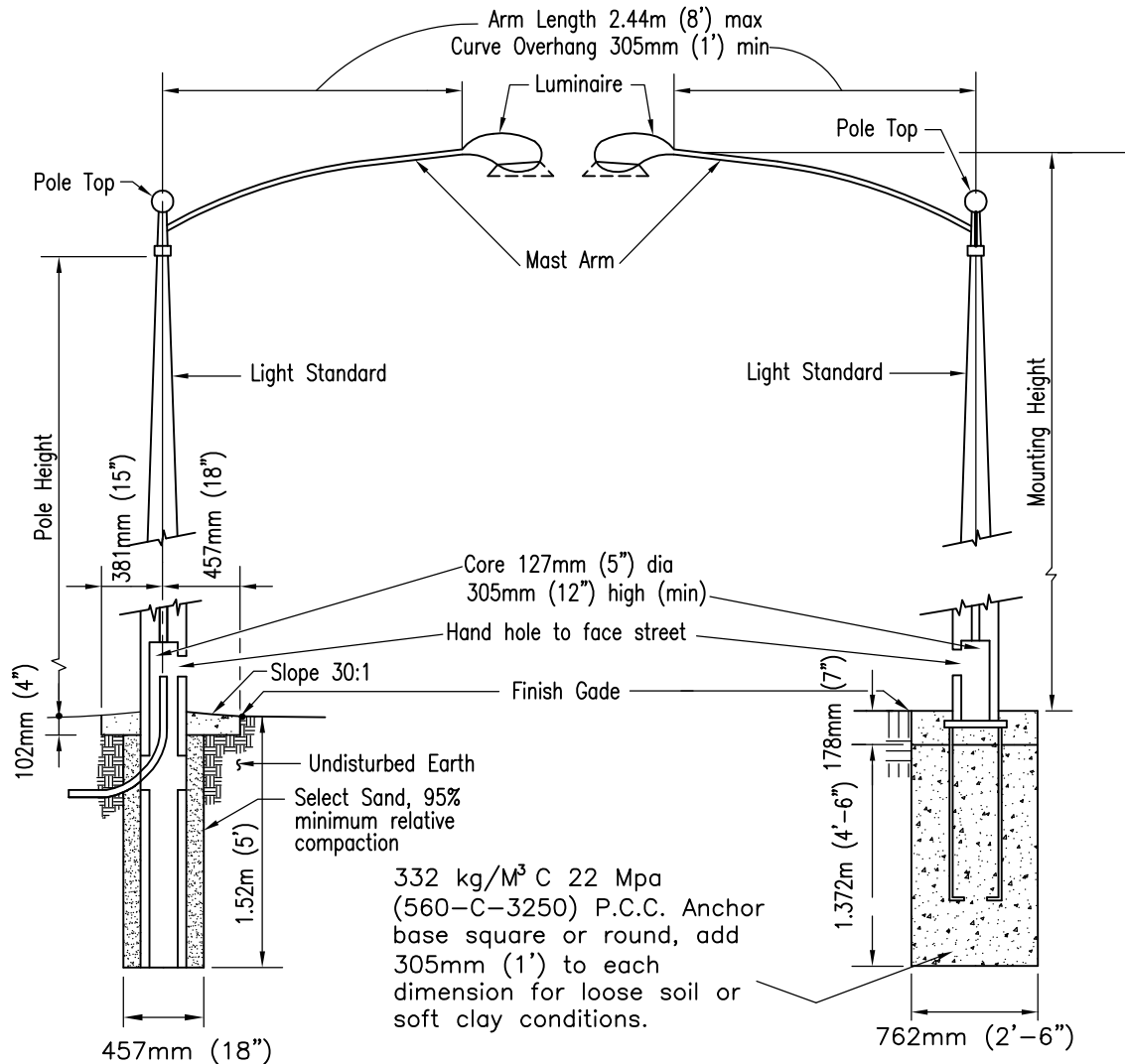


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		H. Hecht	10/82		
Add Metric		T. Stanton	03/03	DEBRIS FENCE	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER D-82

ELECTRICAL SYSTEMS

ELECTRICAL SYSTEMS

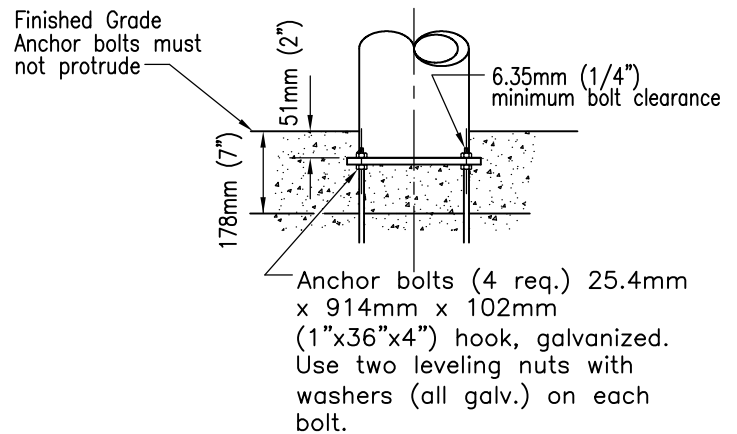
E



DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

POLE HEIGHT	MOUNTING HEIGHT	LAMP SIZE (WATTS)
7.62m ±610mm 25' ±2'	8.23m ±305mm 27' ±1'	170 M.V. 100 H.P.S. 90 L.P.S.
8.53m ±610mm 28' ±2'	9.14m ±305mm 30' ±1'	400 M.V. 250 H.P.S. 180 L.P.S.
7m 23' -0"	8.15m 26' -9"	70 H.P.S.
8.1m 26' -6"	9.14m 30' -0"	150 H.P.S.



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Table		M. Bahmanian	05/86
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

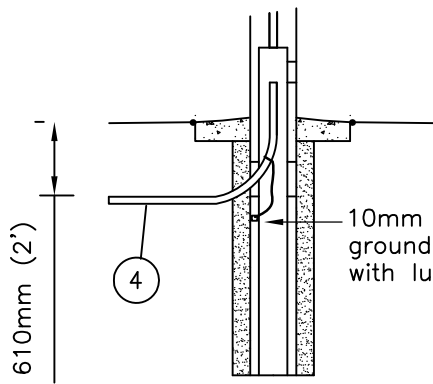
SAN DIEGO REGIONAL STANDARD DRAWING

STREET LIGHTING STANDARD

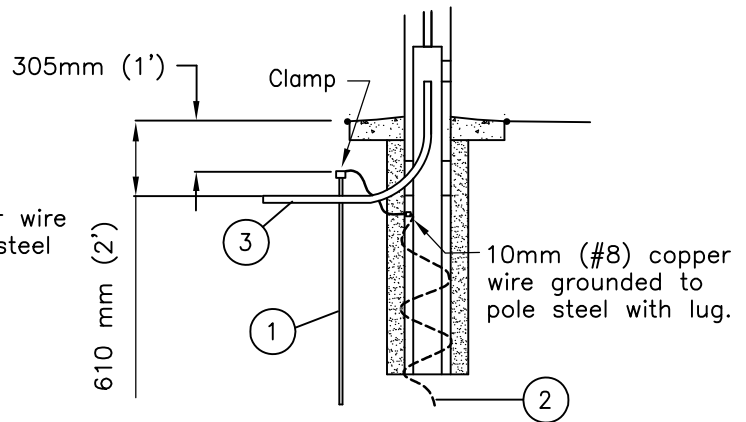
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER E-1

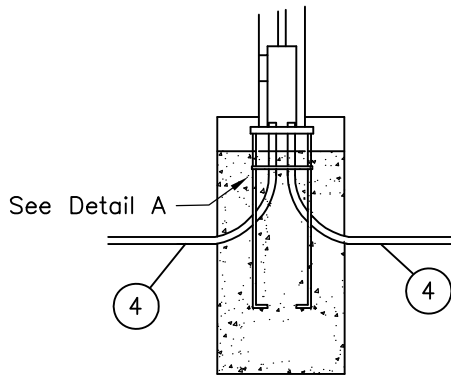


STEEL CONDUIT

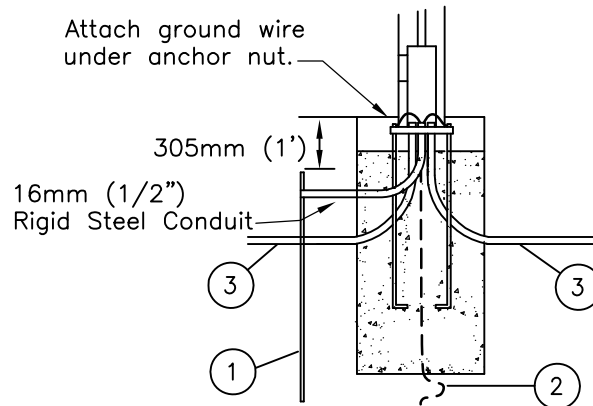


NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION



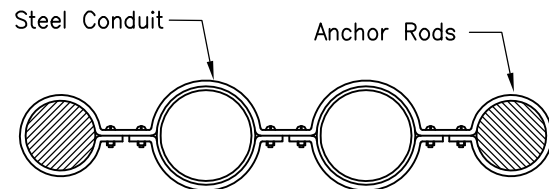
STEEL CONDUIT



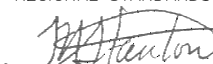
NON-METALLIC CONDUIT

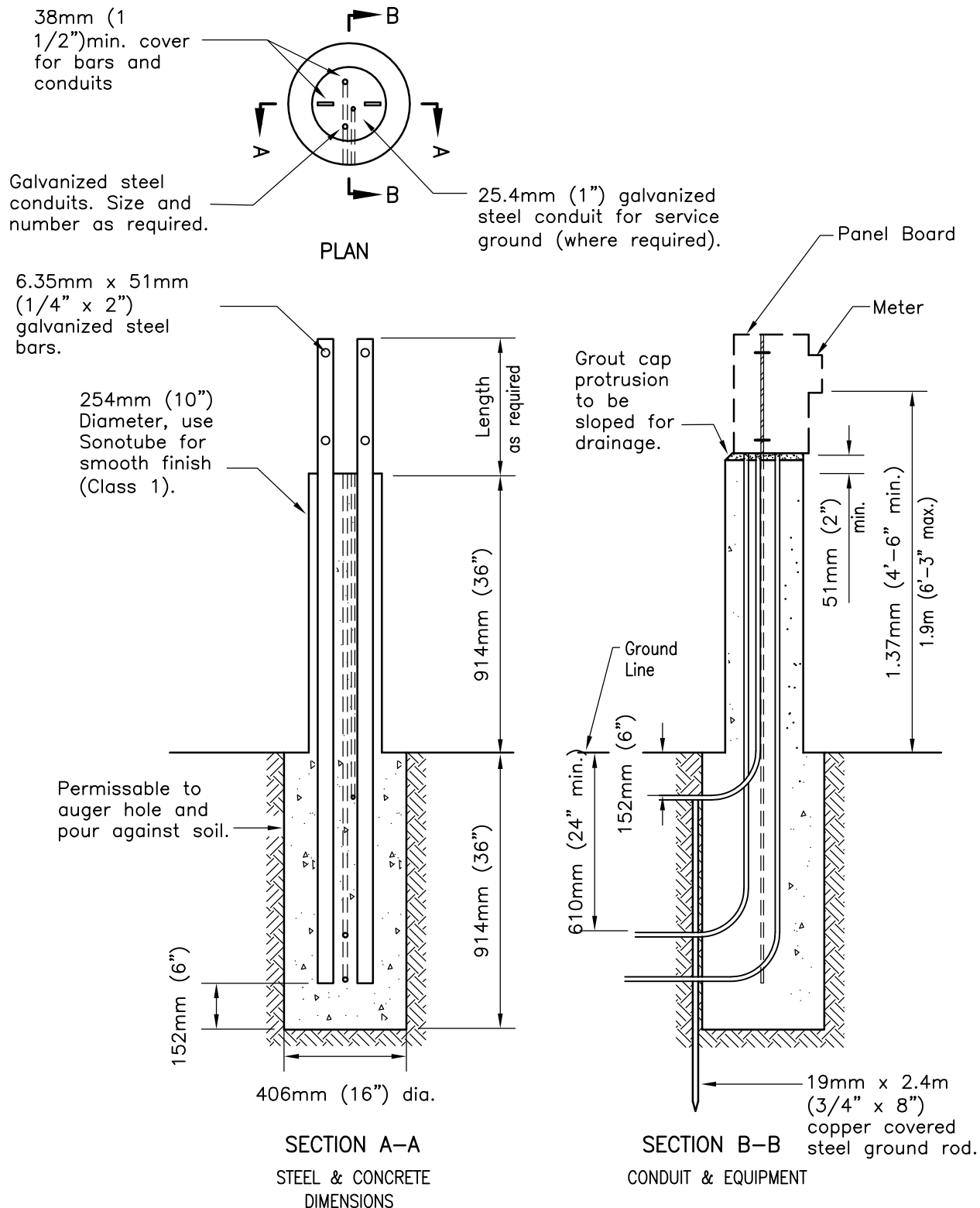
ANCHOR BASE FOUNDATION

- ① 19mm x 2.4m (3/4" x 8') copper covered steel ground rod.
- ② Alternate Ground: 4.57m (15') 35mm (no. 4) stranded copper wire, coiled.
- ③ Approved non-metallic conduit.
- ④ Steel conduit.

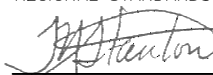


DETAIL A

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	GROUNDING OF CONCRETE LIGHTING STANDARDS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER E-2



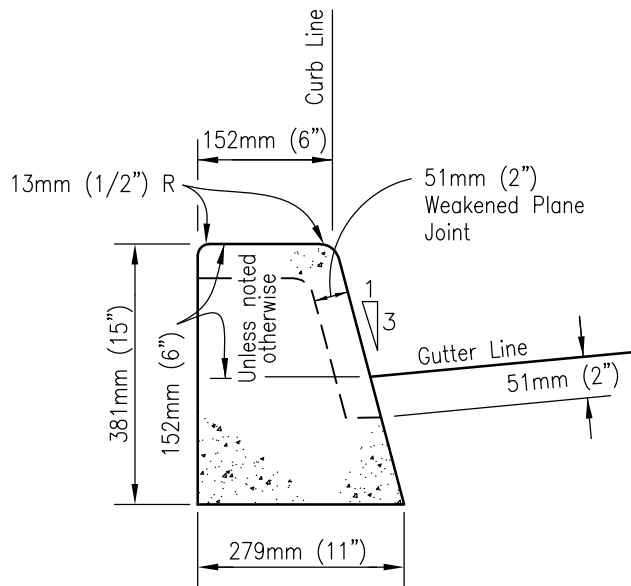
NOTE: Concrete shall be class 332 kg/M³ C 22 Mpa (560-C-3250)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	PEDESTAL FOR ELECTRICAL EQUIPMENT	 3/10/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
				DRAWING NUMBER	E-33

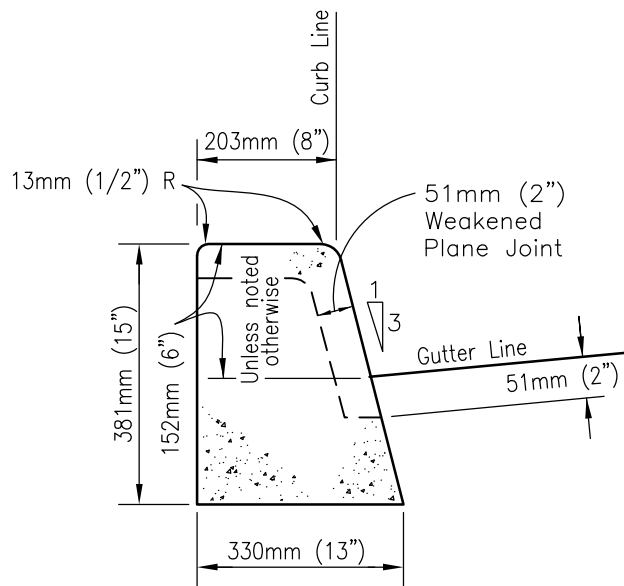
GENERAL SURFACE IMPROVEMENTS

G

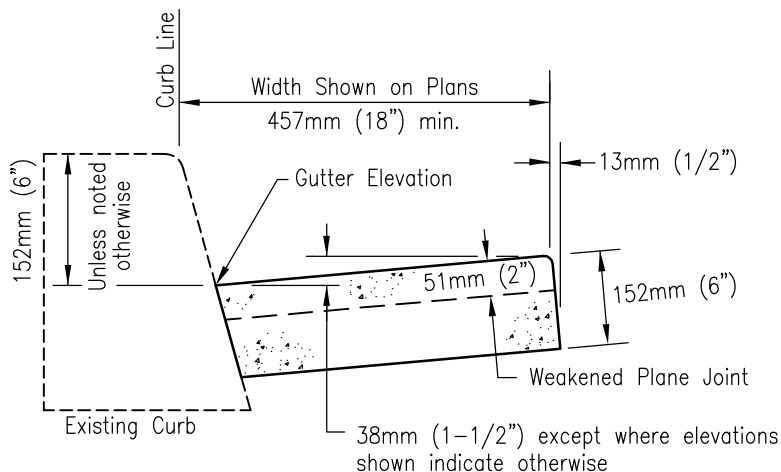
GENERAL SURFACE IMPROVEMENTS



152mm (6") CURB
Area=0.083m (0.89 Sq. Ft.)



203mm (8") CURB
Area=0.1m (1.09 Sq. Ft.)



GUTTER

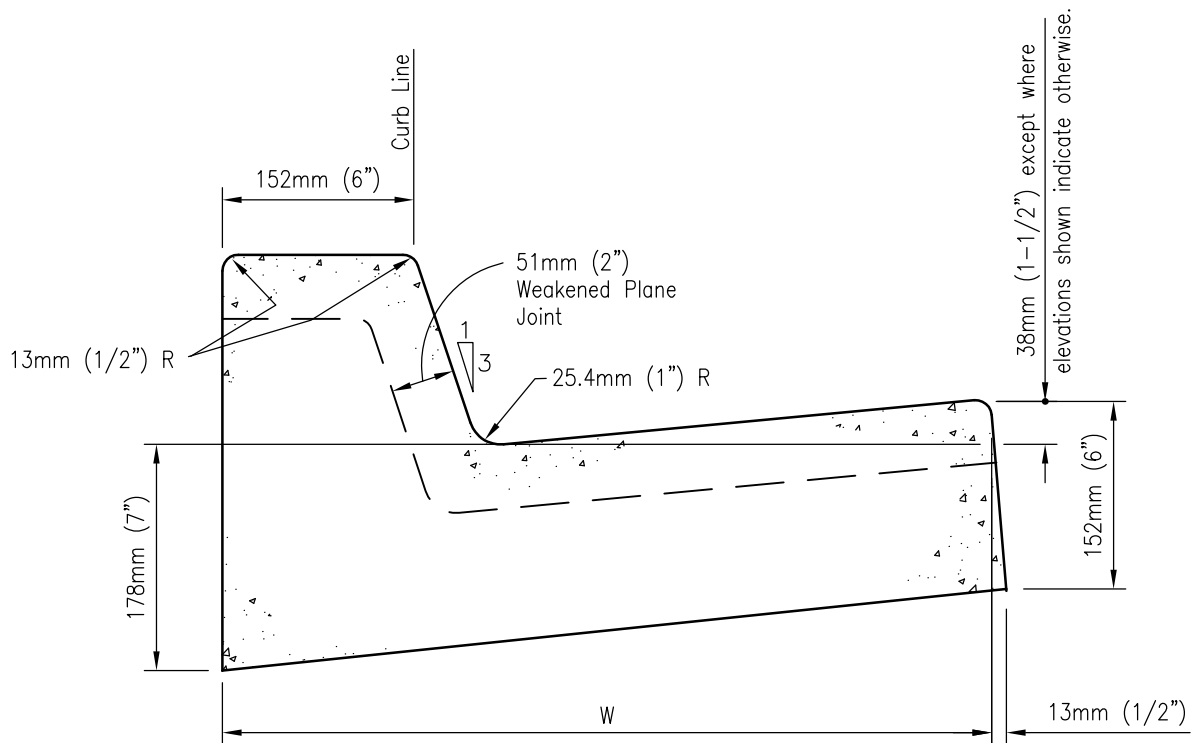
NOTES:

- Concrete shall be 308kg/M³-C-17-MPa (520-C-2500).
- See Standard Drawings G-9 and G-10 for joint details.
- Slope top of curb 6.35mm (1/4") per foot toward street.

LEGEND ON PLANS

152mm (6") curb

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CURBS AND GUTTER – SEPARATE	<i>T. Stanton</i> 3/01/2003
Reformatted		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER G-1



TYPE	W	*AREA
G	610mm (24")	0.124sq. m (1.34sq ft.)
H	762mm (30")	0.150sq. m (1.61sq ft.)

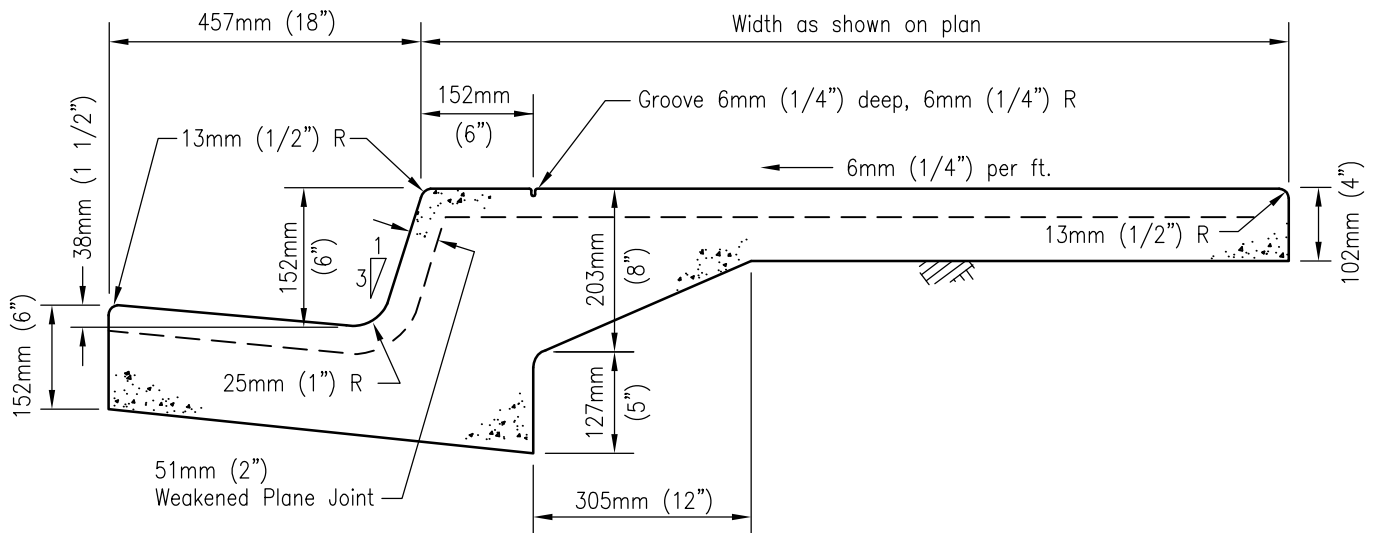
* with 152mm (6") Curb Face

NOTES:

- Concrete shall be 308kg/M³-C-17-MPa (520-C-2500).
- See Standard Drawings G-9 and G-10 for joint details.
- Slope top of curb 6.35mm (1/4") per foot toward street.

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CURB AND GUTTER – COMBINED	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-2



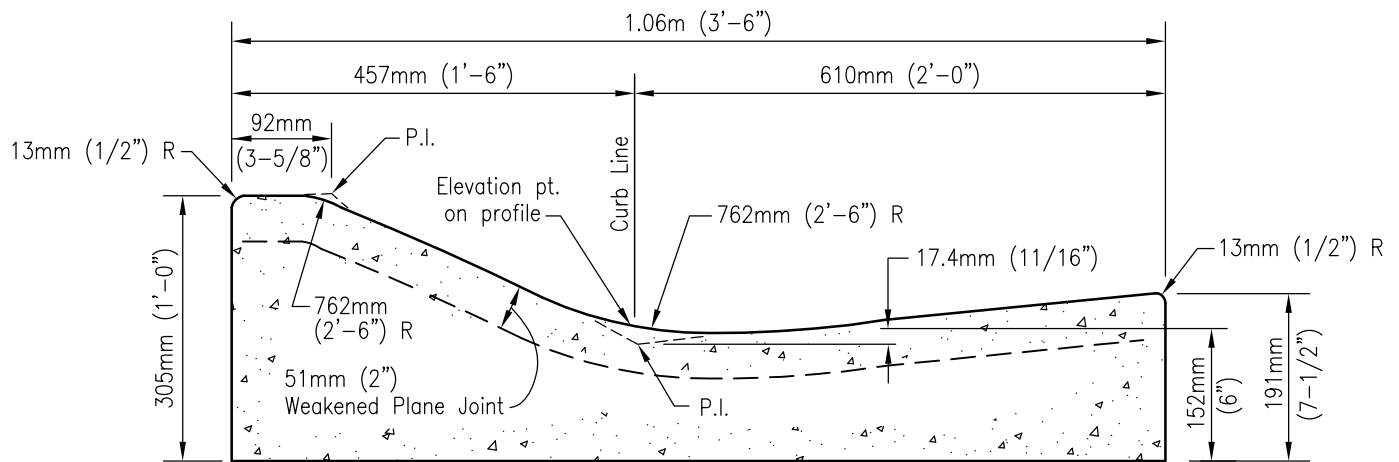
NOTES:

1. Concrete shall be 308kg/M³-C-17-MPa (520-C-2500).
2. See Standard Drawings G-9 and G-10 for joint details.
3. Monolithic curb, gutter and sidewalk is to be used with Agency approval only.

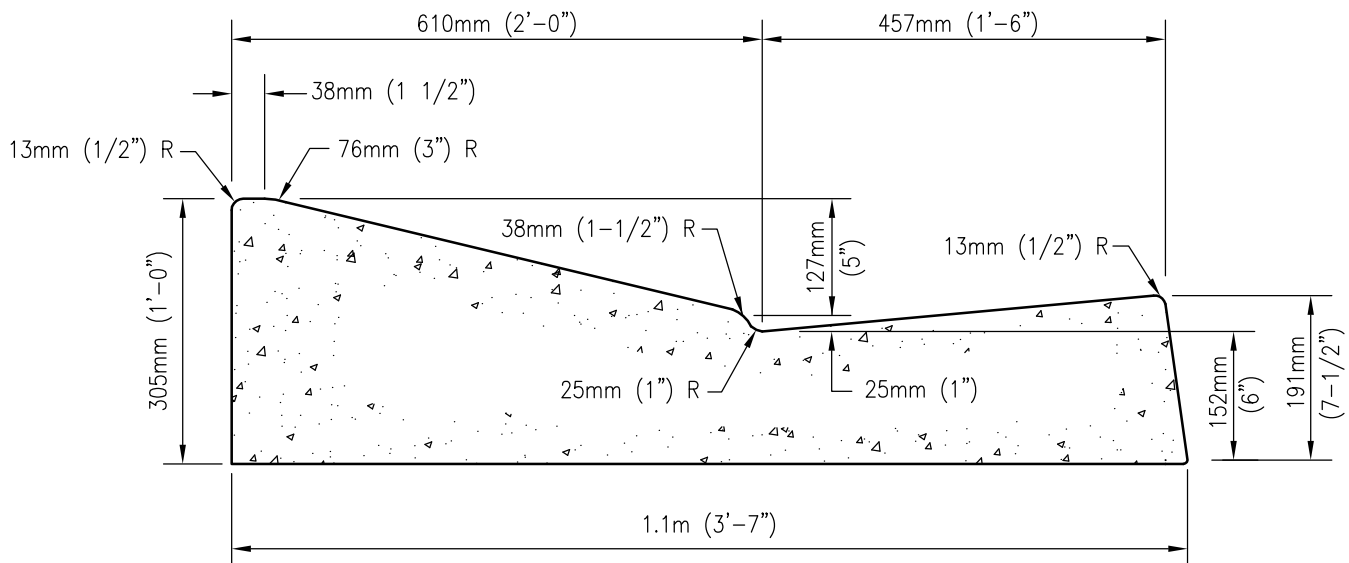
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	MONOLITHIC CURB, GUTTER AND SIDEWALK		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reformatted		T. Stanton	04/06				
						DRAWING NUMBER	G-3



TYPE A
CURB AREA
(0.21 sq. m (2.23 sq. ft.))

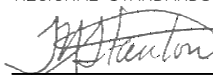


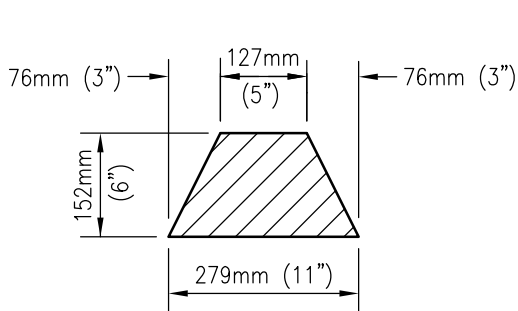
TYPE B
CURB AREA
(0.23 sq. m (2.48 sq. ft.))

NOTES:

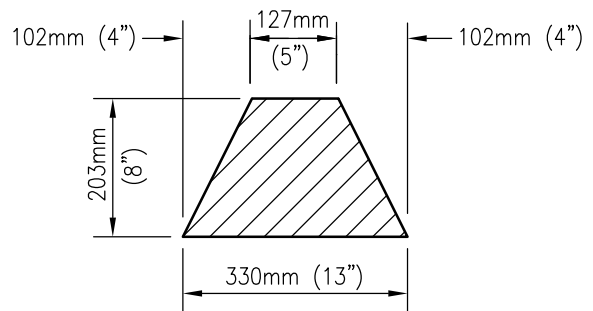
1. Transition to type G curb at all curb returns, except where sidewalk ramps are provided, and at all cul-de-sacs with drainage structures.
2. Concrete shall be 308kg/M³-C-17-MPa (520-C-2500).
3. See Standard Drawings G-9 and G-10 for joint details.

LEGEND ON PLANS

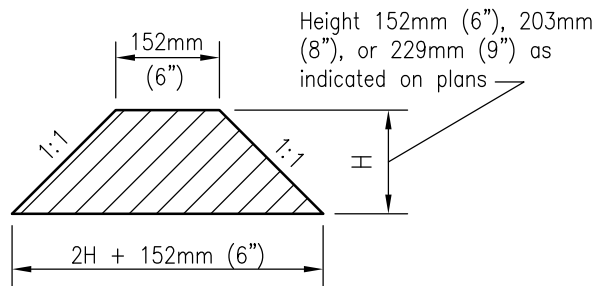
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CURB AND GUTTER – ROLLED	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-4



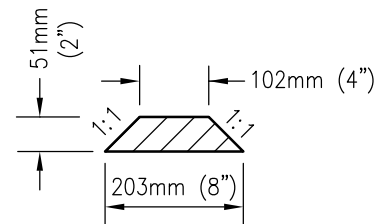
TYPE A



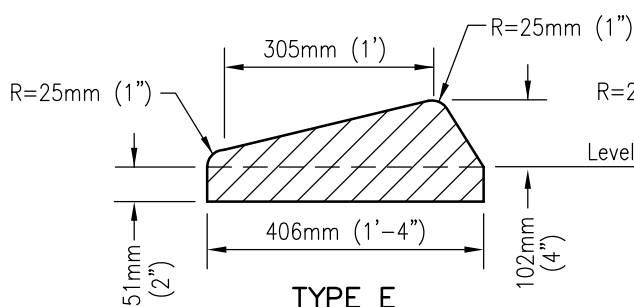
TYPE B



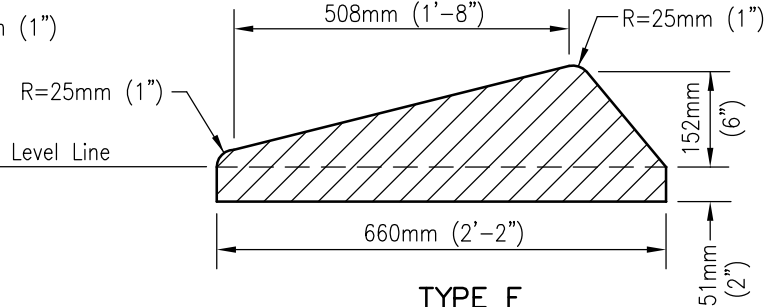
TYPE C



TYPE D

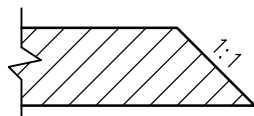


TYPE E



TYPE F

MOUNTABLE DIKES



Slope end of dike 1:1 when not joining other improvements

ALL TYPES – SIDE VIEW

NOTES:

1. Dikes shall be placed on a 51mm (2") of A.C. surfacing, extending throughout the width of the dike.
2. PG-70-10 grade asphalt to be used for all dikes.
3. A.C. dikes may be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

APPROX. DIKE QUANTITIES

TYPE	REQD PER LIN. FT.	
A	25.4kg	(0.0250 tn.)
B	38.1kg	(0.0375 tn.)
C-152mm (6")	38.1kg	(0.0375 tn.)
C-203mm (8")	59.2kg	(0.0583 tn.)
C-229mm (9")	71.3kg	(0.0702 tn.)
D	6.3kg	(0.0062 tn.)
E	41.4kg	(0.0407 tn.)
F	63.3kg	(0.0623 tn.)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

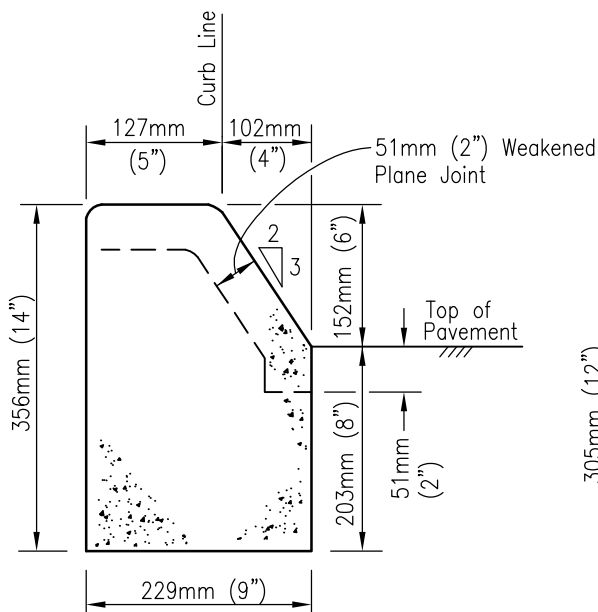
SAN DIEGO REGIONAL STANDARD DRAWING

DIKES – ASPHALT CONCRETE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

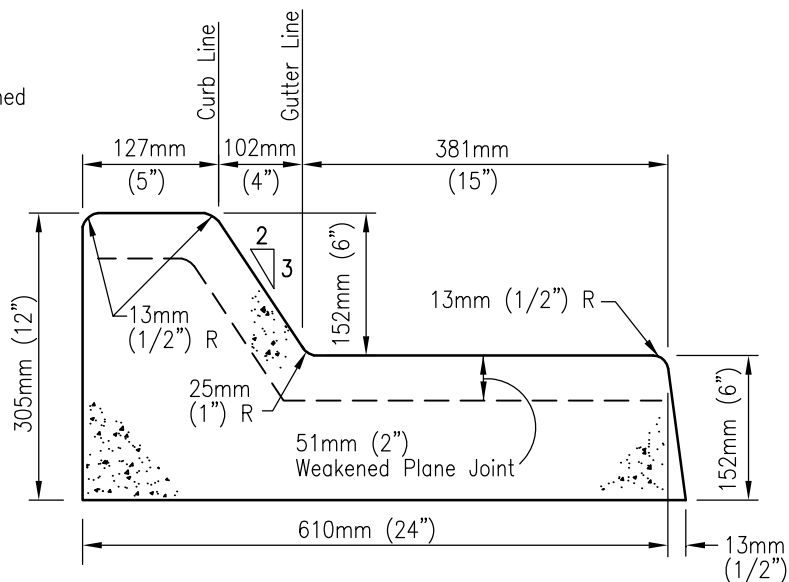
T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G-5



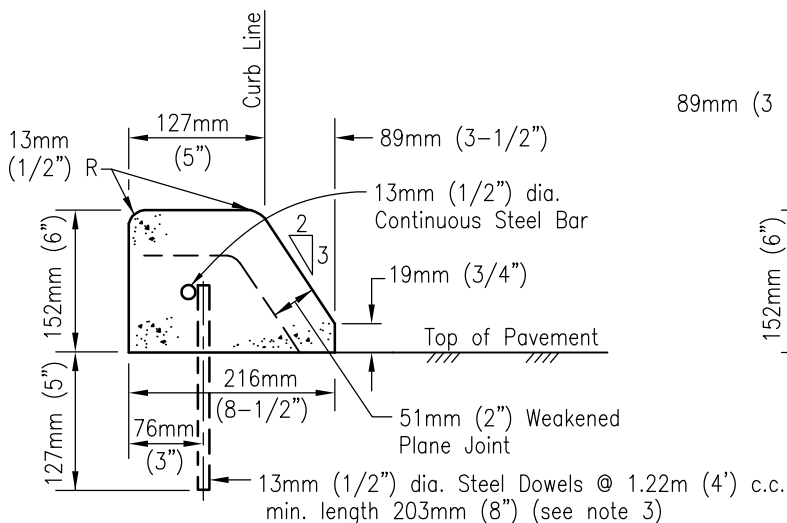
B-1

Area=0.073 sq. m (0.79 Sq.Ft.)



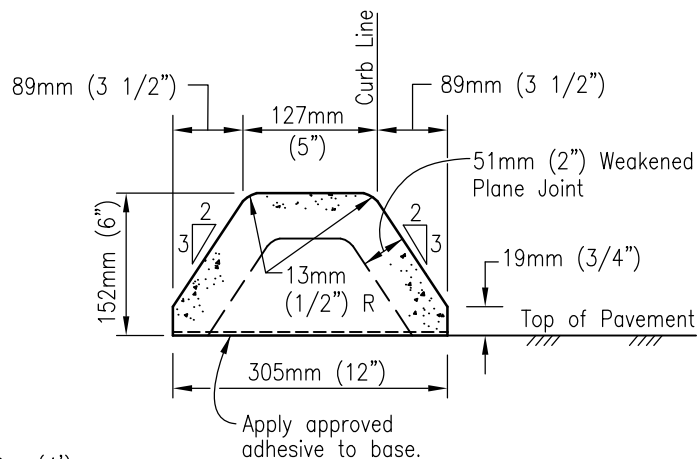
B-2

Area=0.120 sq. m (1.29 Sq.Ft.)



B-3

Area=0.027 sq. m (0.29 Sq.Ft.)



B-4

Area=0.033 sq. m (0.35 Sq.Ft.)

NOTES:

1. Concrete shall be 308kg/m³-C-17-MPa (520-C-2500).
2. See Standard Drawings G-9 and G-10 for joint details.
3. Extruded type B-3 curb shall be anchored to existing pavement by placing steel dowels and reinforcing steel as shown or by using an approved adhesive.

LEGEND ON PLANS

Type B-2 Curb and Gutter

Type B-1, B-3, B-4 Curb

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

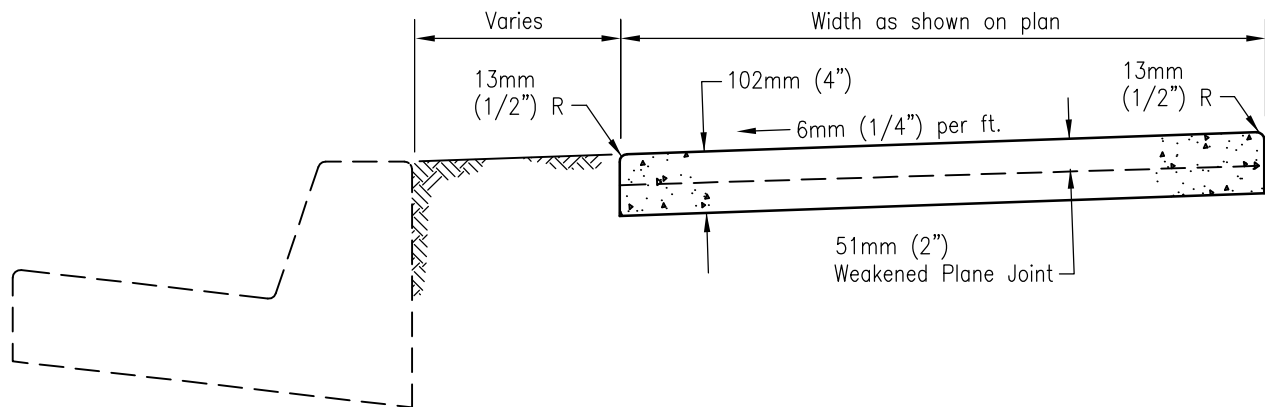
SAN DIEGO REGIONAL STANDARD DRAWING

CURBS AND GUTTER – MEDIANS

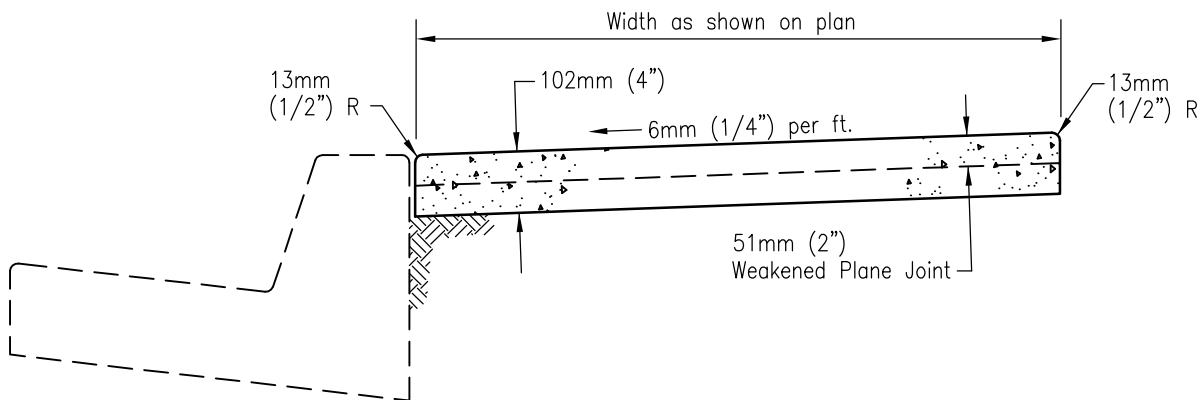
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G-6



NON-CONTIGUOUS

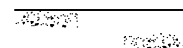


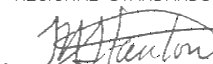
CONTIGUOUS

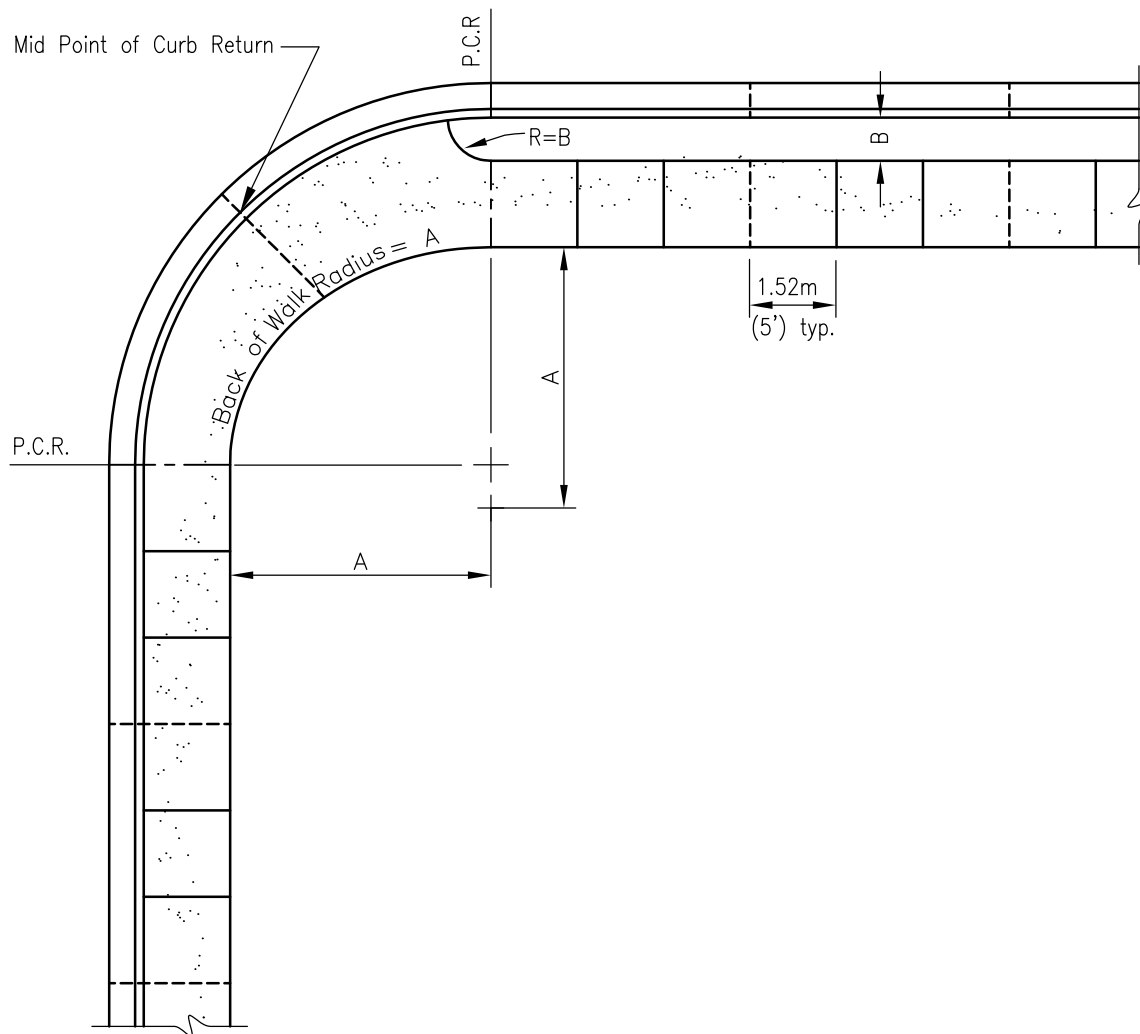
NOTES:

1. Concrete shall be 308kg/M³-C-17-MPa (520-C-2500).
2. See Standard Drawings G-9 and G-10 for joint details.

LEGEND ON PLANS

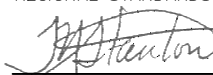


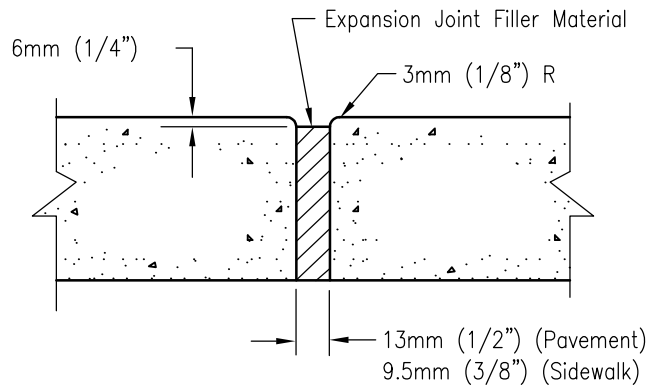
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SIDEWALK - TYPICAL SECTIONS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-7



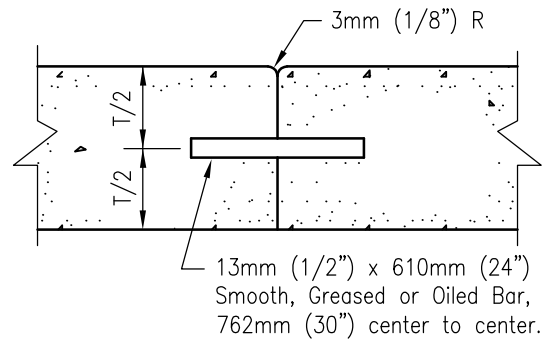
NOTES:

1. Expansion joints --- at curb returns, adjacent to structures and at 13.7m (45') intervals.
(See Standard Drawing G-10).
2. Weakened Plane Joints ----- at mid point of curb return, when required, and at 4.57m (15') intervals from P.C.R.'s
(See Standard Drawing G-10).
3. 6.35mm (1/4") grooves — with 6.35mm (1/4") radius edges at 1.52m (5') intervals.

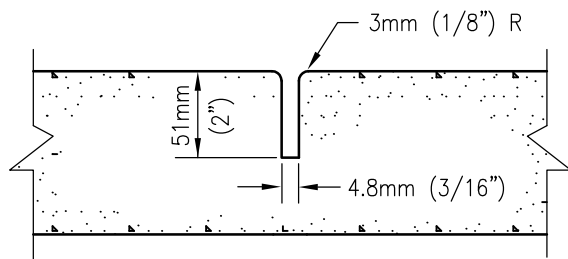
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SIDEWALK JOINT LOCATIONS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-9



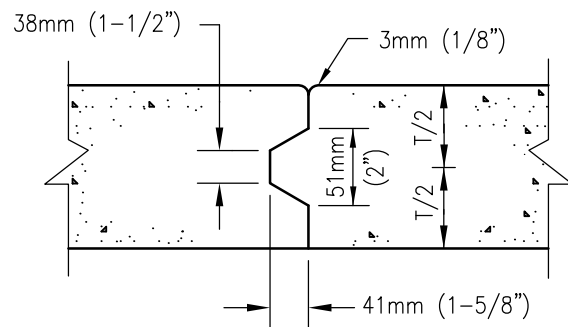
EXPANSION JOINT



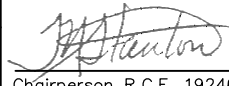
CONTACT JOINT

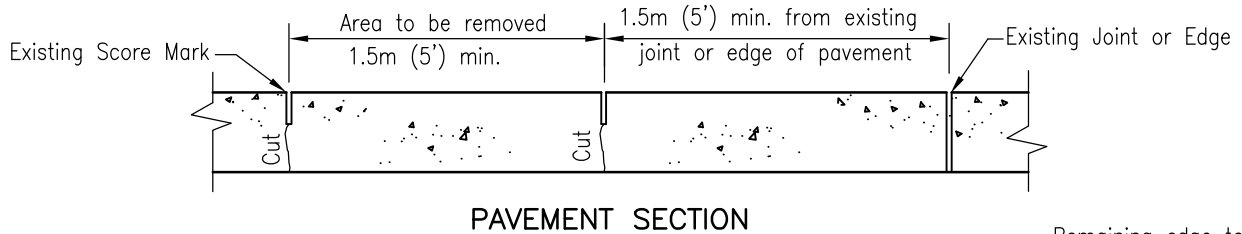
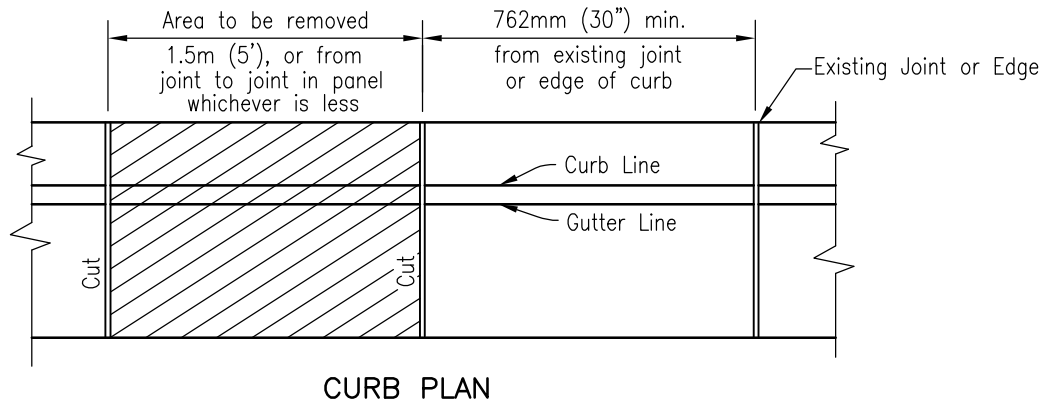
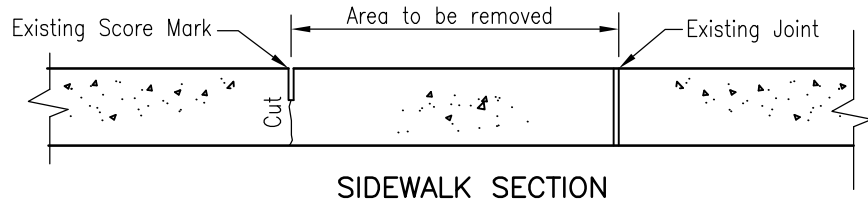
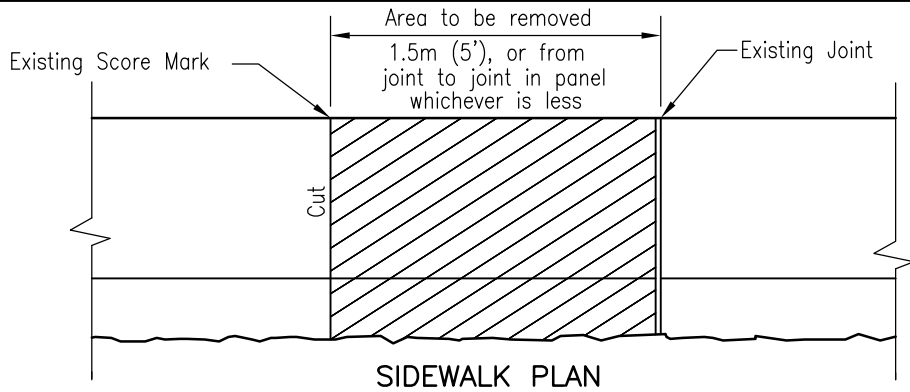


WEAKENED PLANE JOINT
CURB AND SIDEWALK



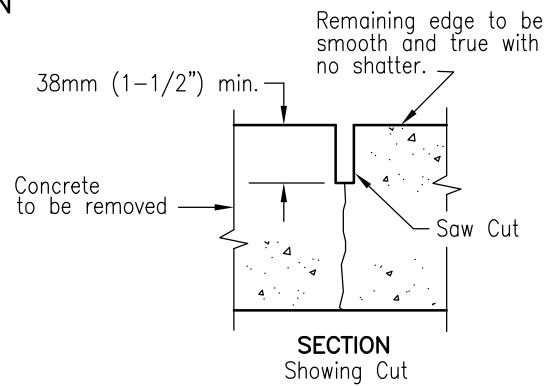
KEYED JOINT

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	2/95		
Add Metric		T. Stanton	03/03	CONCRETE JOINT DETAILS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-10

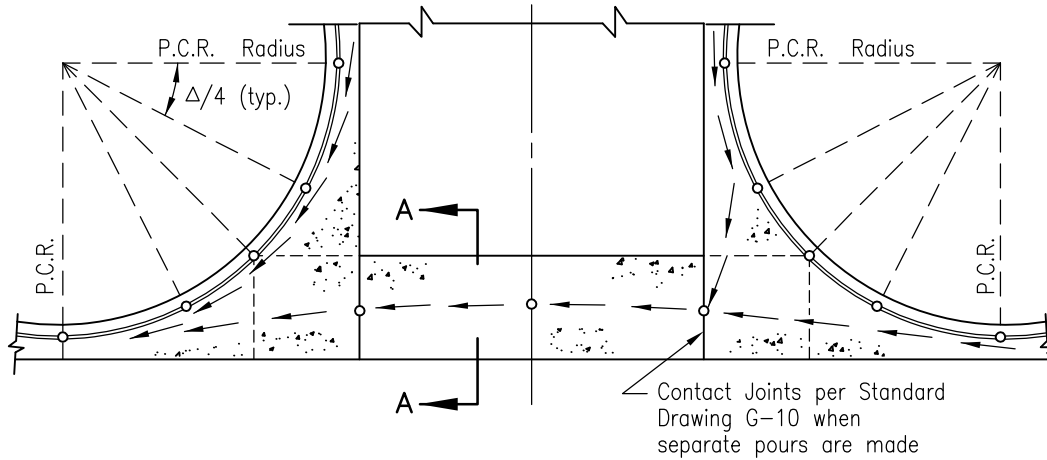


NOTE:

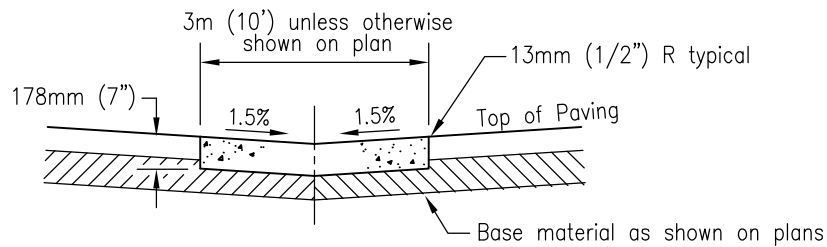
When distance from "Area to be removed" to existing joint, edge or score mark is less than minimum shown, "Area to be removed" shall be extended to joint, edge or score mark.



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
ORIGINAL		Kercheval	12/75	CONCRETE CURB, GUTTER, SIDEWALK AND PAVEMENT REMOVAL AND REPLACEMENT	
Add Metric		T. Stanton	03/03		
Reformatted		T. Stanton	04/06		
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 3/01/2003 Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER G-11	



PLAN

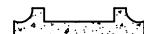


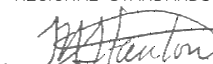
SECTION A-A

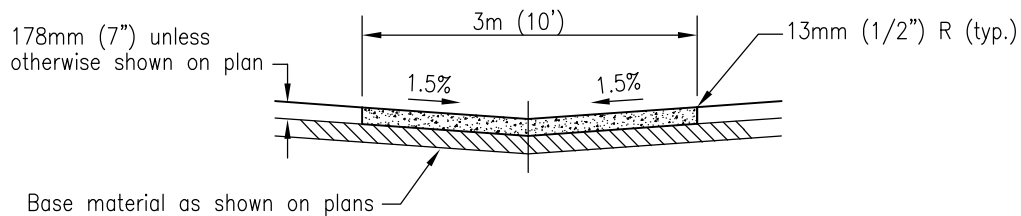
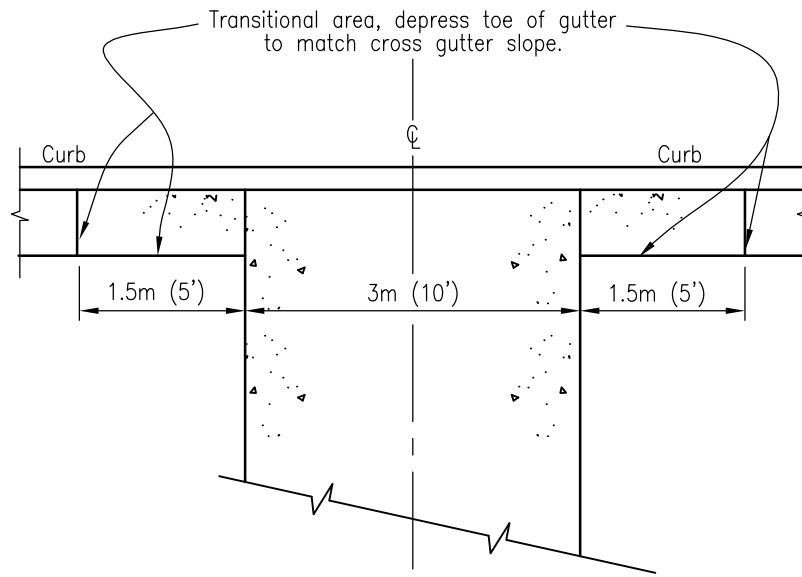
NOTES:

1. Concrete shall be 332kg/m³-C-22-MPa (560-C-3250).
2. ----- = Weakened plane joints.
3. ← ← = Typical flowlines.
4. ○ = Elevations to be shown on plans.
5. Return segments to be 178mm (7") Thick.
6. Curb between P.C.R.s. shall be considered as part of cross gutter.
7. In all cases subgrade shall be compacted to 95% min. relative compaction to depth of 305mm (12").

LEGEND ON PLANS



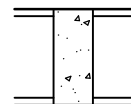
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CROSS GUTTER	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-12

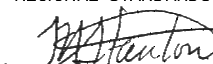


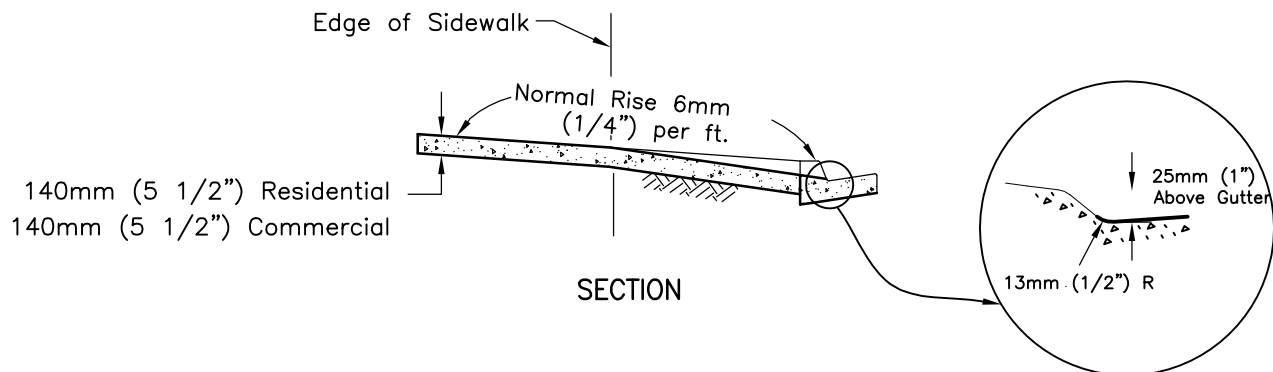
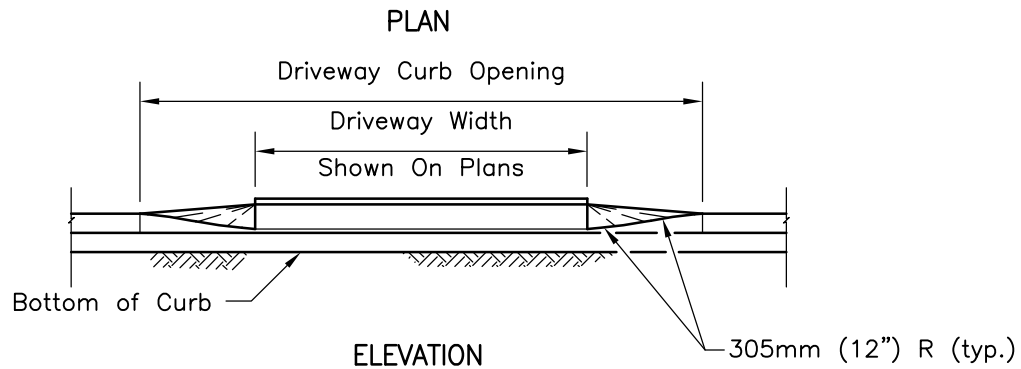
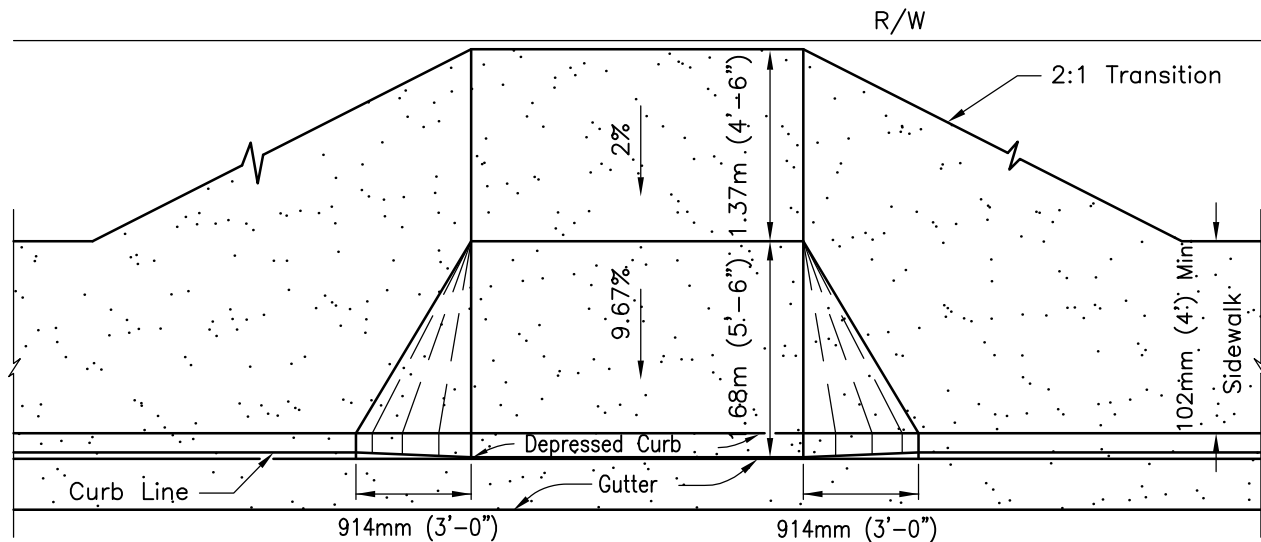
NOTES:

1. Cross gutter to be constructed where the drainage is carried across street.
2. Minimum allowable cross slope is 0.5%
3. Concrete shall be 332kg/m^3 -C-22-MPa (560-C-3250).
4. In all cases subgrade shall be compacted to 95% minimum relative compaction to depth of 305mm (12").

LEGEND ON PLANS

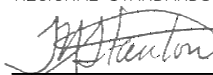


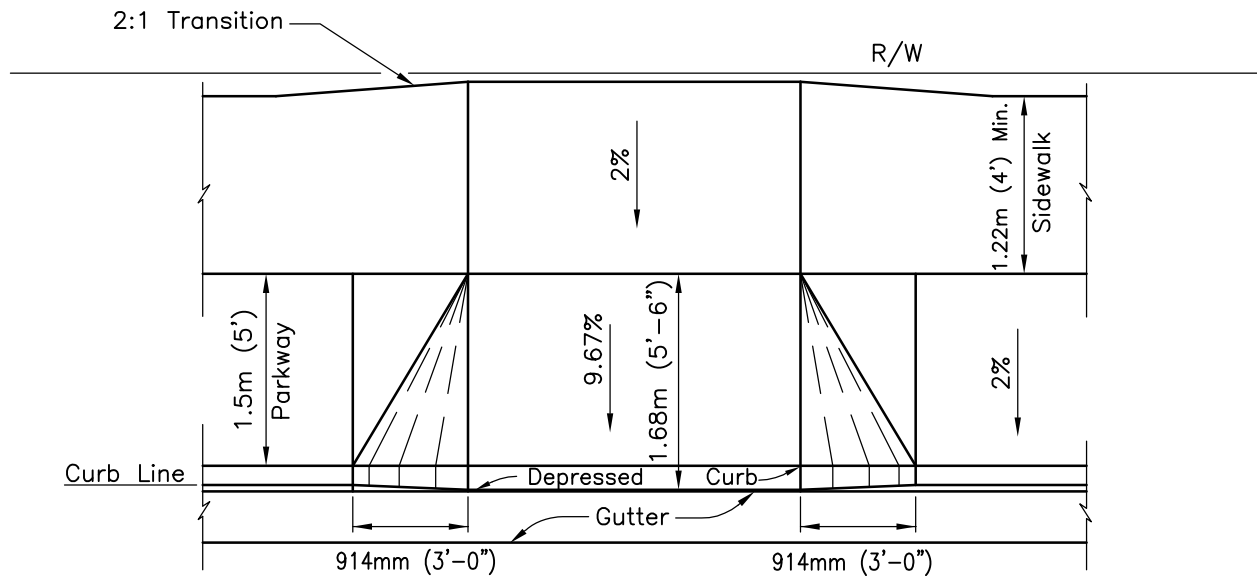
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	MID-BLOCK CROSS GUTTER	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	03/03		
					DRAWING NUMBER G-13



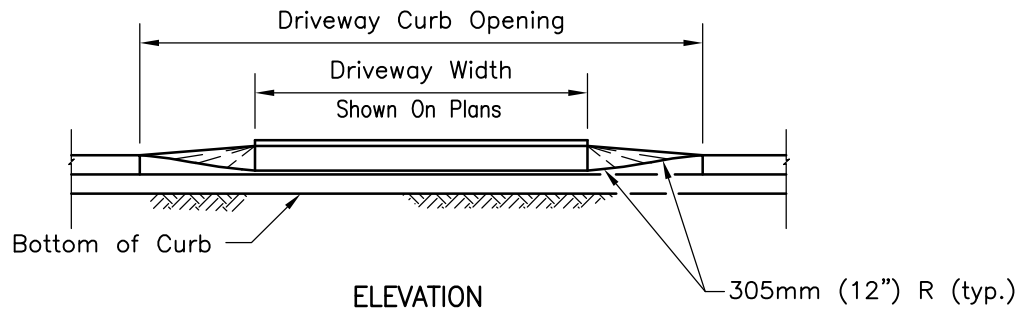
NOTES:

1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 332 kg/M³ C 22 Mpa (520-C-2500).
3. See Standard Drawings G-15 and G-16 for width and location requirements.
4. Driveway ramp to extend to 3m (10') from curb face or to property line whichever is less. (For commercial driveways only)
5. See Standard Drawings G-2 and G-10 for curb and joint details.

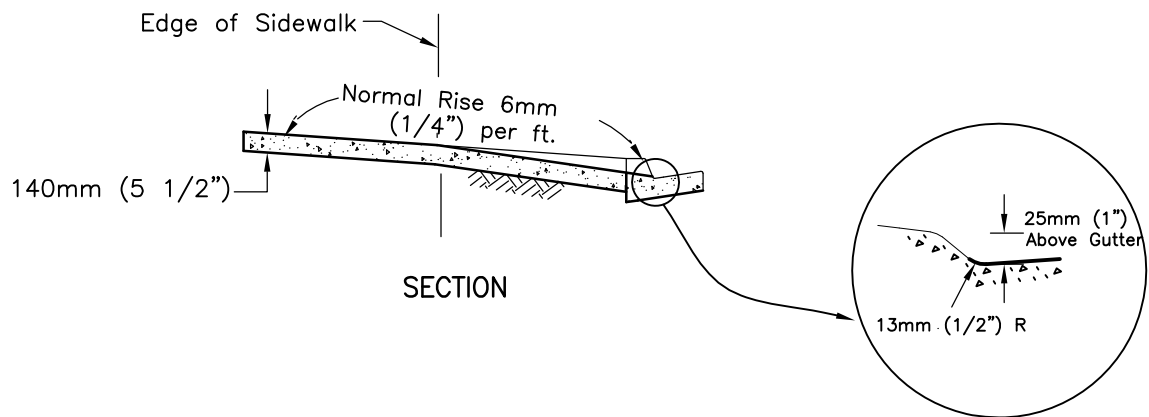
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		R. Munoz	4/97		
Add Metric		T. Stanton	03/03	CONCRETE DRIVEWAY (CONTIGUOUS SIDEWALK)	 3/10/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER G-14A



PLAN



ELEVATION

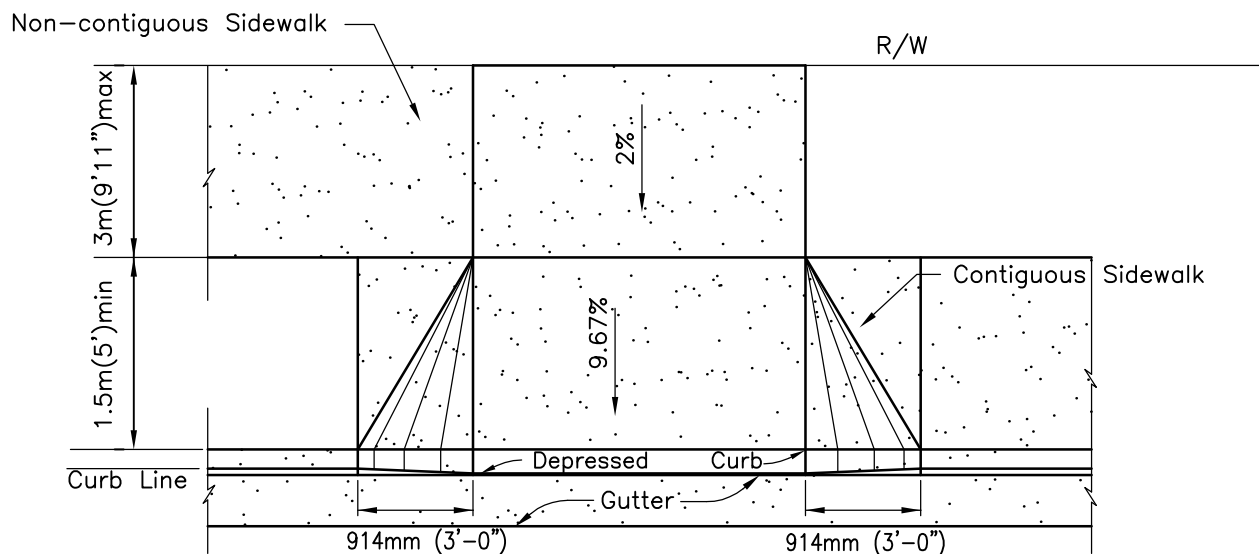


SECTION

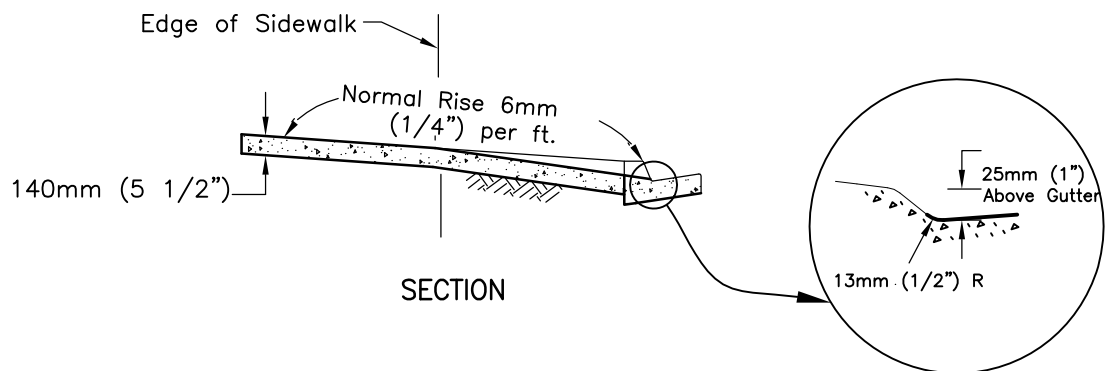
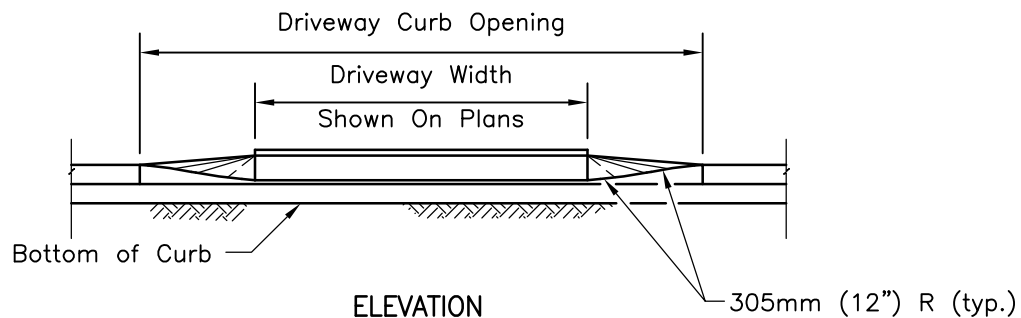
NOTES:

1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 308 kg/M³ C 17 Mpa (520-C-2500).
3. See Standard Drawings G-15 and G-16 for width and location requirements.
4. Driveway ramp to extend to 3m (10') from curb face or to property line whichever is less. (For commercial driveways only)
5. See Standard Drawings G-2 and G-10 for curb and joint details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		R. Munoz	4/97		
Add Metric		T. Stanton	03/03	CONCRETE DRIVEWAY (NON-CONTIGUOUS SIDEWALK)	 3/10/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-14B

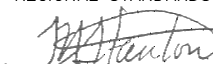


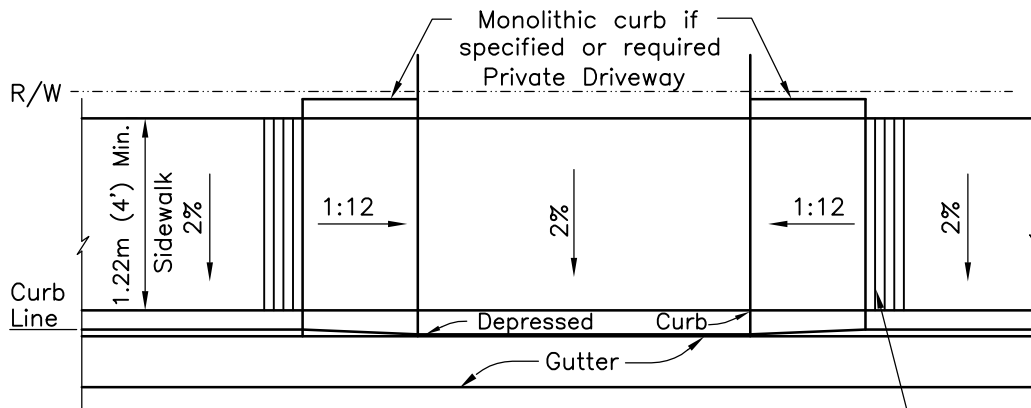
PLAN



NOTES:

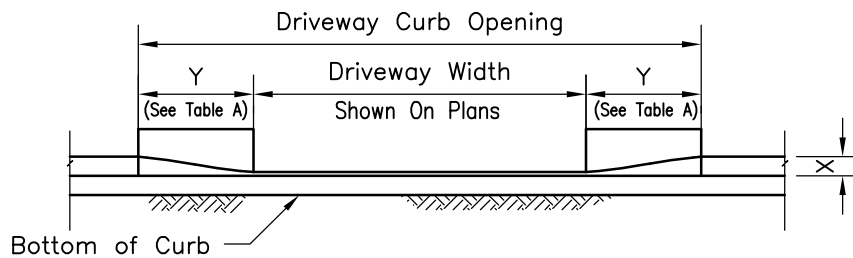
1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 308 kg/M³ C 17 Mpa (520-C-2500).
3. See Standard Drawings G-15 and G-16 for width and location requirements.
4. Driveway ramp to extend to 3m (10') from curb face or to property line whichever is less. (For commercial driveways only)
5. See Standard Drawings G-2 and G-10 for curb and joint details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		R. Munoz	4/97		
Add Metric		T. Stanton	03/03	RESIDENTIAL CONCRETE DRIVEWAY (PARKWAY LESS THAN 3.0m (10') IN DEPTH)	 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
					DRAWING NUMBER G-14C



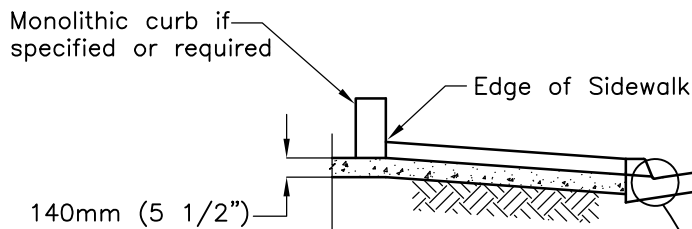
PLAN

305mm (12") wide border with 6mm (1/4") grooves approx. 19mm (3/4") O.C.

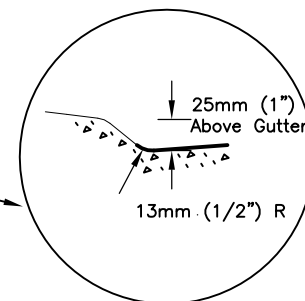


ELEVATION

TABLE A	
X	Y
CURB HIEGHT	RAMP LENGTH
25mm (1")	152mm (0'-6")
51mm (2")	457mm (1'-6")
76mm (3")	762mm (2'-6")
102mm (4")	1.10m (3'-6")
127mm (5")	1.40m (4'-6")
152mm (6")	1.70m (5'-6")
178mm (7")	2.0m (6'-6")
203mm (8")	23m (7'-6")

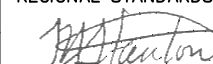


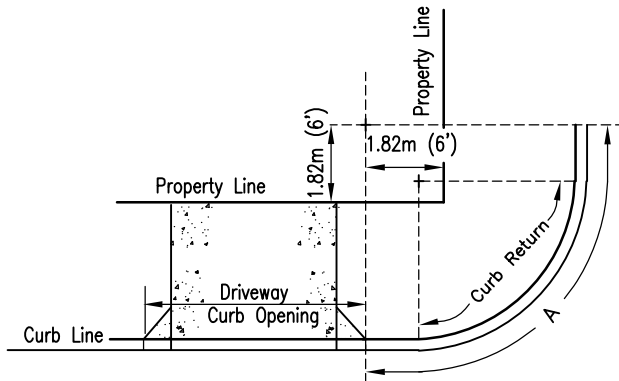
SECTION



NOTES:

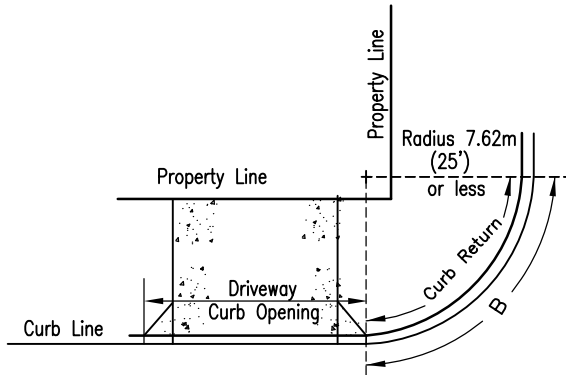
1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 308 kg/M³ C 17 Mpa (520-C-2500).
3. See Standard Drawings G-15 and G-16 for width and location requirements.
4. See Standard Drawings G-2 and G-10 for curb and joint details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL	HH	T. Stanton	02/03		CONCRETE DRIVEWAY (FOR CONFINED RIGHT-OF-WAY)	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING		G-14D
				NUMBER		



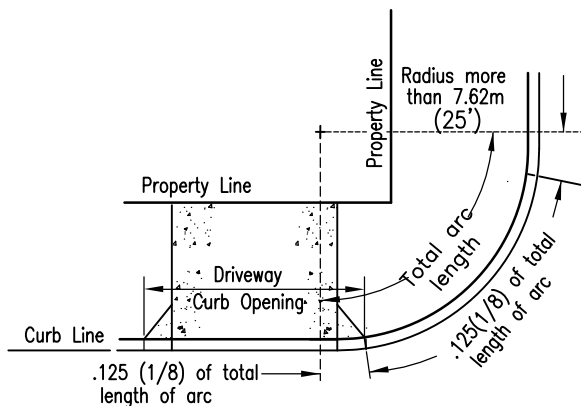
REQUIREMENT 1

No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb as shown by arc A.



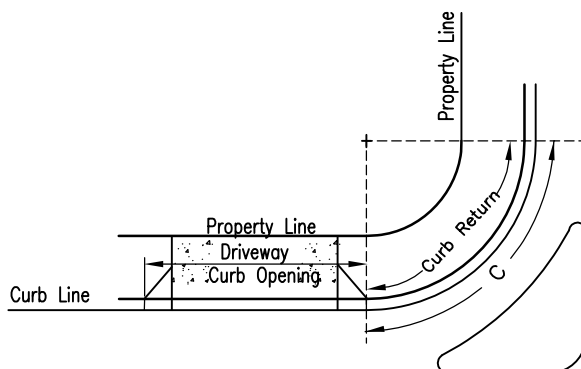
REQUIREMENT 2

No portion of any curb opening shall be permitted in the curb return where the radius of curb is 7.62m (25') or less, as shown by arc B.



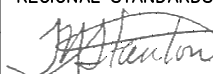
REQUIREMENT 3

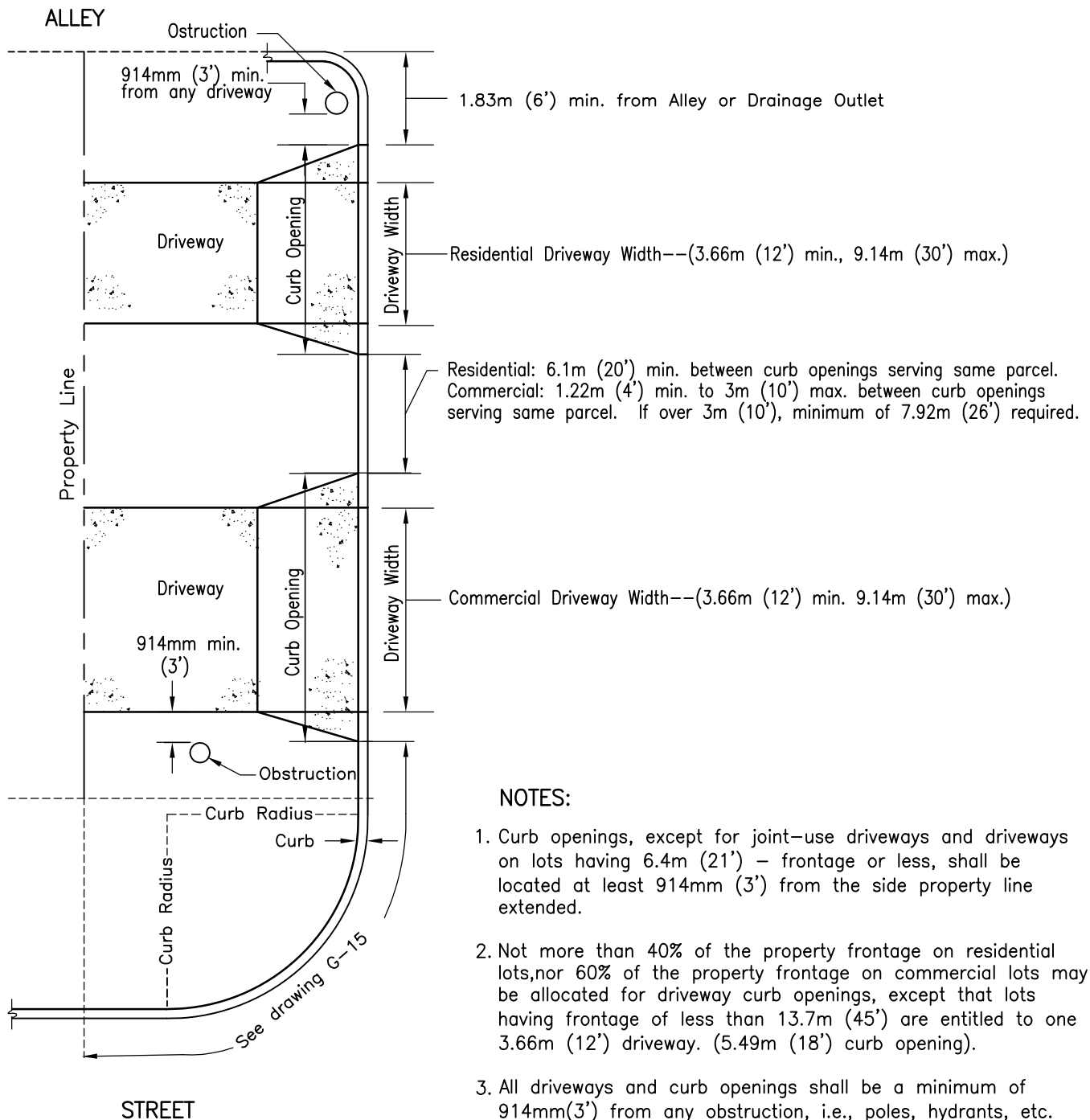
On all curb returns where the radius is more than 25', curb openings may encroach upon each end of the return a distance equal to 12 1/2% or .125 (1/8) of the total length of the arc on the curb return, thus leaving at least 75% of the length of arc on the return face free from driveway encroachment, provided Requirement 1 is met.



REQUIREMENT 4

No portion of any curb opening shall be permitted in the curb return where a separate turning movement is provided, as shown by arc C.

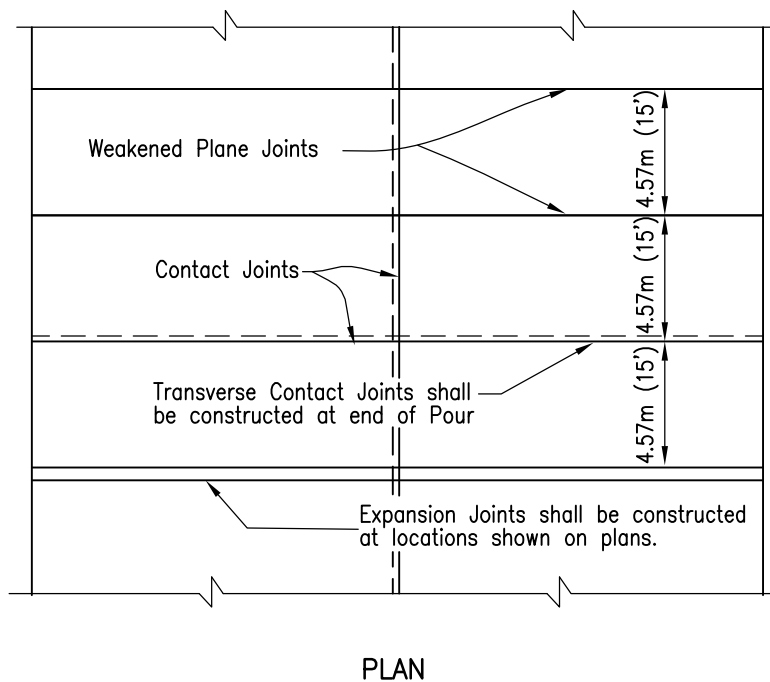
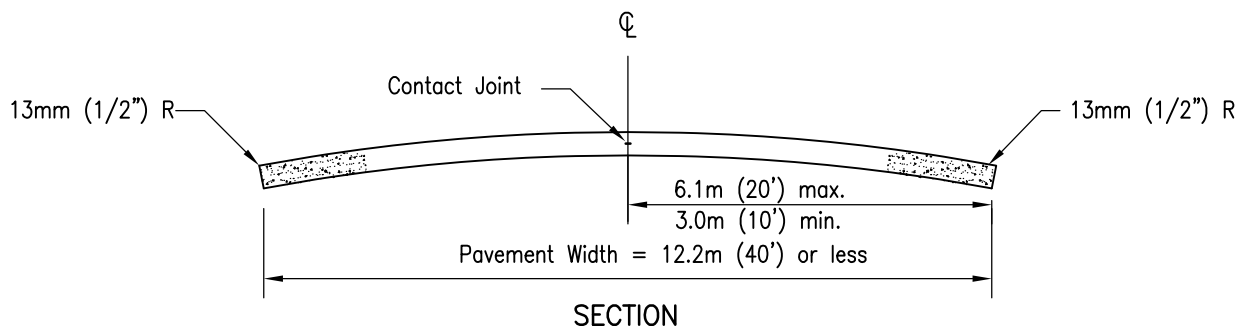
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		DRIVEWAY LOCATION – ADJACENT TO CURB RETURNS AND STREET LINES	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		G-15



NOTES:

1. Curb openings, except for joint-use driveways and driveways on lots having 6.4m (21') - frontage or less, shall be located at least 914mm (3') from the side property line extended.
2. Not more than 40% of the property frontage on residential lots, nor 60% of the property frontage on commercial lots may be allocated for driveway curb openings, except that lots having frontage of less than 13.7m (45') are entitled to one 3.66m (12') driveway. (5.49m (18') curb opening).
3. All driveways and curb openings shall be a minimum of 914mm (3') from any obstruction, i.e., poles, hydrants, etc.
4. No portion of any driveway shall be allowed across a line extending normal to the roadway from the front corner of the property, except that joint-use driveways may be permitted in special instances where written approval of both property owners is filed with the Agency.

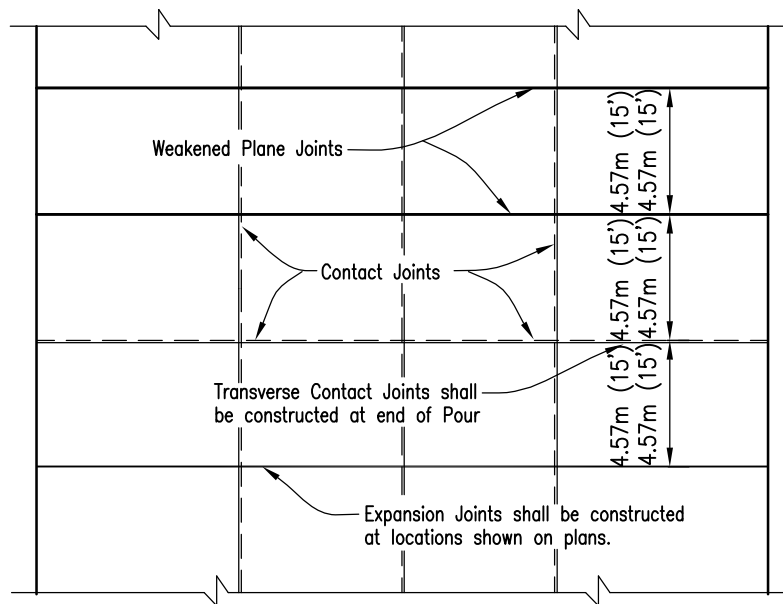
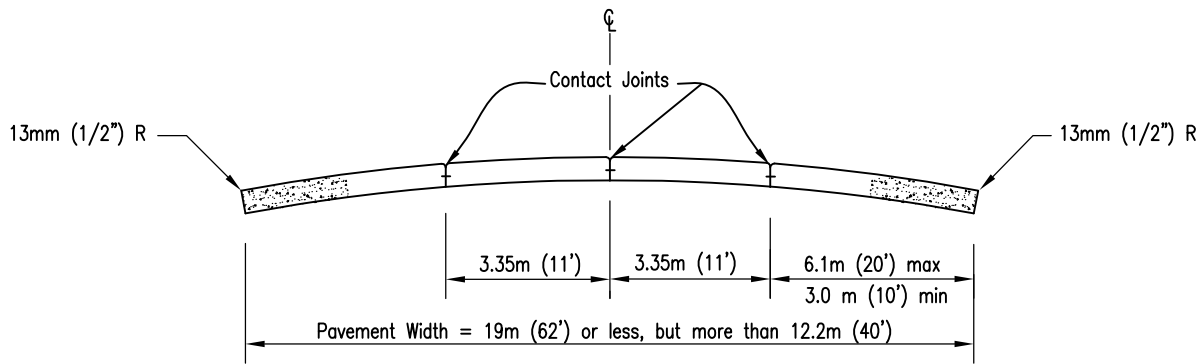
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	DRIVEWAY LOCATION AND WIDTH REQUIREMENTS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER G-16



NOTES:

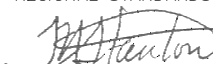
1. Concrete shall be 332 kg/M³ C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

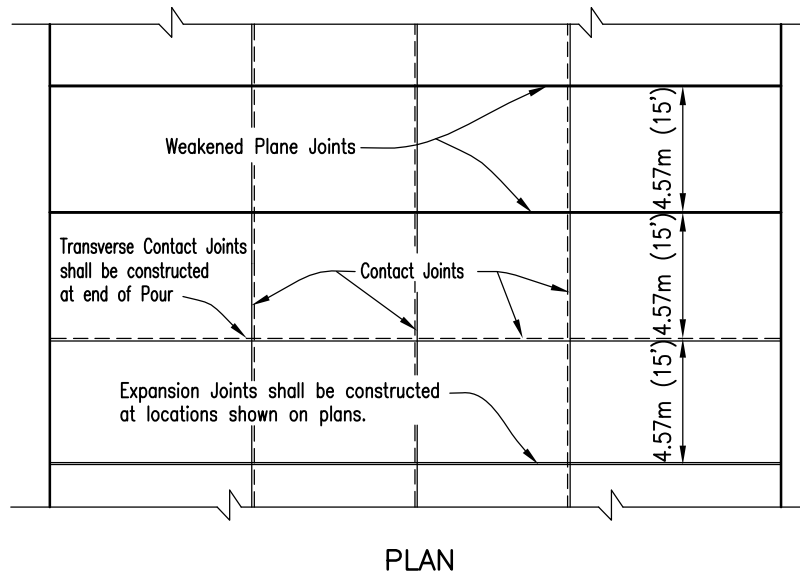
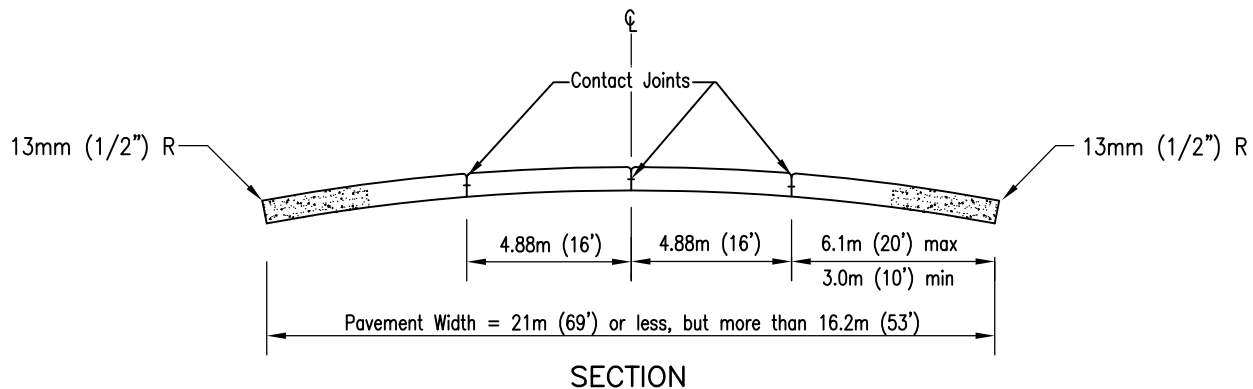
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE PAVEMENT WIDTH 12.2m (40') OR LESS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER G-18



NOTES:

1. Concrete shall be 332 kg/M³ C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

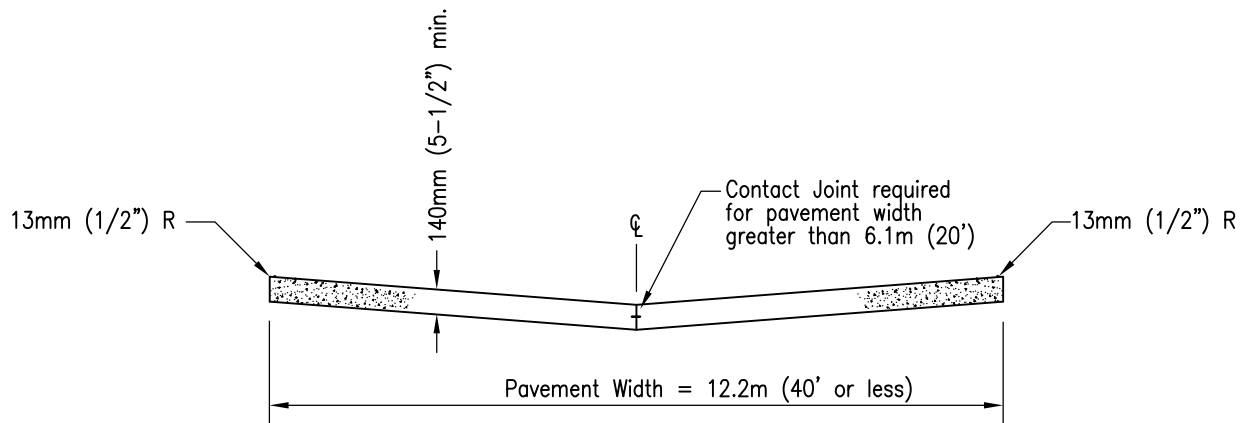
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE PAVEMENT WIDTH 12.2m (40') TO 19m (62')	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
				DRAWING NUMBER	G-19



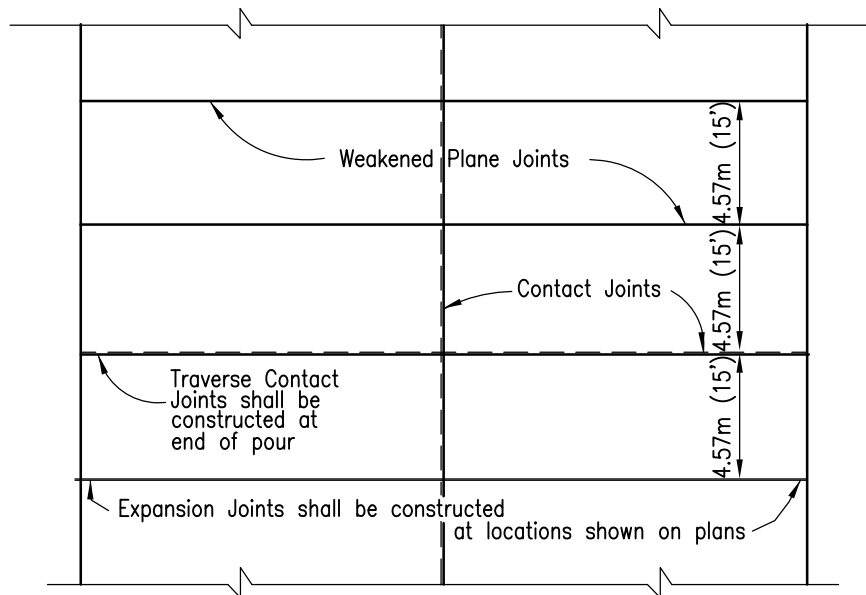
NOTES:

1. Concrete shall be 332 kg/M³ C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	CONCRETE PAVEMENT, ALLEY SECTION WIDTH 16.2m (53') TO 21m (69')		 3/01/2003	Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER	G-20



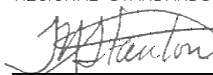
SECTION

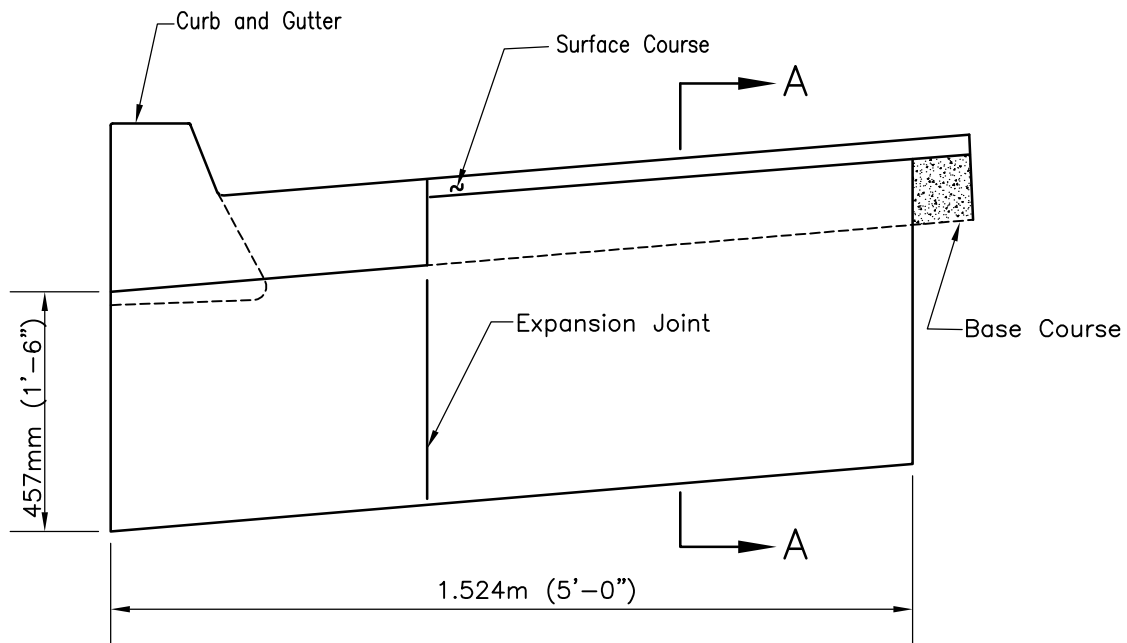


PLAN

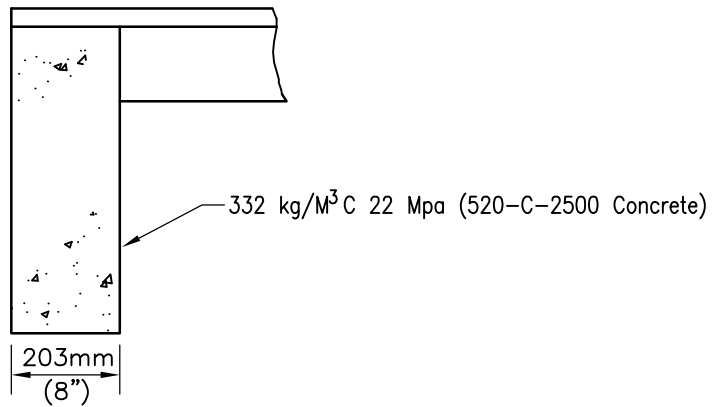
NOTES:

1. Concrete shall be 332 kg/M³ C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	CONCRETE PAVEMENT ALLEY SECTION, WIDTH 12.2m (40') OR LESS		 3/01/2003	Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER	G-21



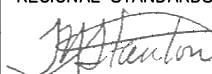
ELEVATION

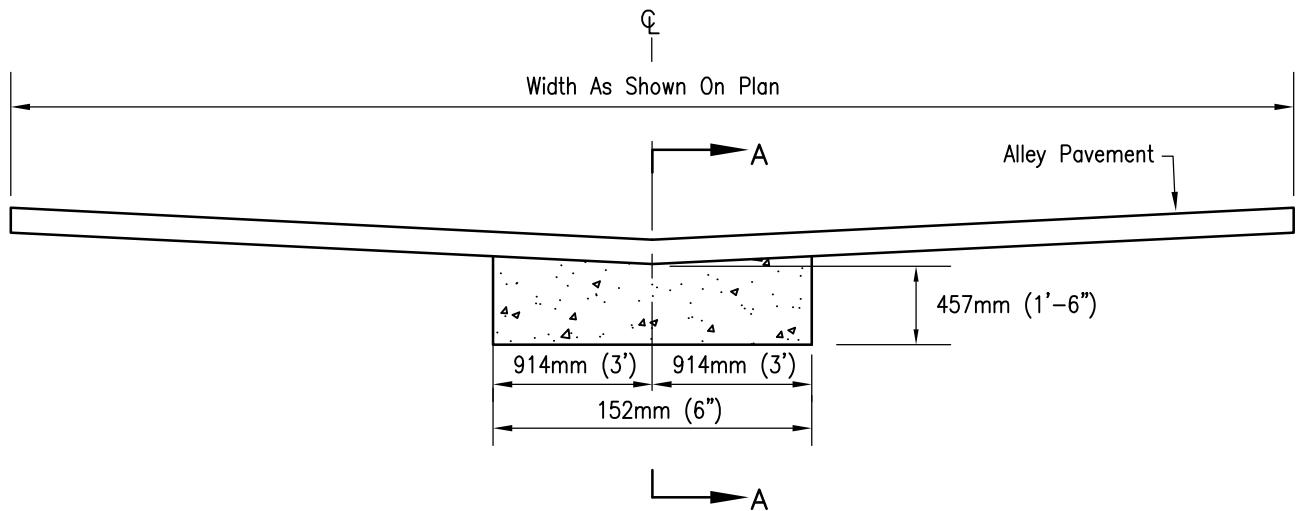


SECTION A-A

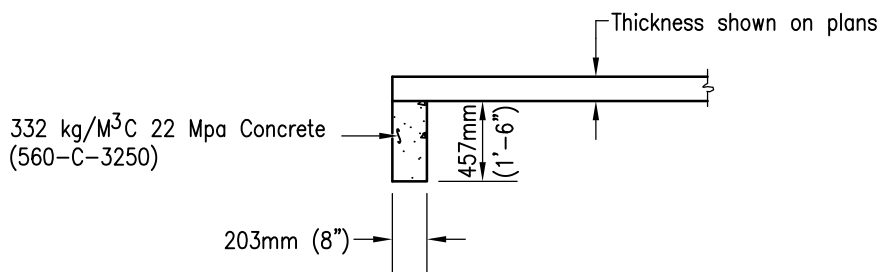
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CUTOFF WALL AT END OF PAVEMENT	 3/01/2003
Reviewed		T. Stanton	04/06		
				Chairperson R.C.E. 19246	Date
				DRAWING NUMBER	G-22



ELEVATION

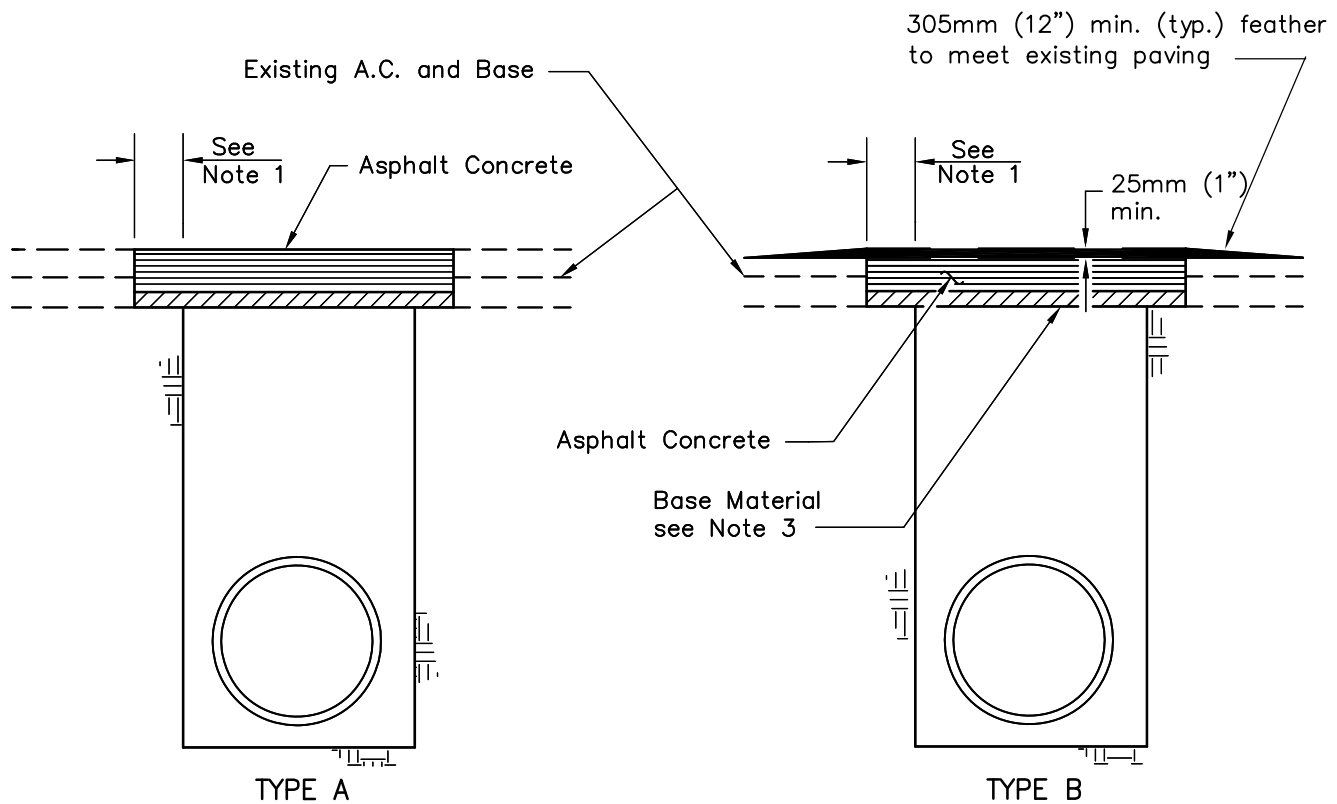


SECTION A-A

LEGEND ON PLANS

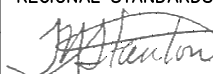


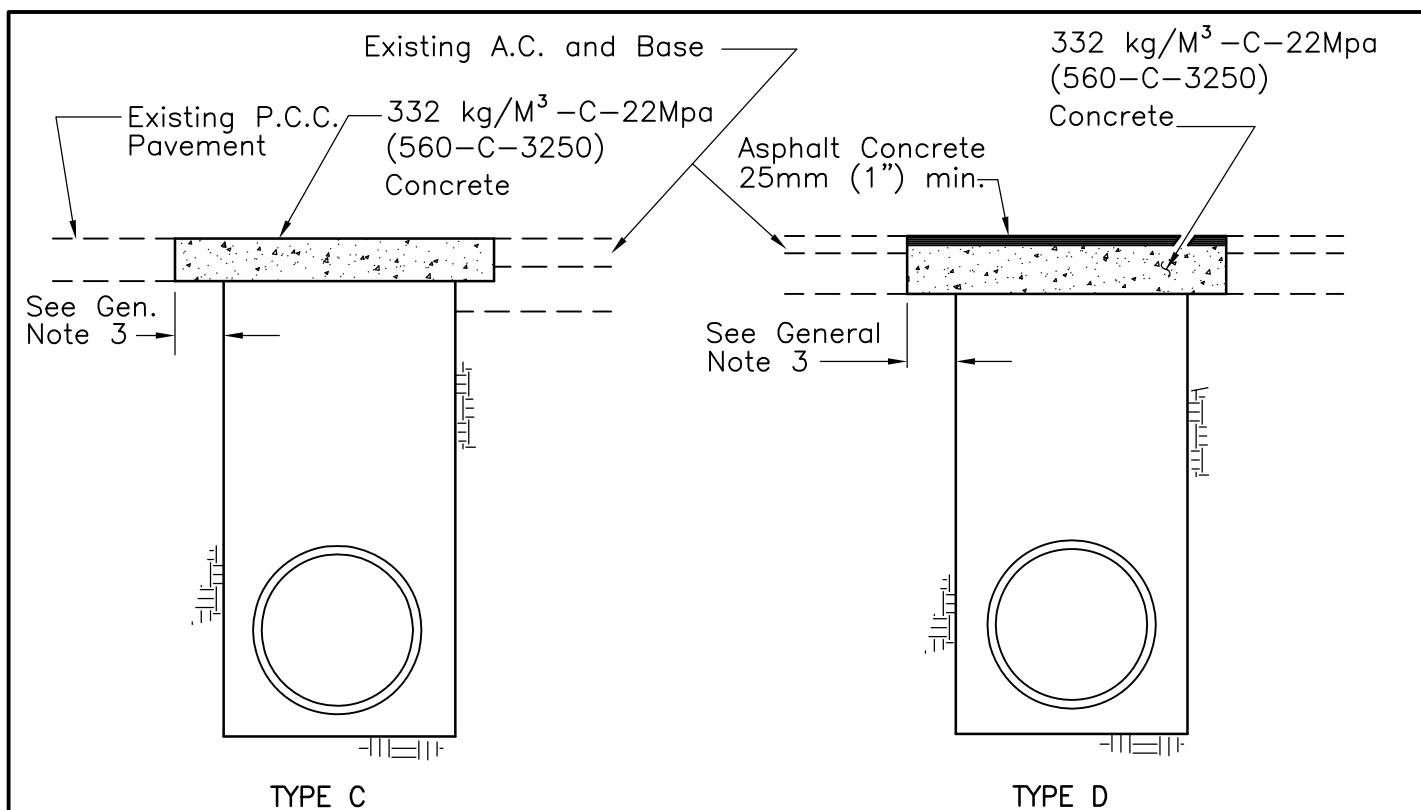
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CUTOFF WALL AT END OF ALLEY PAVEMENT	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER G-23



NOTES:

1. Trench edges to be cut a minimum of 152mm (6") wider than trench for 914mm (3') wide or less, and 305mm (12") wider for trenches over 914mm (3') wide.
2. Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.
3. Base material shall be replaced to depth of existing base. A.C. may be substituted for base material.
4. A tack coat of asphaltic emulsion or paving asphalt shall be applied to existing A.C. or P.C.C. contact surfaces, prior to resurfacing.
5. Asphalt Concrete Resurfacing:
 - a) Minimum total thickness shall be one inch greater than existing A.C.
 - b) A.C. shall be hot plant mix.
 - c) Finish course for Type B resurfacing shall be laid down using a spreader box.
6. All A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.
7. Type B shall not be used on lateral crossings.
8. Sloughing of trench under pavement shall be cause for requiring additional pavement and base.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Parkinson	2/95		TRENCH RESURFACING TYPES A & B	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		G-24



GENERAL NOTES:

- Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.
- Sloughing of trench under pavement shall be cause for requiring additional pavement and base.
- Trench edges to be cut a minimum of 152mm(6") wider than trench for 914mm (3') wide or less, and 305mm (12") wider for trenches over 914mm (3') wide.

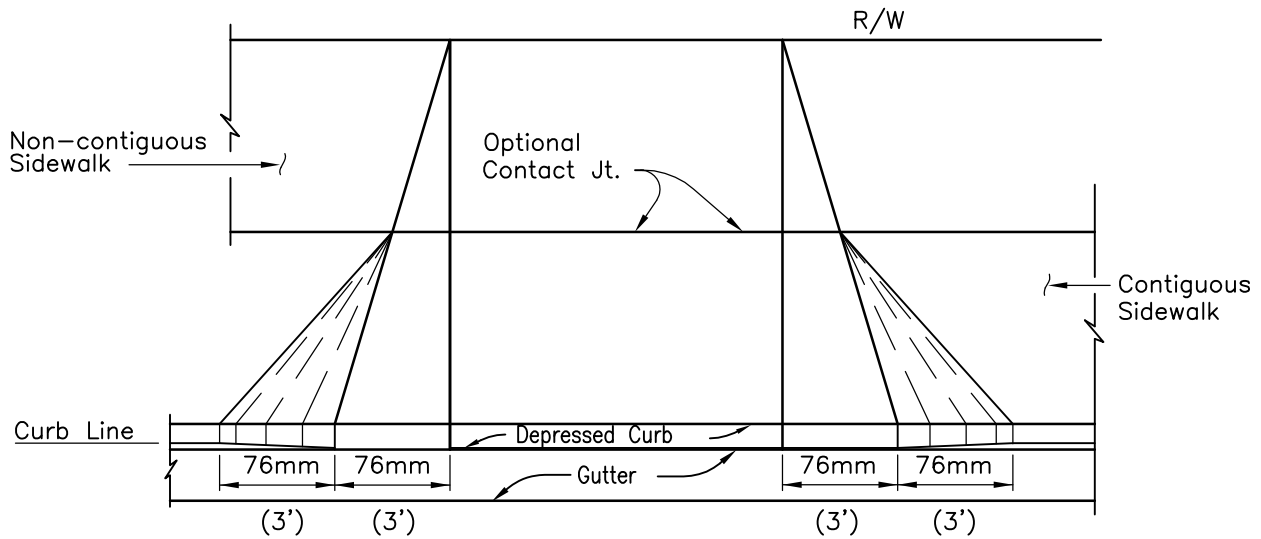
NOTES TYPE-C:

- Concrete shall be colored black where required to match existing pavement, method to be specified by Agency.
- Minimum concrete thickness:
 Alleys and local residential street -----127mm (5")
 Major streets and highway -----178mm (7")
 Trench resurfacing in P.C.C. pavement shall have the above minimum thickness or match the existing concrete thickness plus one inch, whichever is greater.

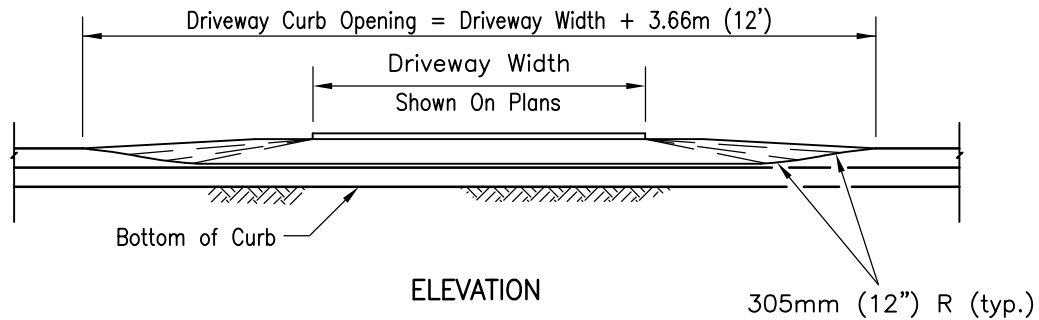
NOTES TYPE-D:

- A.C. shall be hot plant mix.
- A tack coat of asphaltic emulsion or paving asphalt shall be applied to the existing A.C. at all contact surfaces and to portland cement concrete prior to placing new A.C.
- A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.

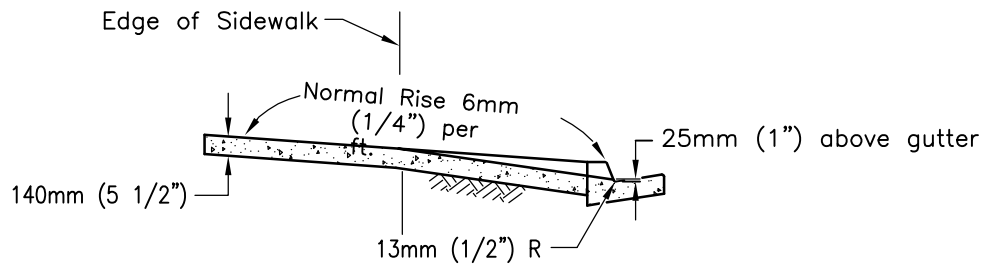
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	2/95		
Add Metric		T. Stanton	03/03	TRENCH RESURFACING TYPES C & D	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER G-25



PLAN



ELEVATION

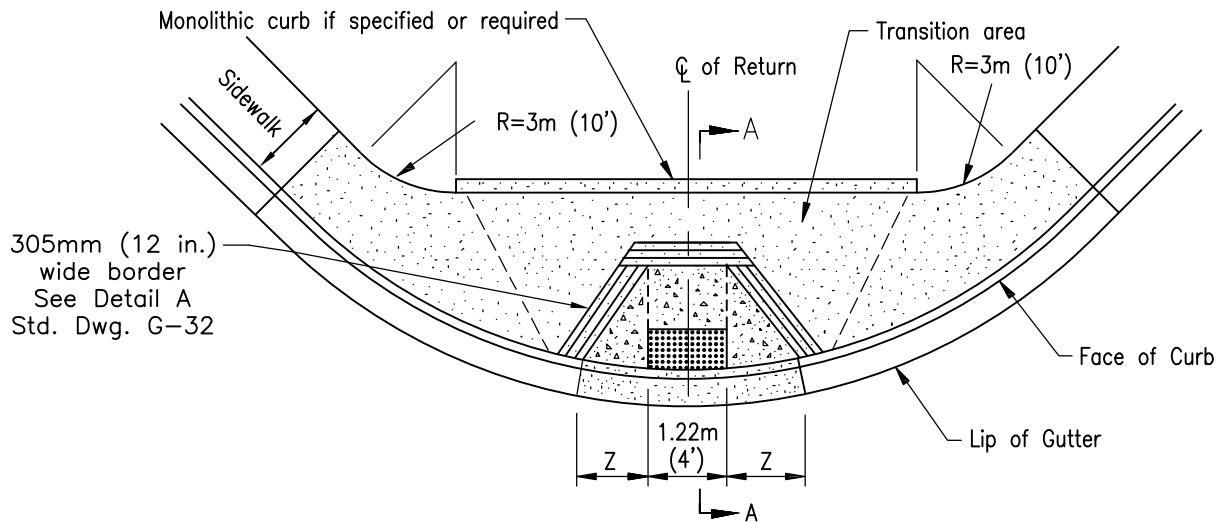


SECTION

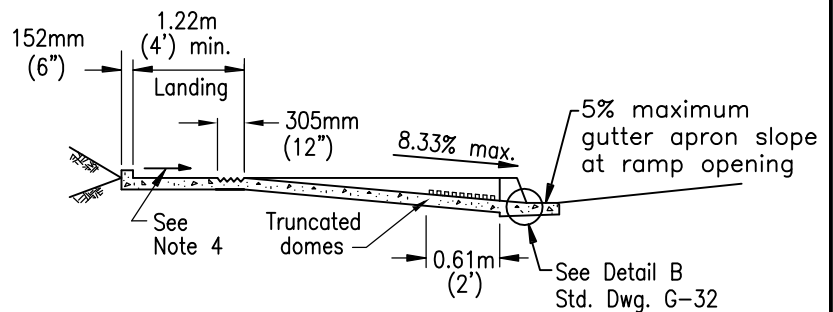
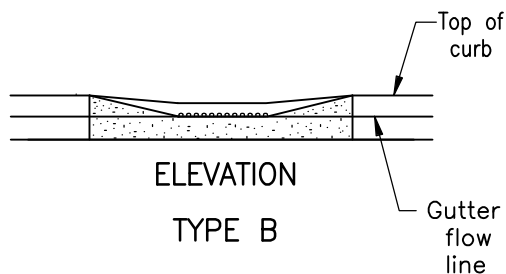
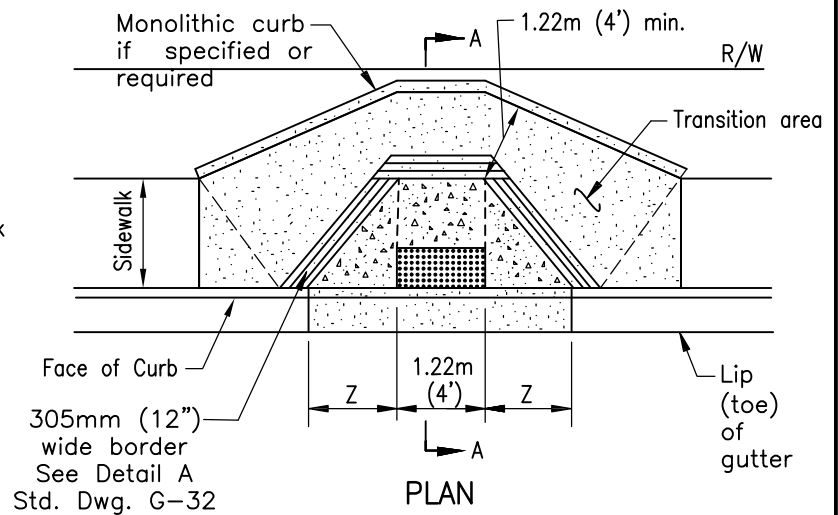
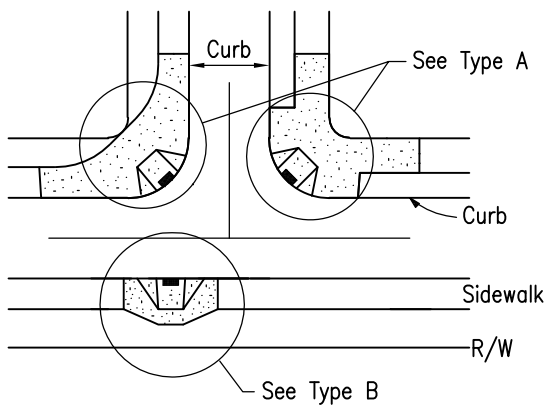
NOTES:

1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 308 kg/M³ C 17 Mpa (520-C-2500.)
3. See Standard Drawings G-15 and G-16 for width and location requirements
4. Driveway ramp to extend to 3m (10') from curb face or to property line whichever is less. (For commercial driveways only)
5. See Standard Drawings G-2 and G-10 for curb and joint details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		H. Hecht	10/82				
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
				CONCRETE DRIVEWAY COMMERCIAL ALTERNATE		Chairperson R.C.E. 19246 Date	
						DRAWING NUMBER G-26	



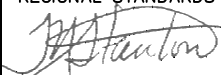
PLAN - TYPE A

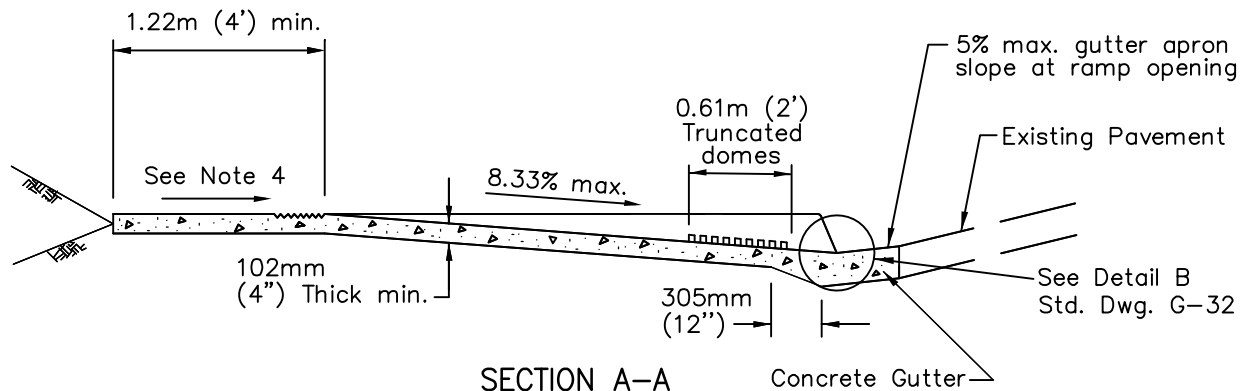
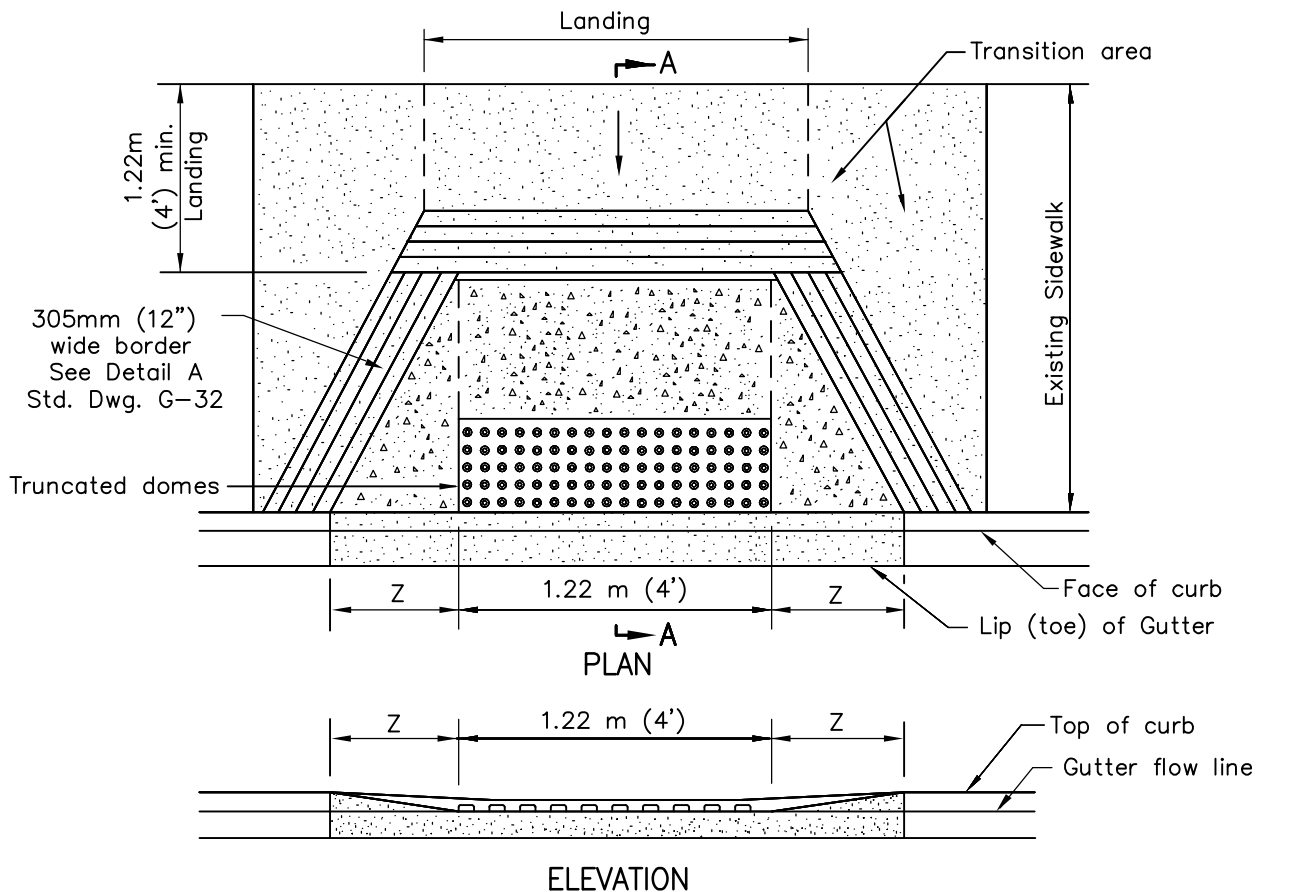


SECTION A-A

NOTES:

1. See Drawing G-32 for general notes.
2. For truncated domes details, please see Drawing G-30.
3. Z side slope shall be 10:1.
4. Landing cross slope shall be 2.0% max. in both directions.

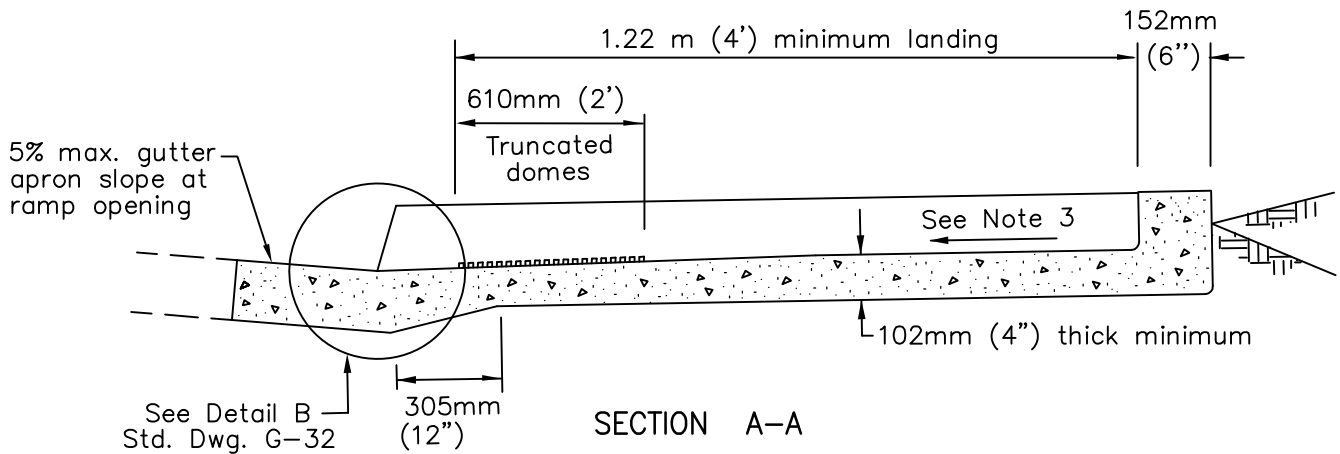
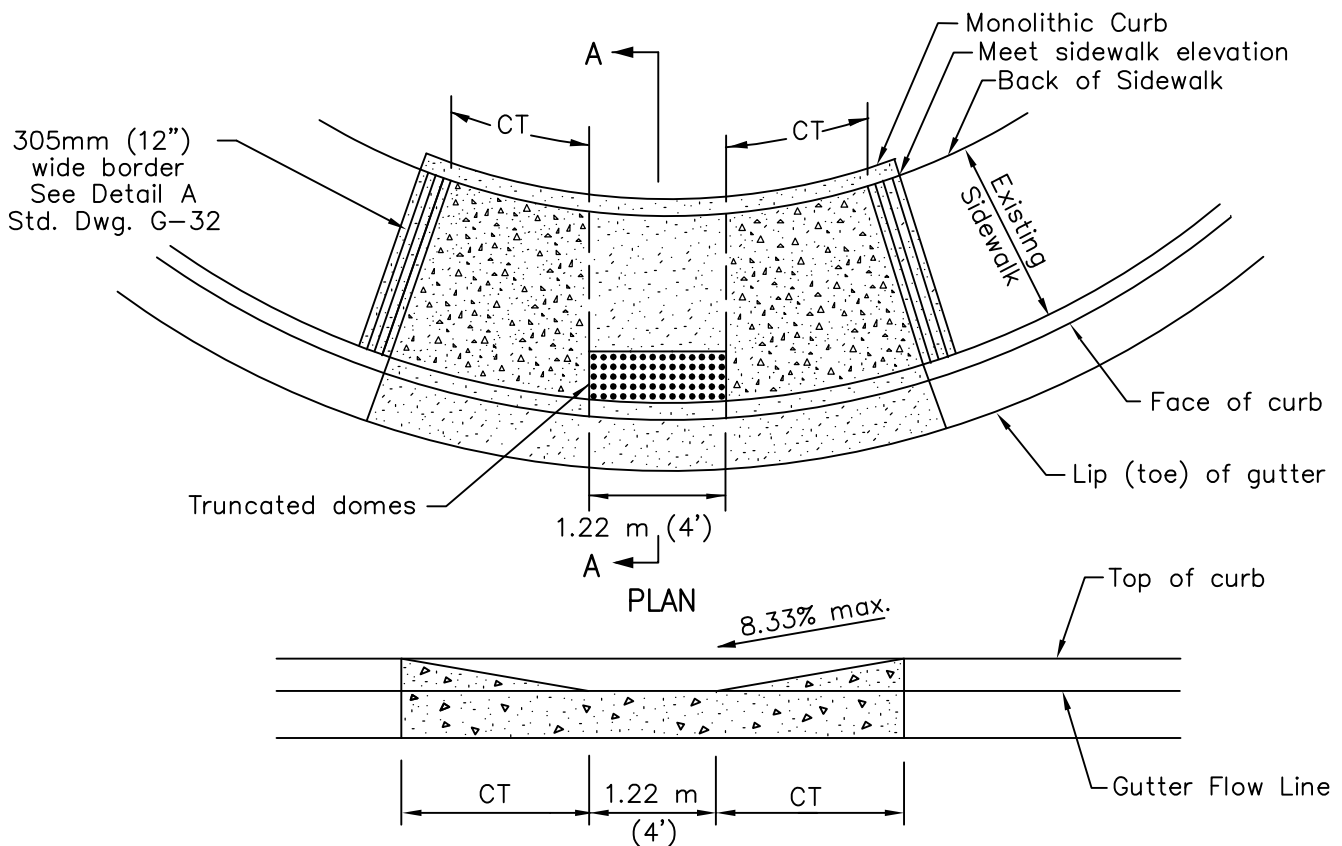
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Bahmanian	4/86	CURB RAMP - TYPES A AND B (NEW CONSTRUCTION)		 12-09-2004 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
UPDATE		D. Davies	12/04			
Revised		T. Stanton	04/06			
						DRAWING NUMBER G-27



NOTES:

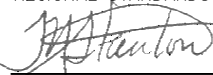
1. See Standard Drawing G-32 for general notes.
2. Type A-1 is a designation for ramp at curb return.
3. Type B-1 is a designation for ramp at straight curb (shown above).
4. Landing cross slope shall be 2.0% max. in both directions.
5. For truncated domes details, please see Standard Drawing G-30.
6. Z side slope shall be 10:1.

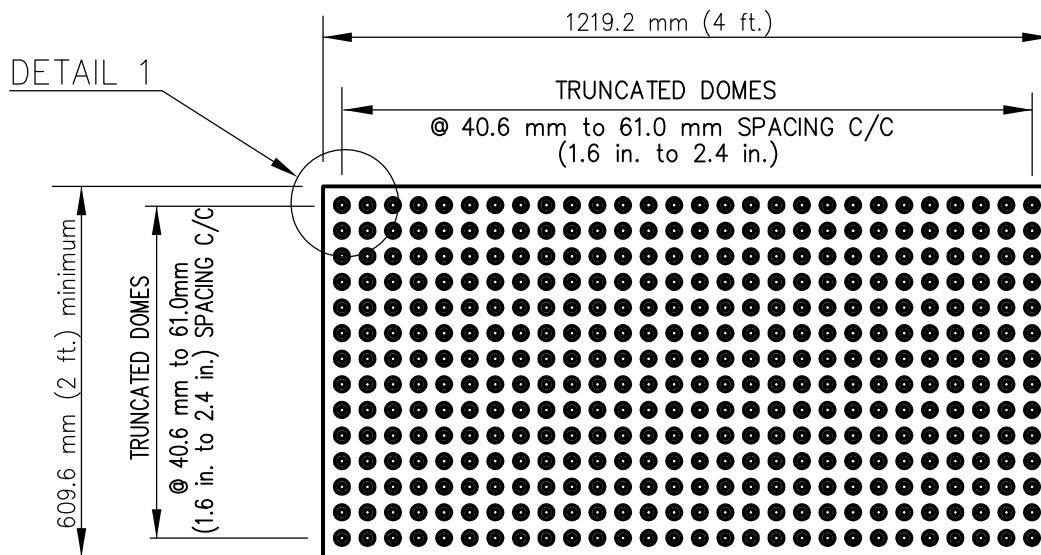
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Bahmanian	2/95		
Add Metric		T. Stanton	03/03	CURB RAMP - TYPES A-1 AND B-1 (FOR EXISTING SIDEWALK)	 12-09-2004 Chairperson R.C.E. 19246 Date
UPDATE		D. Davies	12/04		
Revised		T. Stanton	04/06		
					DRAWING NUMBER G-28



NOTES:

1. Type C ramps are only to be used to mitigate existing conditions where inadequate right of way exists to use Standard Drawing G-28, and are not to be used in new construction.
2. See Standard Drawing G-32 for general notes.
3. Landing cross slope shall be 2.0% max. in both directions.
4. For truncated domes, please see Standard Drawing G-30.
5. CT Curve Transition slope shall be 8.33% maximum.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		R. Munoz	5/97		
Add Metric		T. Stanton	03/03	CURB RAMP – TYPE C (FOR EXISTING SIDEWALK)	 12-09-2004 Chairperson R.C.E. 19246 Date
UPDATE		D. Davies	12/04		
Revised		T. Stanton	04/06		
					DRAWING NUMBER G-29

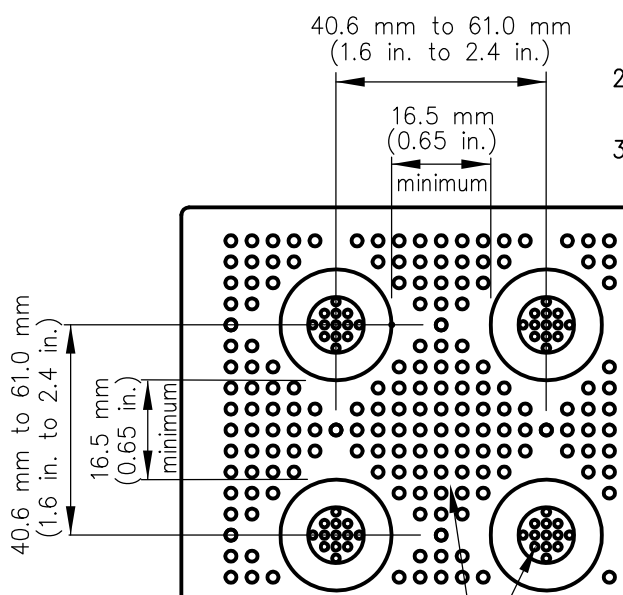


PLAN - TILE

NOT TO SCALE

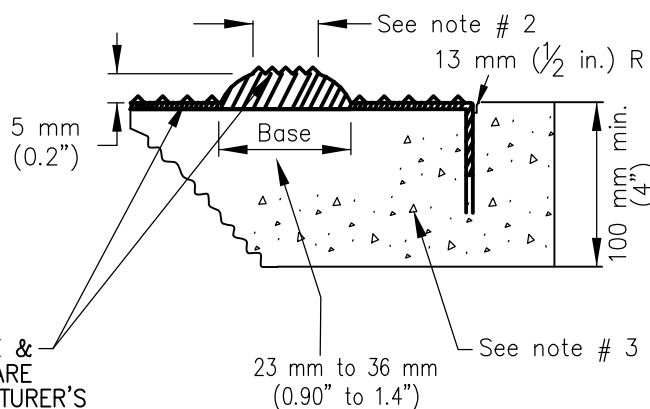
NOTES

1. Detectable warning surface color shall be yellow conforming to federal standards 595B Table IV, color No. 33538, or as specified by the agency. Color shall be homogeneous throughout the tile.
2. Truncated dome top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum.
3. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile to rock the tile, causing a void between the underside of tile and concrete.



DETAIL 1
NOT TO SCALE

NOTE:
PATTERN, SIZE &
ORIENTATION ARE
PER MANUFACTURER'S
RECOMMENDATION



Revision	By	Approved	Date
ORIGINAL		G. Parkinson	2/95
Add Metric		T. Stanton	03/03
UPDATE		D. Davies	12/04

SAN DIEGO REGIONAL STANDARD DRAWING

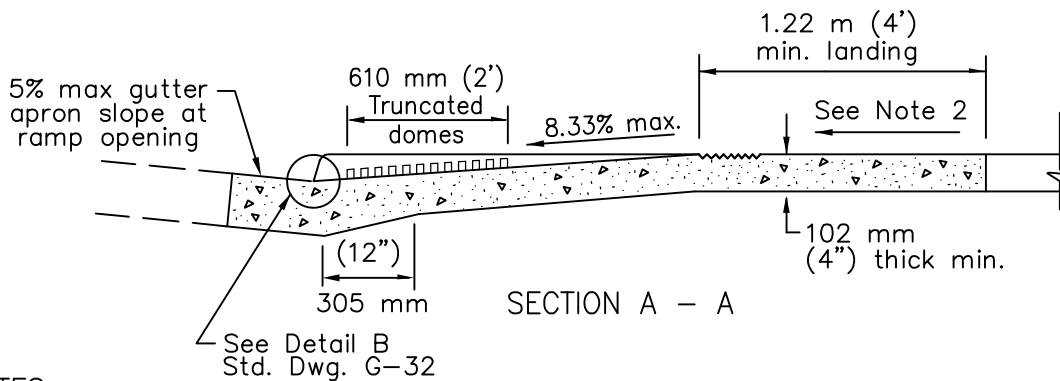
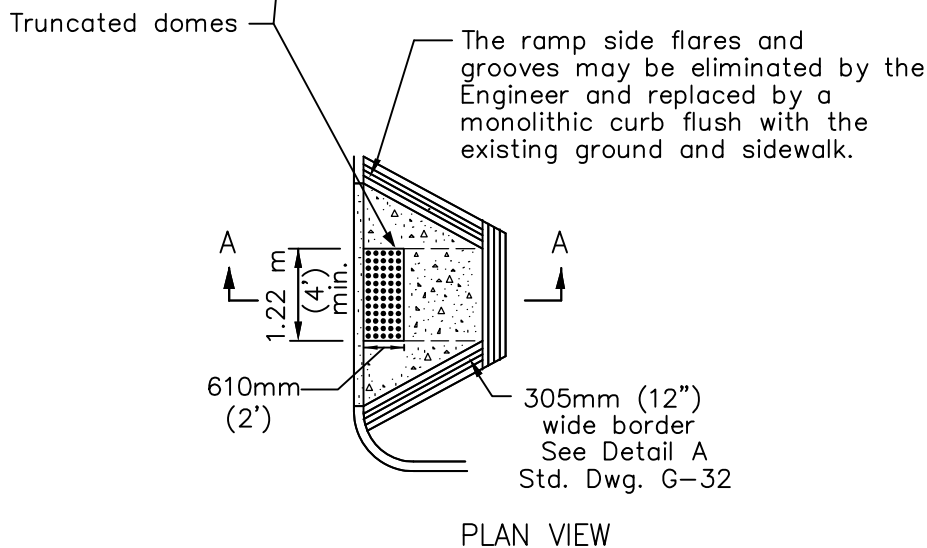
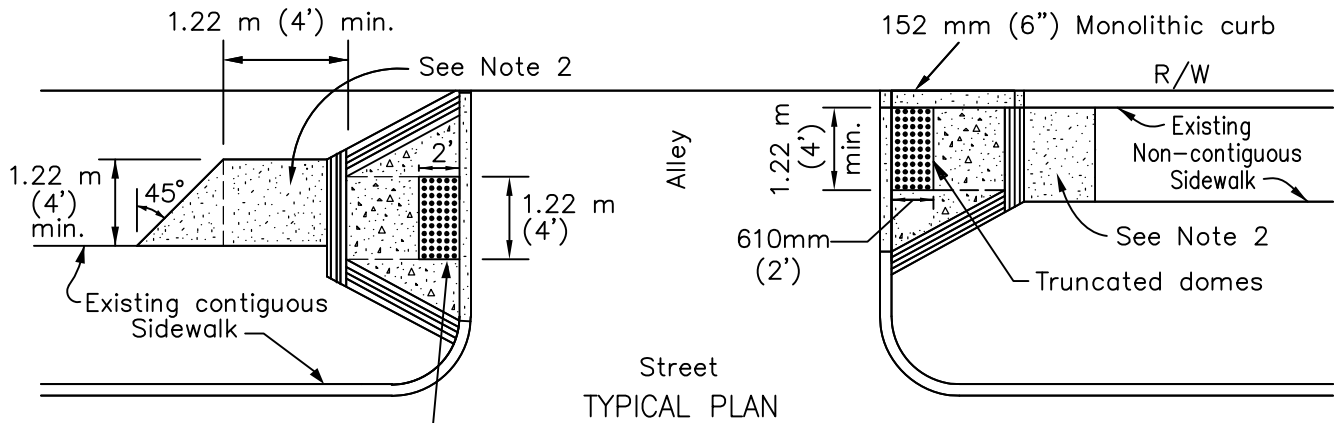
TRUNCATED DOMES

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 12-09-2004

Chairperson R.C.E. 19246 Date

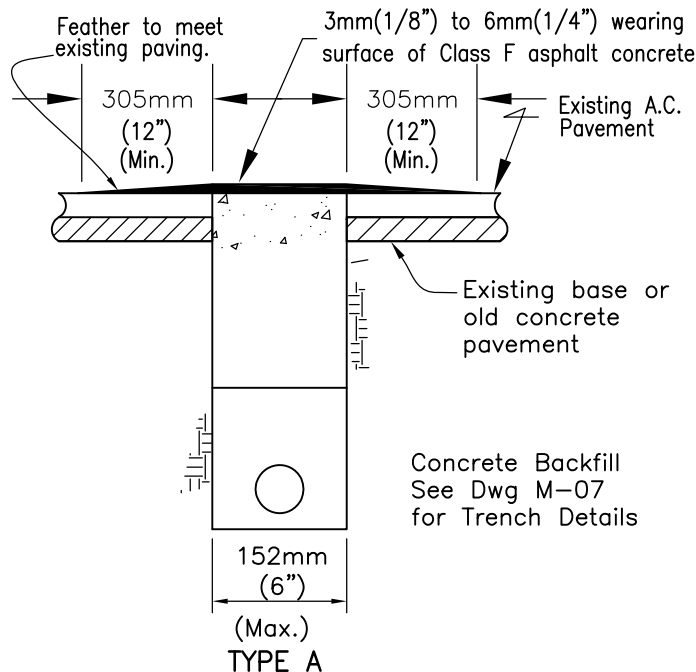
DRAWING
NUMBER G-30



NOTES

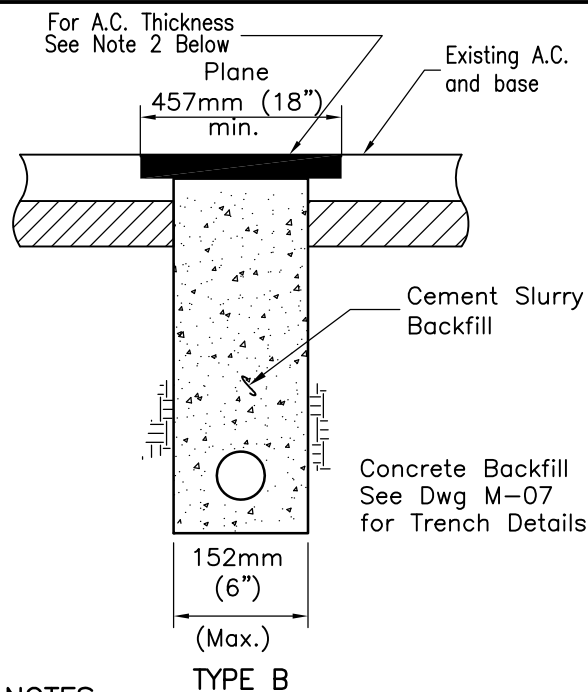
1. See Standard Drawing G-32 for general notes.
2. Landing cross slope shall be 2.0% max. in both directions.
3. For truncated domes details, see Standard Drawing G-30.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G. Parkinson	2/95		
Add Metric		T. Stanton	03/03	CURB RAMP - TYPE D	 12-09-2004 Chairperson R.C.E. 19246 Date
UPDATE		D. Davies	12/04		
Revised		T. Stanton	04/06		
					DRAWING NUMBER G-31



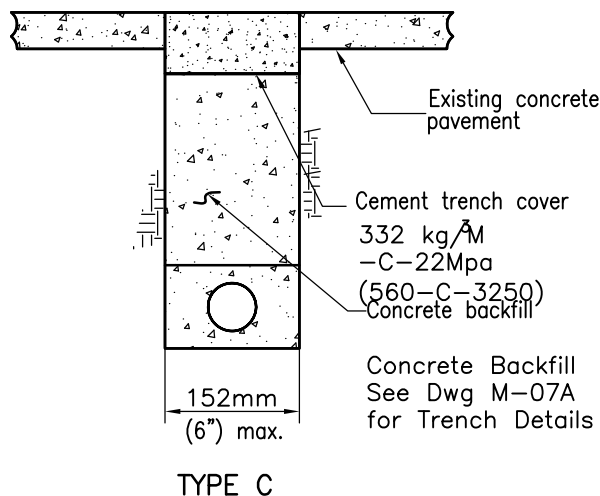
NOTES

1. Concrete shall be screeded off to match pavement grade and floated to assure proper edge match.
2. A tack coat shall be applied to the concrete and existing asphalt pavement prior to placing the new asphalt pavement wearing surface.
3. Existing A.C. pavement will not require saw cutting when using rockwheel for excavation.
4. Allow concret backfill to cure for seven prior to paving operation



NOTES

1. A tack coat shall be applied to the cement slurry backfill and existing asphalt pavement prior to placing the new asphalt surface.
2. Asphaltic Concrete Resurfacing:
 - a. Allow cement slurry backfill seven days minimum to cure before planing.
 - b. Thickness of Asphaltic Concrete shall be a minimum of 51mm (2") or as specified by the Agency's engineer.
 - c. A.C. shall be hot mix.
3. A.C. shall be sealed or chip sealed when required by the Agency's Engineer.



NOTES

1. Concrete shall be screeded off to match existing pavement grade and floated to assure proper edge match.
2. Concrete trench cover shall be a minimum of 140mm (5 1/2") thick in alley or local residential streets and 178mm (7") thick in all other streets.
3. Existing concrete pavement will require sawcutting when using rockwheel for excavation.
4. In major or prime arterial streets, an approved set accelerating admixture, such as Calcium Chloride, may be used only with prior approval of the Agency's engineer.

Revision	By	Approved	Date
ORIGINAL	HH	T. Stanton	11/02
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

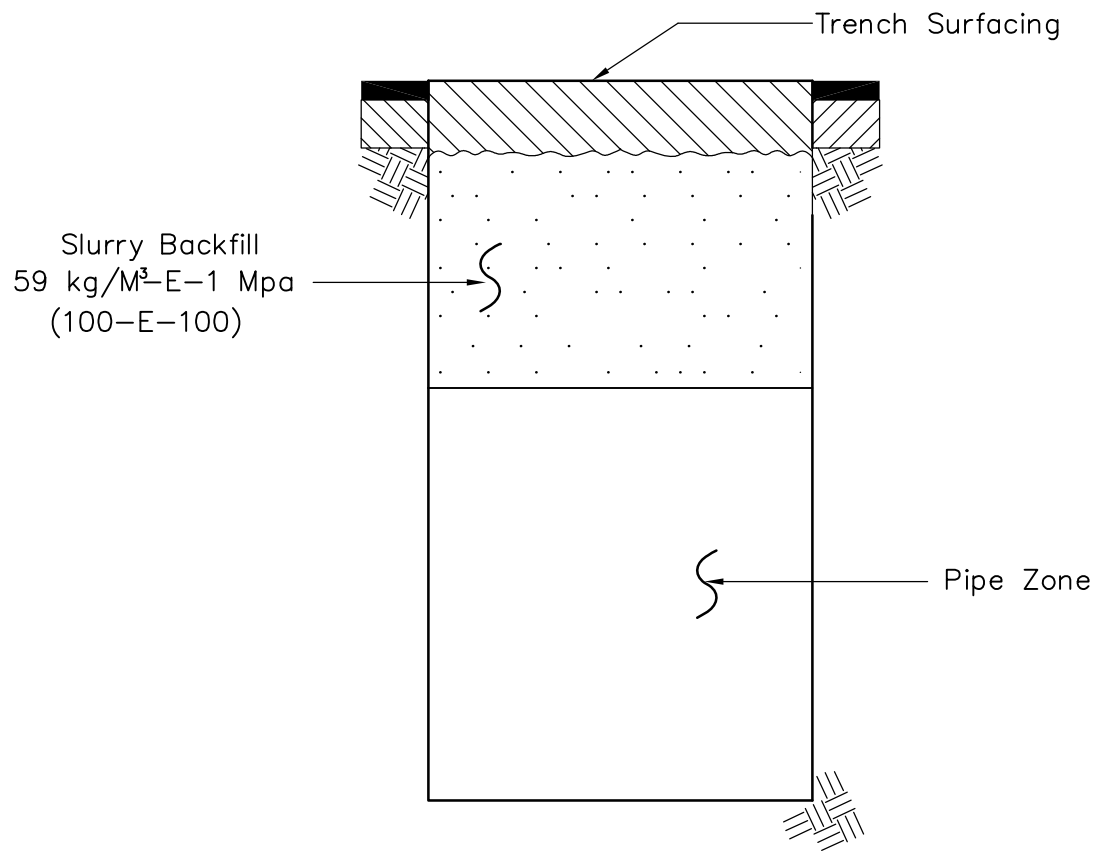
NARROW TRENCHES TRENCHING & BACKFILLING

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

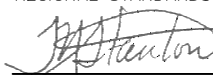
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER G-33



NOTES

1. Trench resurfacing shall be done according to governmental (permitting) agency's requirements.
2. The sand used for the slurry backfill shall meet the requirements for fine aggregate (subsection 400-1.3) listed in the Standard Specifications for Public Works Construction. Slurry must be firm prior to trench resurfacing.
3. Slurry backfill shall not be used where it will impede subsurface drainage.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	9/88		
Add Metric		T. Stanton	03/03	SLURRY BACKFILL	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
				DRAWING NUMBER	G-36

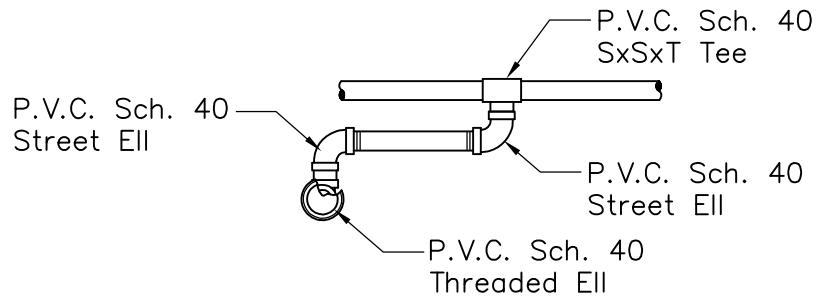
SPRINKLER IRRIGATION SYSTEMS



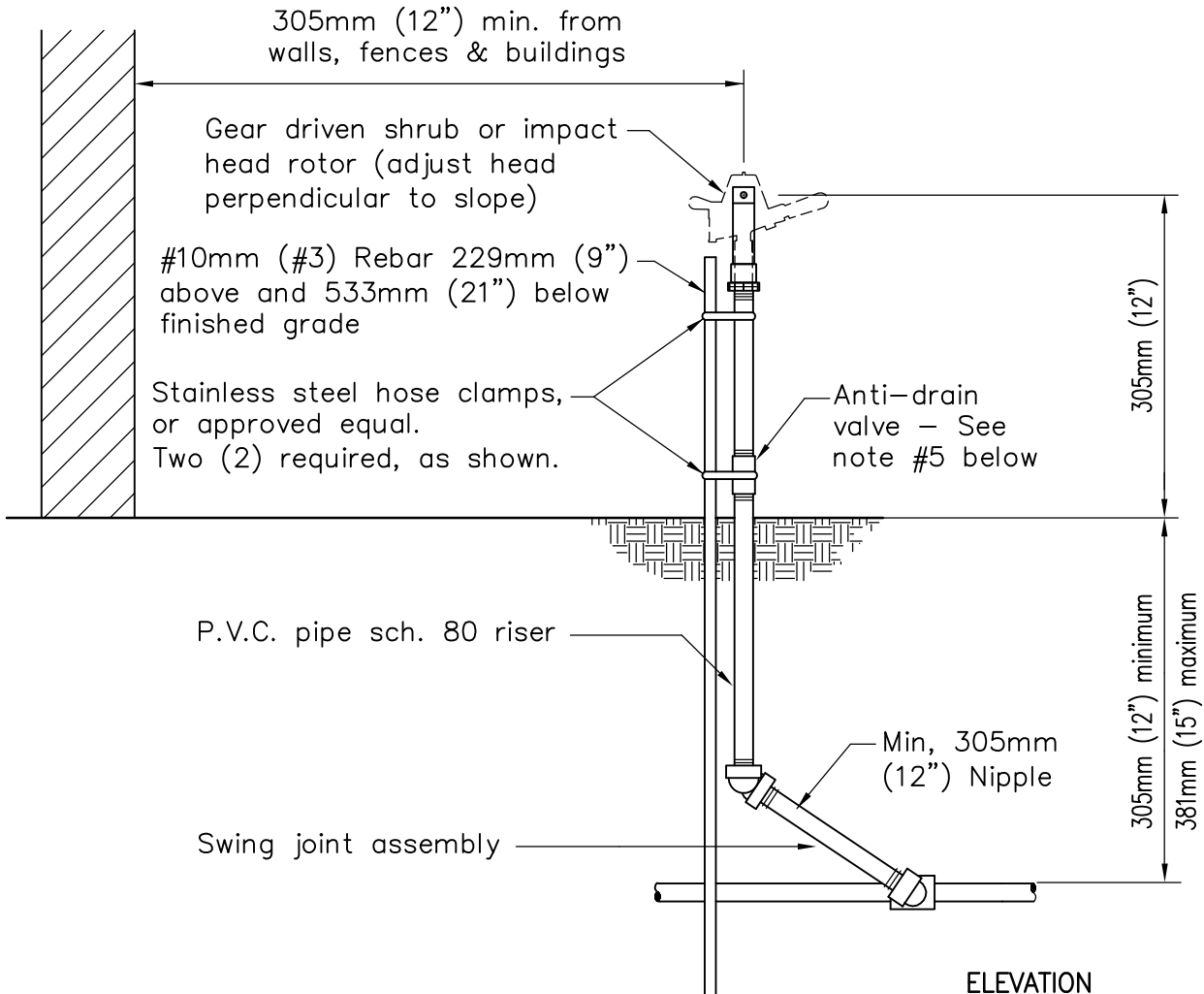
- LEGEND ON PLANS

Or approved agency symbol

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  03-25-2004
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SHRUB SPRAY HEAD ON FIXED RISER	Chairperson R.C.E. 19246 Date DRAWING NUMBER I-1
UPDATE		M. Caro	03/04		



PLAN



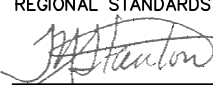
ELEVATION

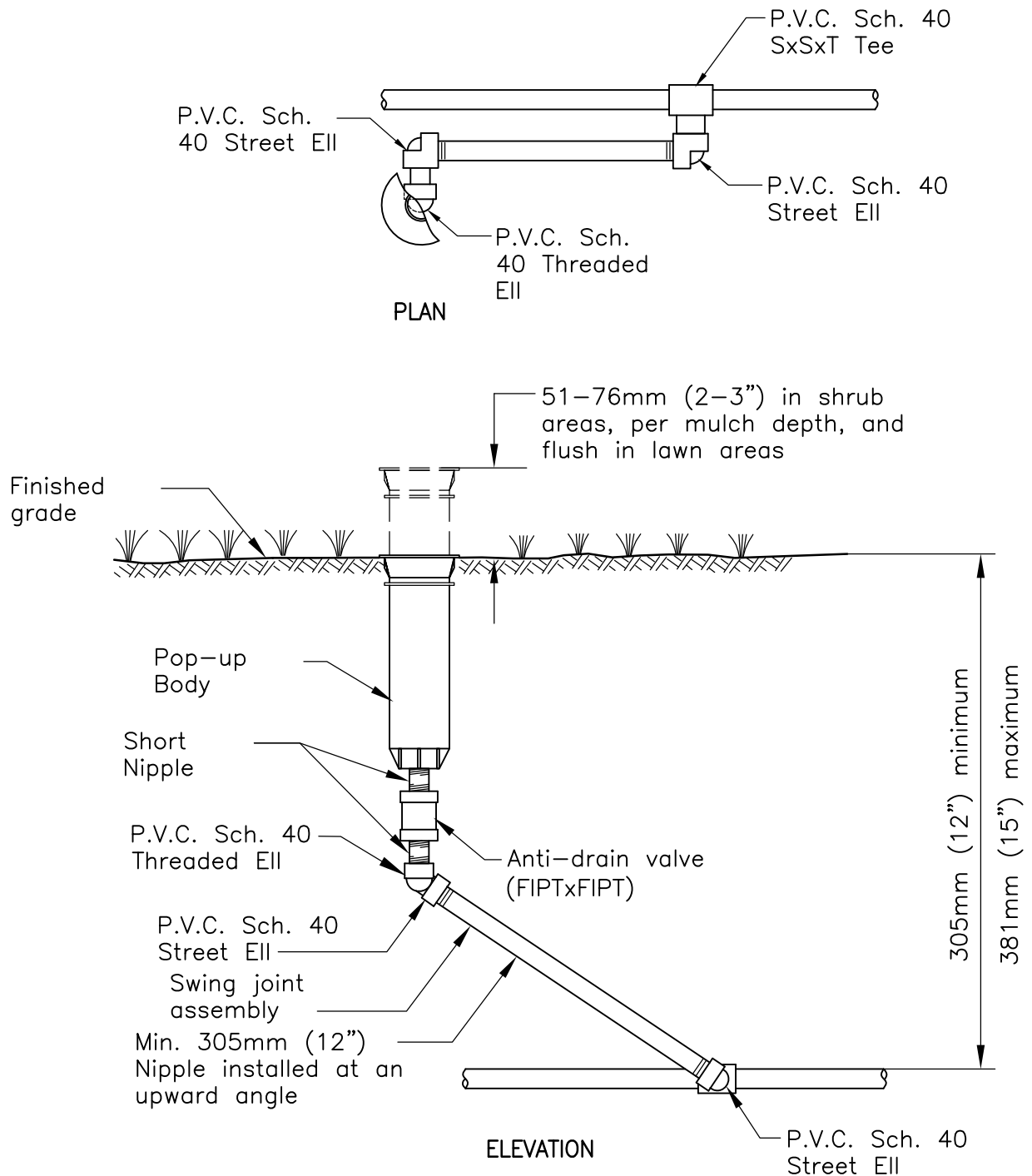
NOTES

1. All fittings shall be P.V.C. Sch. 40 (except as noted).
2. All nipples shall be P.V.C. Sch. 80 (except as noted).
3. Teflon tape shall be used on all threaded connections.
4. Close nipples shall not be used.
5. Anti-drain valves shall be installed under all heads unless otherwise specified.
6. No fixed risers allowed in right-of-way or adjacent to vehicular or pedestrian traffic unless otherwise approved by agency.

LEGEND ON PLANS

Show a number to indicate head type Or approved agency symbol.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	5/92		
Add Metric		T. Stanton	03/03	ROTOR OR IMPACT HEAD ON FIXED RISER	 06/24/2004 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	06/04		
				DRAWING NUMBER 1-2	



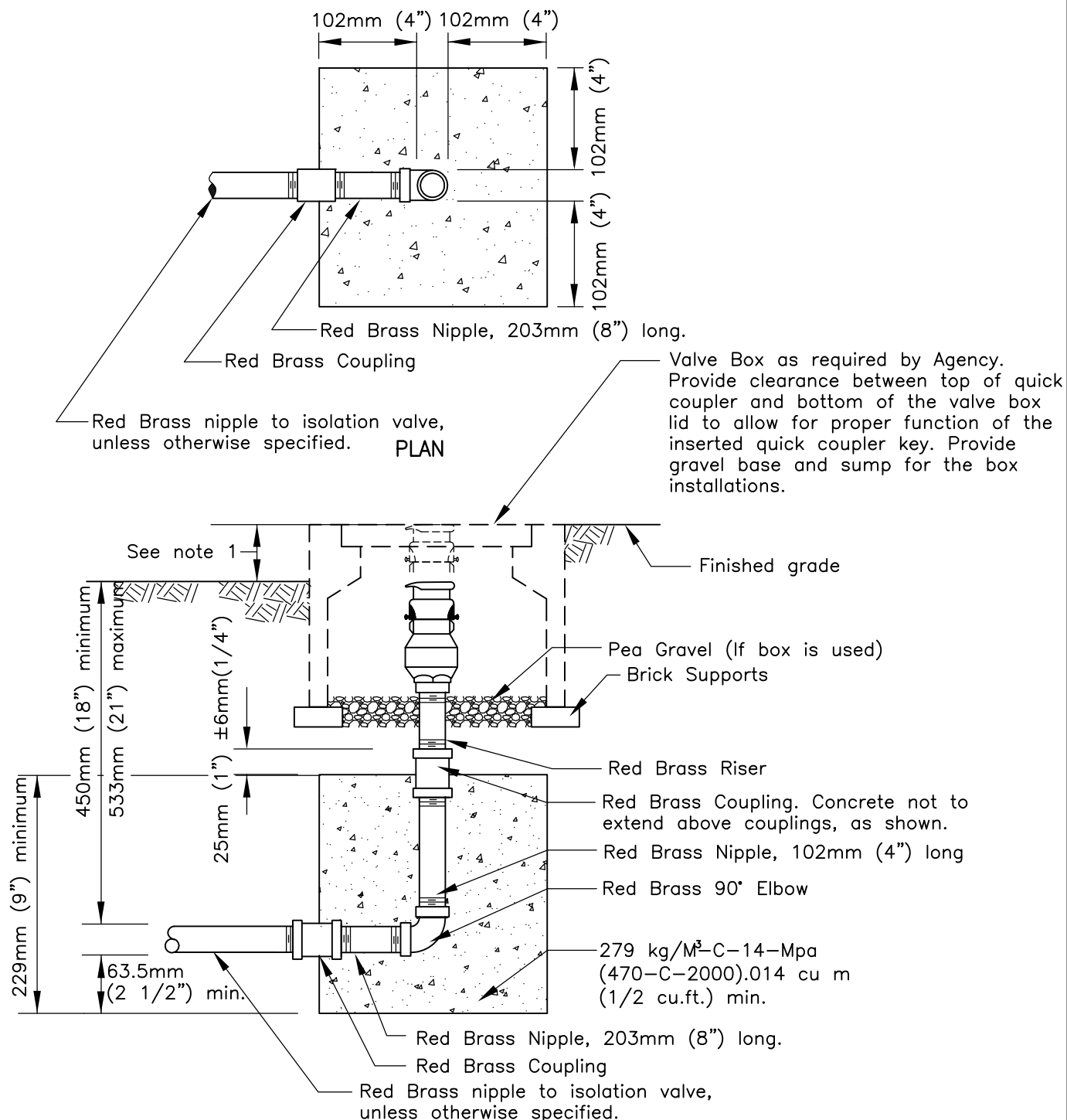
NOTES

1. All fittings shall be P.V.C. Schedule 40.
2. All nipples shall be P.V.C. Schedule 80.
3. Teflon tape shall be used on all threaded connections.
4. Close nipples shall not be used.
5. Lateral depth shall be 457mm (18") when 305mm (12") pop-up bodies are used.

LEGEND ON PLANS

Show a number to indicate type head or approved agency symbol

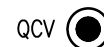
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		ROTOR OR SPRAY POP-UP HEAD	 06/24/2004
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
UPDATE		M. Caro	06/04	DRAWING		1-3
				NUMBER		



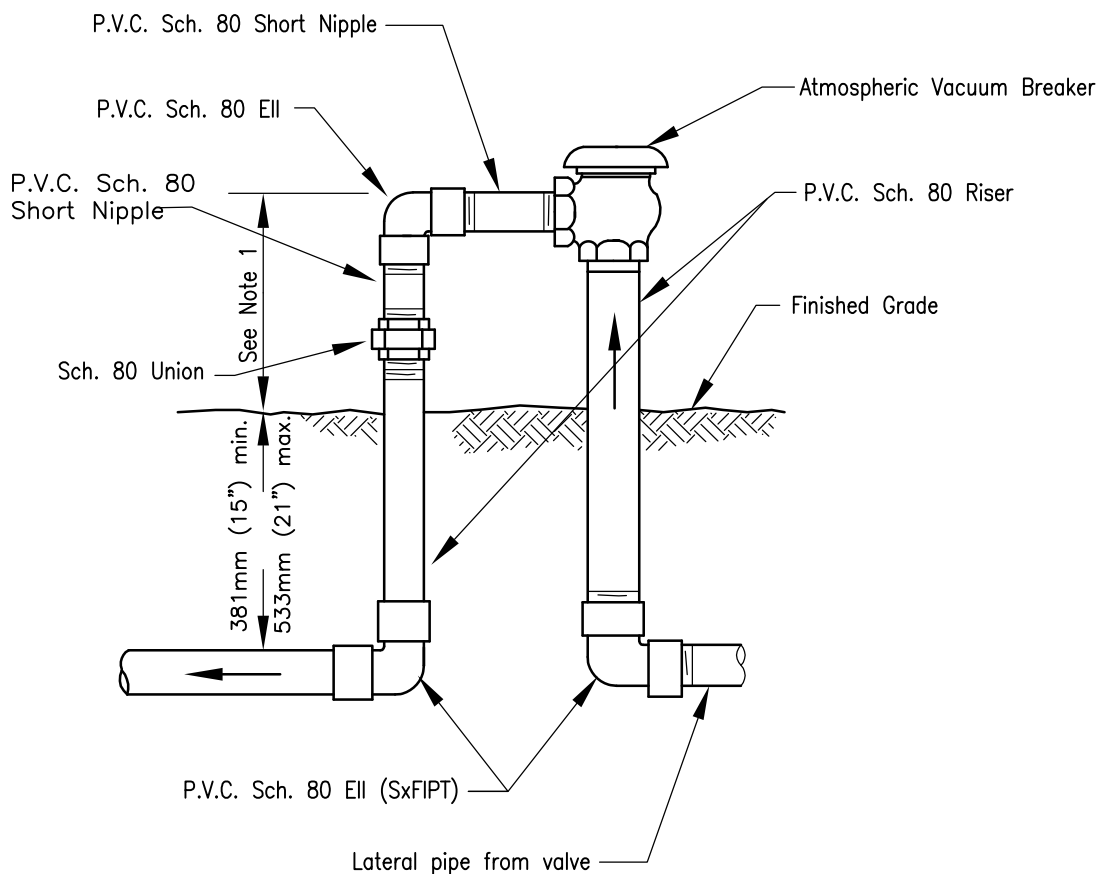
NOTES

1. Quick coupling valves or boxes shall be set flush in lawn and 51-76mm (2-3") above finish grade in shrub/ groundcover areas, per mulch depth
2. Dimensions of concrete anchors are minimum.
3. Close nipples shall not be used.
4. Provide appropriate key and swivel adapter as specified on plans.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	QUICK COUPLING VALVE	 05-27-2004 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	05/04		
					DRAWING NUMBER 1-5



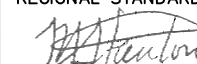
NOTES

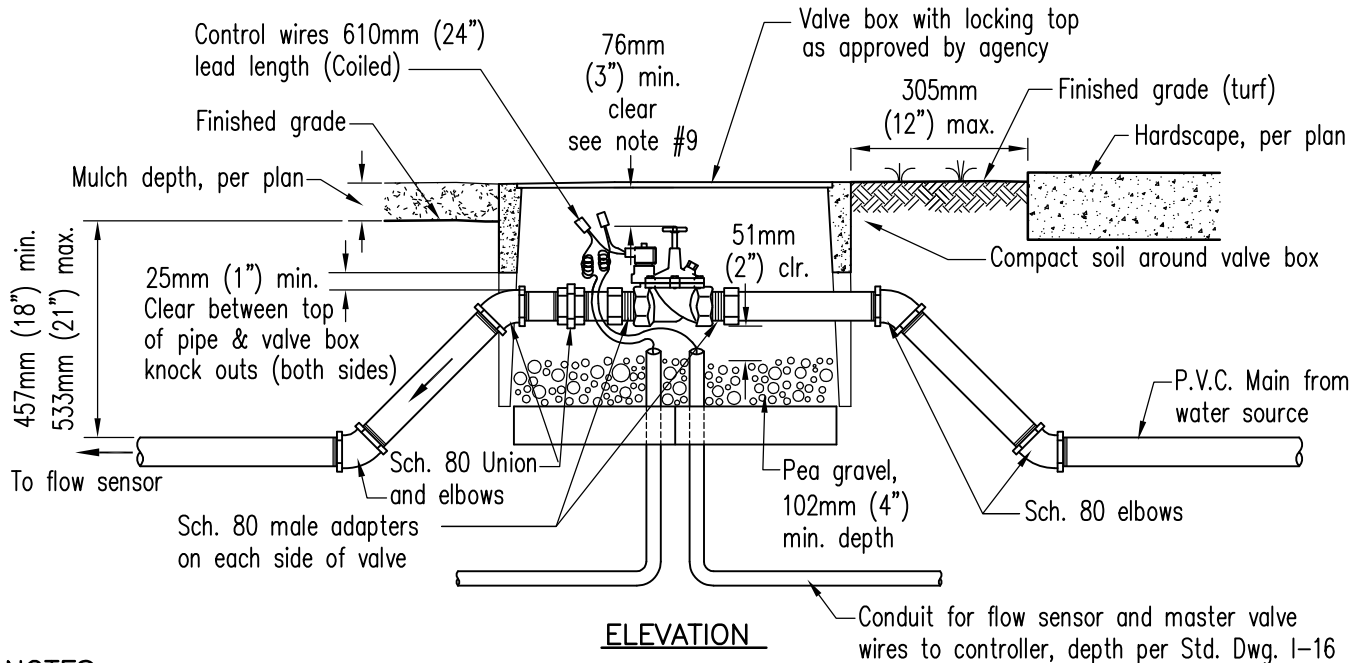
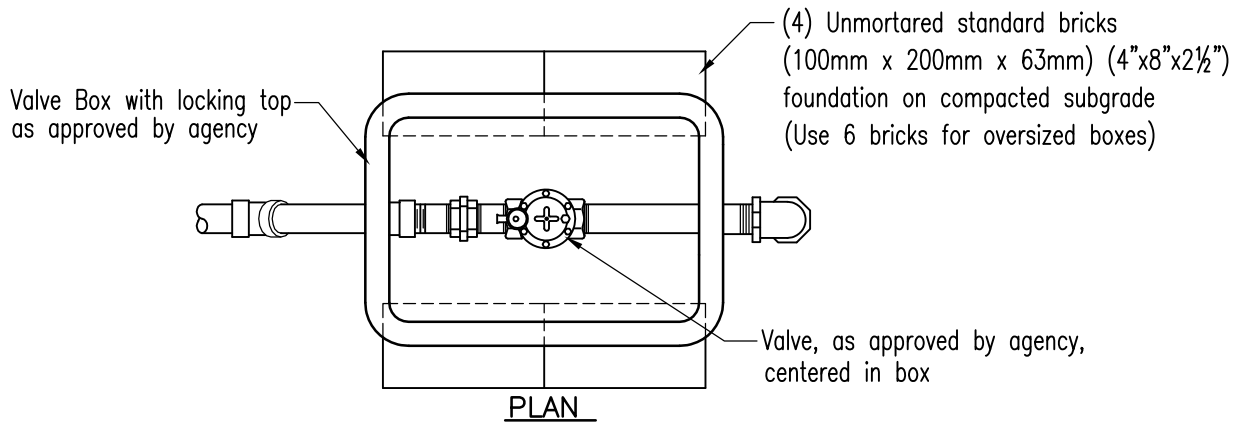
1. Atmospheric vacuum breakers shall be installed a minimum of 305mm (12") above the highest sprinkler head so that at no time will it be subjected to back pressure or drainage.
2. Close nipples shall not be used.
3. Teflon tape shall be used on all threaded connections.
4. For use on lines 51mm (2") inches and smaller.

LEGEND ON PLANS



Or approved
agency symbol

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	ATMOSPHERIC VACUUM BREAKER (50mm (2") & SMALLER)	 02/24/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	02/05		
				DRAWING NUMBER	1-7



NOTES:

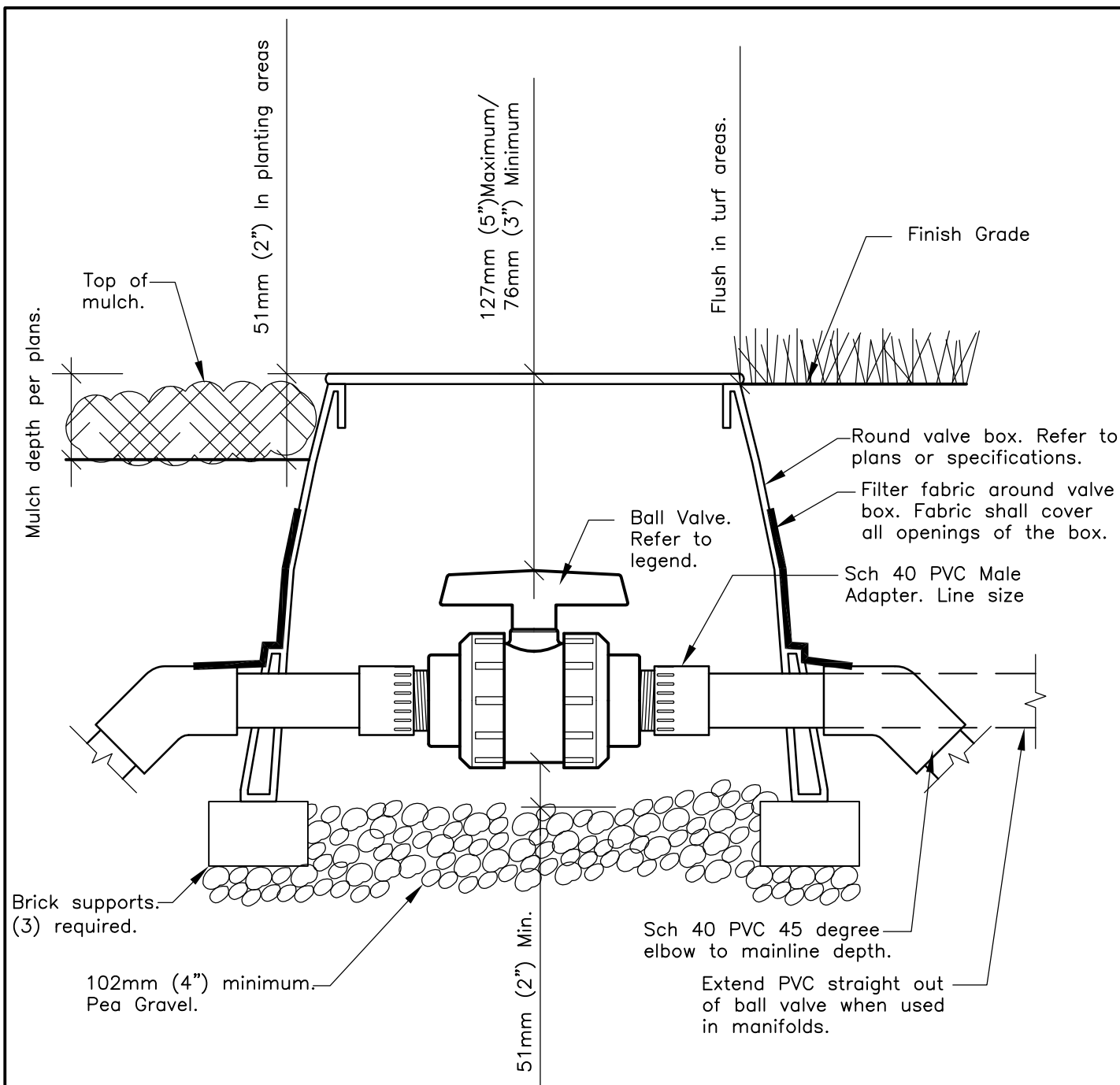
1. Splicing shall be made in valve boxes and pull boxes only. See Standard Drawing I-15 for splice/soldering notes.
2. All splices shall be made with a properly set mechanical splice connector entirely enclosed in self-curing resin and shall be completely water-proof.
3. Duct seal conduit openings per agency requirements.
4. All PVC pipe used in master valve assembly shall be of the same class as specified for the mainline.
5. Conduit shall be 25mm (1") min. or as approved by agency.
6. Valve/controller identification shall be labeled on the valve box and tagged on the valve per agency requirements.
7. Knock outs shall not be enlarged unless approved by agency.
8. Install only one valve per box.
9. 76mm (3") min. clear from bottom of box lid to highest point of valve assembly.
10. Valve boxes shall be set perpendicular to hardscape, a max. 305mm (12") from edge of hardscape, 51-76mm (2-3") above finished grade in shrub/groundcover areas, per mulch depth. If necessary to be set in turf, valve boxes shall be set flush with finished grade.
11. Close nipples shall not be used.

LEGEND ON PLANS

▼ M.V.

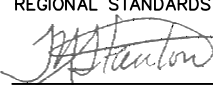
Or approved agency symbol.

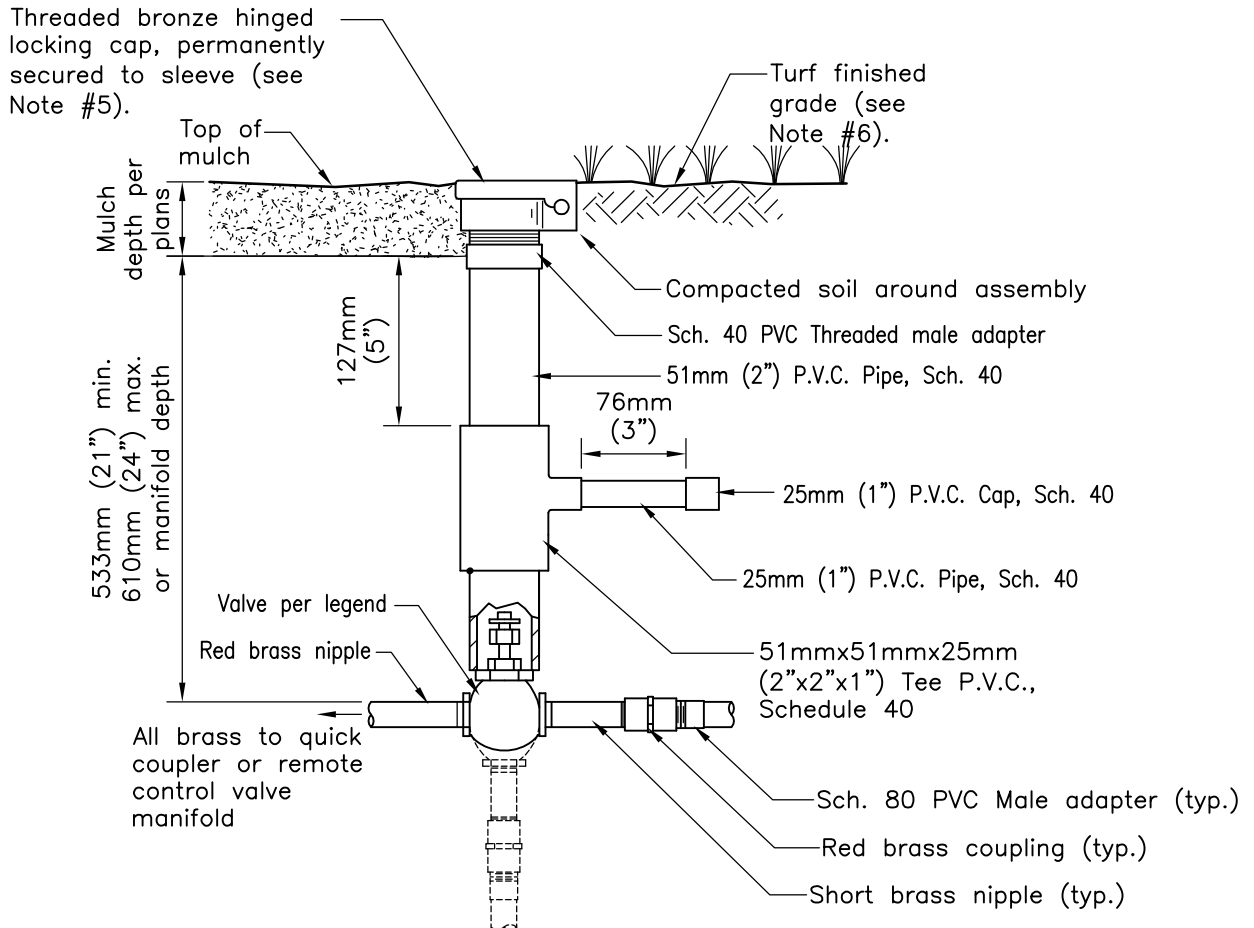
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	IRRIGATION MASTER VALVE	 04/28/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	04/05		
					DRAWING NUMBER I-10



NOTES

1. Teflon tape, 19mm (3/4") wide, shall be used on all threaded connections.
2. Close nipples shall not be used.
3. All PVC Pipe used in manifold assemblies shall of the same class as specified for the mainline.
4. All plastic valve boxes shall be heat branded with the appropriate identification. Refer to plans and specifications.
5. Do not cut additional holes in valves boxes.
6. Add single unions on each side of valve when True Union ball valves are not used.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	ISOLATION BALL VALVE 50mm (2") AND SMALLER	 02/24/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	02/05		
				DRAWING NUMBER	1-11



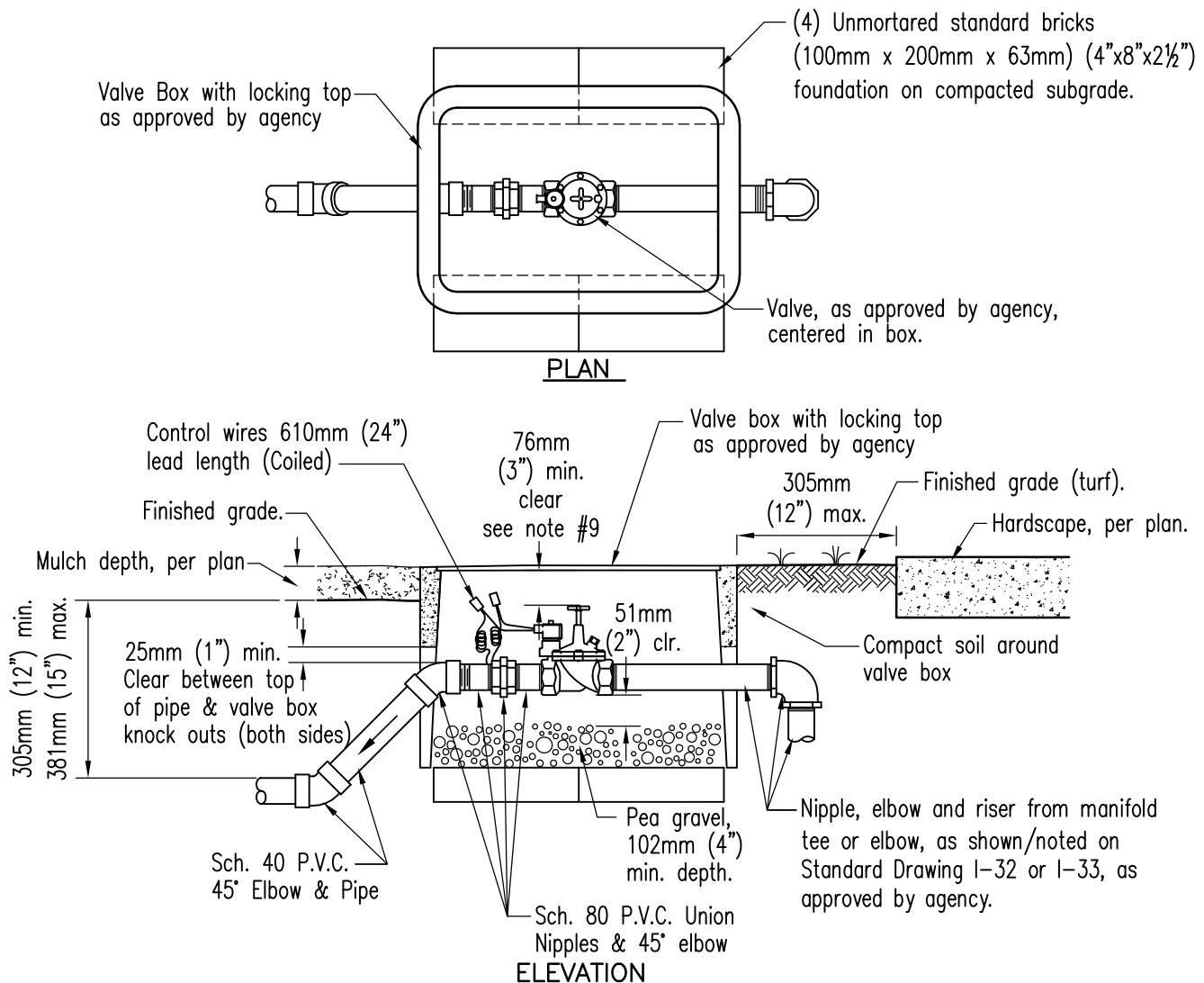
NOTES

1. All Globe Valves shall be furnished with a standard manual control valve bronze cross handle, centered in pipe sleeve.
2. All valves shall be installed within 305mm (12") of hardscape, unless otherwise shown on the plans.
3. All Globe Valves shall be furnished with a removable bonnet and packing gland nut.
4. Close Nipples shall not be used.
5. Locking cap shall be mounted flush with finish grade in turf areas and 51-76mm (2-3") above finish grade in shrub areas, per depth of mulch.
6. Locate outside of turf when possible.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		A.Kercheval	12/75		
Add Metric		T. Stanton	03/03	ISOLATION GLOBE VALVE 50mm (2") AND SMALLER	 02/24/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	02/05		
					DRAWING NUMBER 1-13



NOTES:

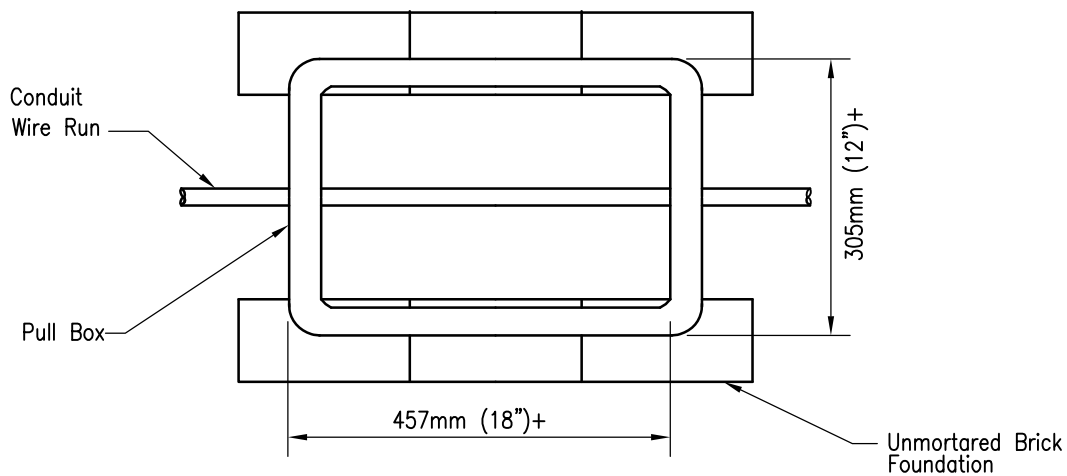
1. Splicing shall be made in valve boxes and pull boxes only. See Standard Drawing I-15 for splice/soldering notes.
2. All splices shall be made with a properly set mechanical splice connector entirely enclosed in self-curing resin and shall be completely water-proof.
3. Spare wires terminating in valve boxes shall have their ends insulated, the same as for a splice.
4. When two or more valves are installed in the same location, see Standard Drawing I-32 or I-33, per agency standards.
5. All valves shall be installed with a union on the downstream side of the valve. The union shall be Sch. 80 P.V.C.
6. Valve/controller identification shall be labeled on the valve box and tagged on the valve per agency requirements.
7. Knock outs shall not be enlarged unless approved by agency.
8. Install only one valve per box.
9. 76mm (3") min. clear from bottom of box lid to highest point of valve assembly.
10. Valve boxes shall be set perpendicular to hardscape, a max. 305mm (12") from edge of hardscape, 51-76mm (2-3") above finished grade in shrub/groundcover areas, per mulch depth. If necessary to be set in turf, valve boxes shall be set flush with finished grade.
11. Close nipples shall not be used.

LEGEND ON PLANS

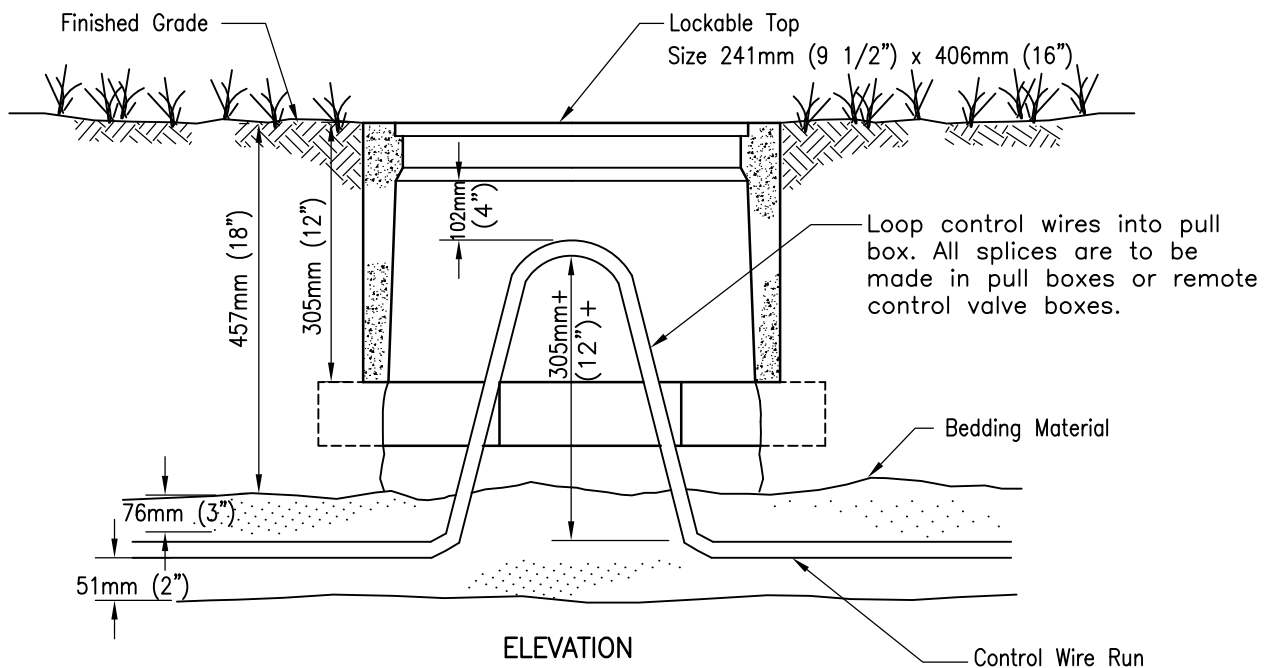
▼ R.C.V

Or approved agency symbol.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		R.Munoz	3/97		
Add Metric		T. Stanton	03/03	REMOTE CONTROL VALVE	 04/28/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	04/05		
					DRAWING NUMBER I-14



PLAN VIEW



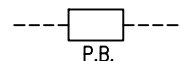
ELEVATION

NOTES

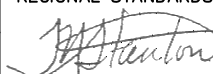
1. Install pull boxes as shown on plans.
2. At junctions where runs combine, splice common ground in pull box.
3. Pull box cover shall be permanently marked "ELECTRIC".
4. Conductors for each controller clock shall be harnessed separately and at sufficient intervals to maintain a definite bundle.
5. All splices shall be made with a properly set mechanical splice connector entirely enclosed in self-curing resin and shall be completely water-proof.
6. All spare wire ends shall be insulated in the same manner as wire splices.
7. If specified, all splices shall be soldered with metallic alloy solder prior to installing connectors.

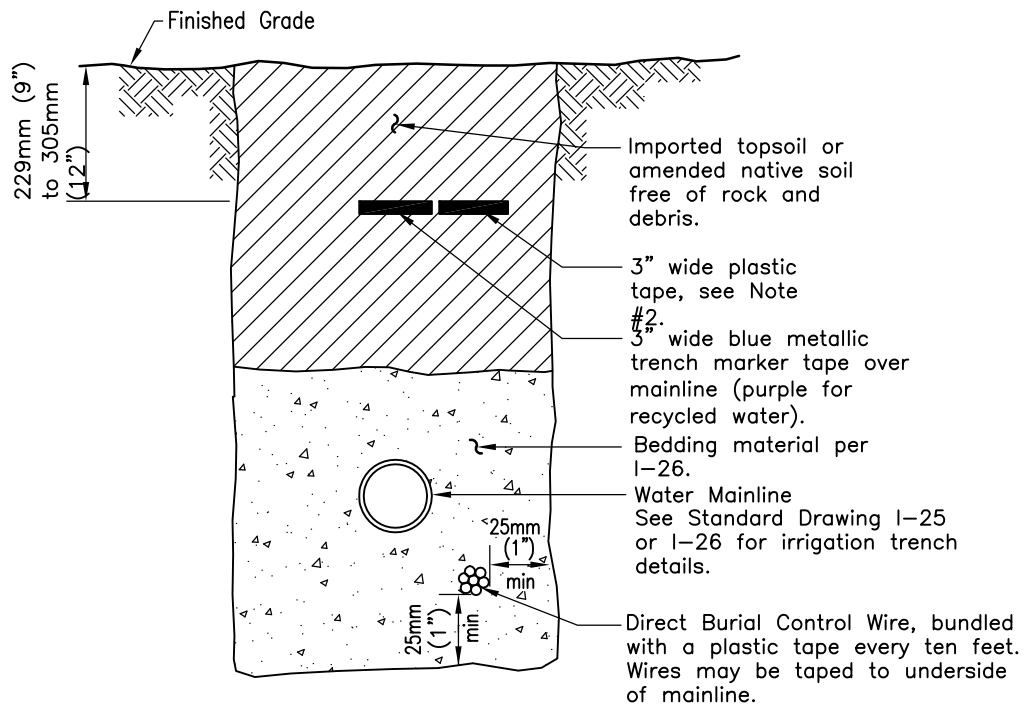
Wire bundles inside pull boxes shall be at least 102mm (4") from the under side of the box cover. Minimum size pull box shall be as shown above. Larger boxes may be necessary to meet 102mm (4") clearance required.

LEGEND ON PLANS

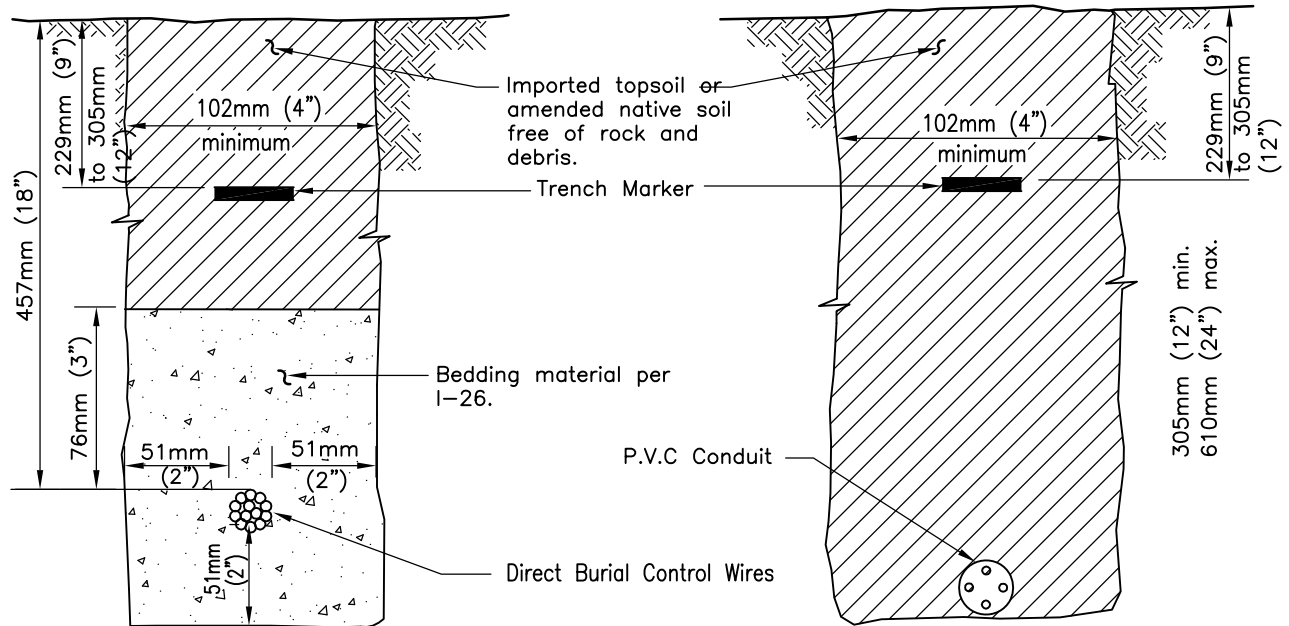


P.B.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
ORIGINAL		A.Kercheval	12/75			ELECTRICAL PULL BOX FOR DIRECT BURIAL CONTROL WIRES AND SPLICE DETAILS		 3/01/2003	
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date					
				DRAWING NUMBER				I-15	



NORMAL LOCATIONS OF CONTROL WIRES



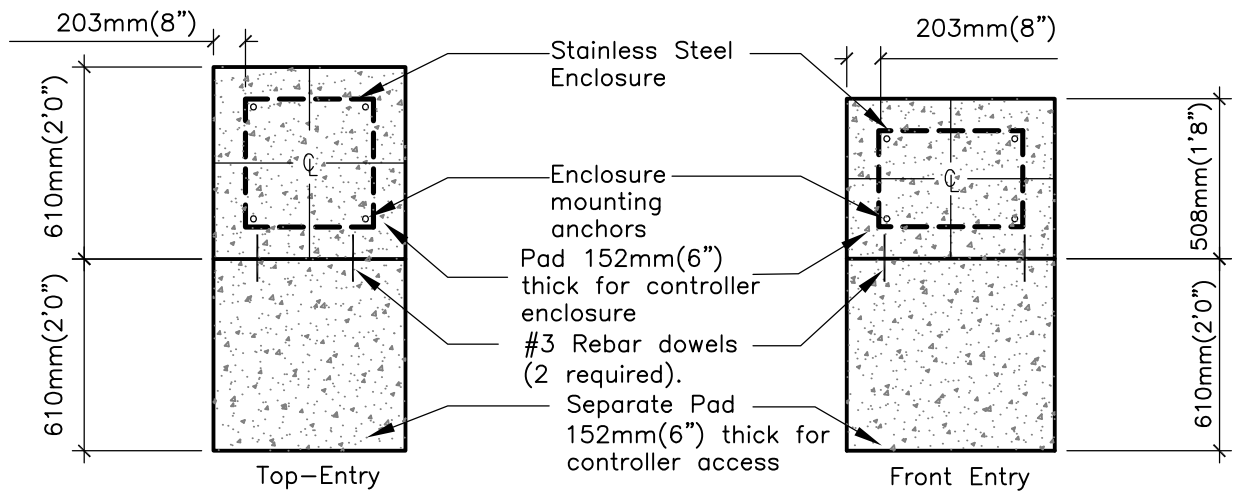
ALTERNATE LOCATION OF CONTROL WIRES

COMMUNICATION CABLE

NOTES

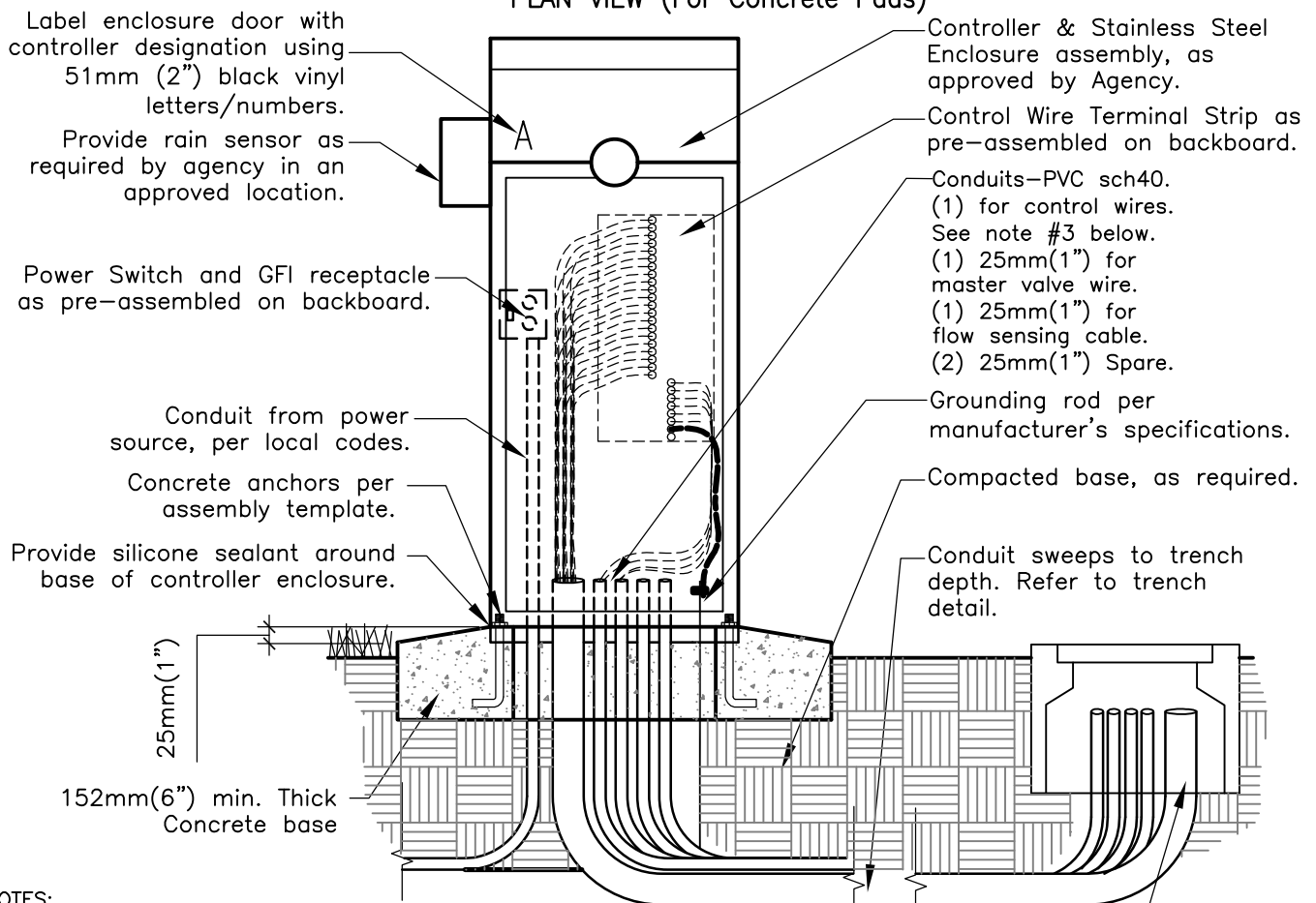
1. Bedding material shall be sand as approved by the agency and trench shall be
 2. free of rocks.
- Place a 76mm (3") wide red continuous plastic tape trench marker, 229mm (9") to 305mm (12") below finish grade, directly above the direct burial control wires.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	CONTROL WIRE / CABLE INSTALLATION		 02/24/2005 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
UPDATE		M. Caro	02/05			
						DRAWING NUMBER 1-16



Note: All pads to slope away from controller.

PLAN VIEW (For Concrete Pads)

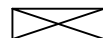


NOTES:

1. All controller assemblies and options shall be completely pre-assembled in a stainless steel enclosure.
2. Pre-assembly shall include 25mm(1") rubber grommets where controller is attached to backboard.
3. Control wire conduit shall be twice the diameter of the wire bundle, 51mm(2") minimum.
4. Provide separate circuit breaker for controller(s) at electrical control panel and label.

FRONT VIEW

Pull box installed within 1.5m (5') of controller enclosure, LEGEND ON PLANS as required by agency.



Or approved agency symbol

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
UPDATE		M. Caro	05/04

SAN DIEGO REGIONAL STANDARD DRAWING

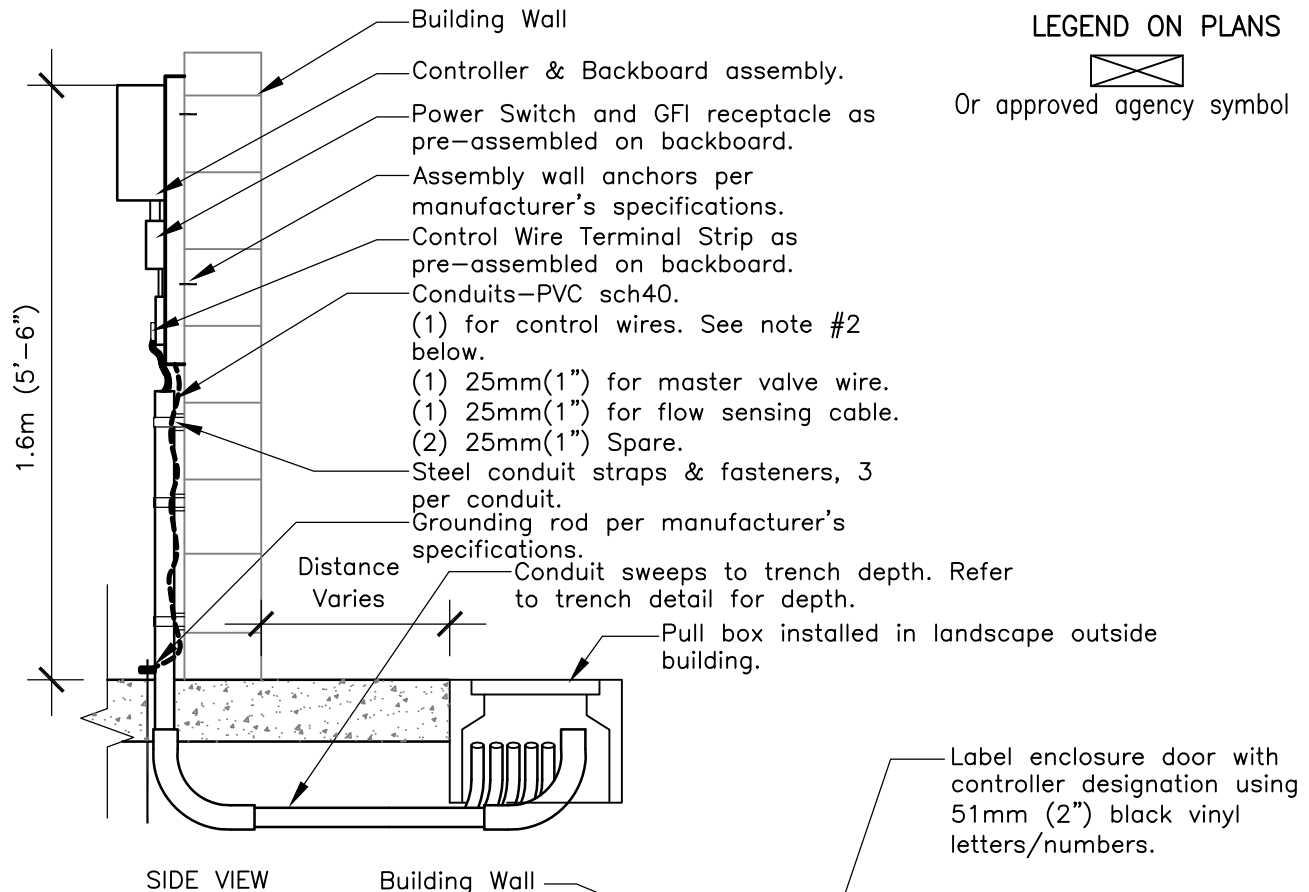
AUTOMATIC CONTROLLER PEDESTAL MOUNTED

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 05-27-2004

Chairperson R.C.E. 19246 Date

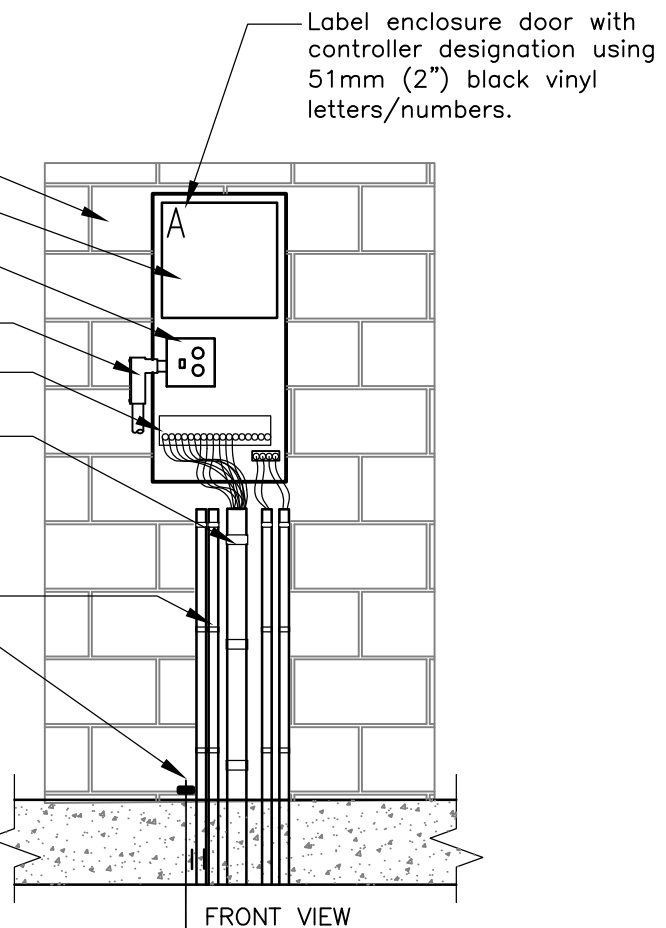
DRAWING
NUMBER 1-17



- SIDE VIEW
- Building Wall
- Controller & Backboard assembly.
- Power Switch and GFI receptacle as pre-assembled on backboard.
- Power source conduit per local codes.
- Control Wire Terminal Strip as pre-assembled on backboard.
- Conduits-PVC sch40.
- (1) for control wires. See note #2 below.
- (1) 25mm(1") for master valve wire.
- (1) 25mm(1") for flow sensing cable.
- (2) 25mm(1") Spare.
- Steel conduit straps & fasteners, 3 per conduit.
- Grounding rod per manufacturer's specifications.

NOTES:

- 1) All controller assemblies and options shall be completely pre-assembled on a stainless steel backboard.
- 2) Control wire conduit shall be twice the diameter of the wire bundle, 50mm(2") minimum.
- 3) Provide separate circuit breaker for controller(s) at electrical control panel and label.
- 4) Provide rain sensor as required by agency in an approved location.



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
UPDATE		M. Caro	05/04

SAN DIEGO REGIONAL STANDARD DRAWING

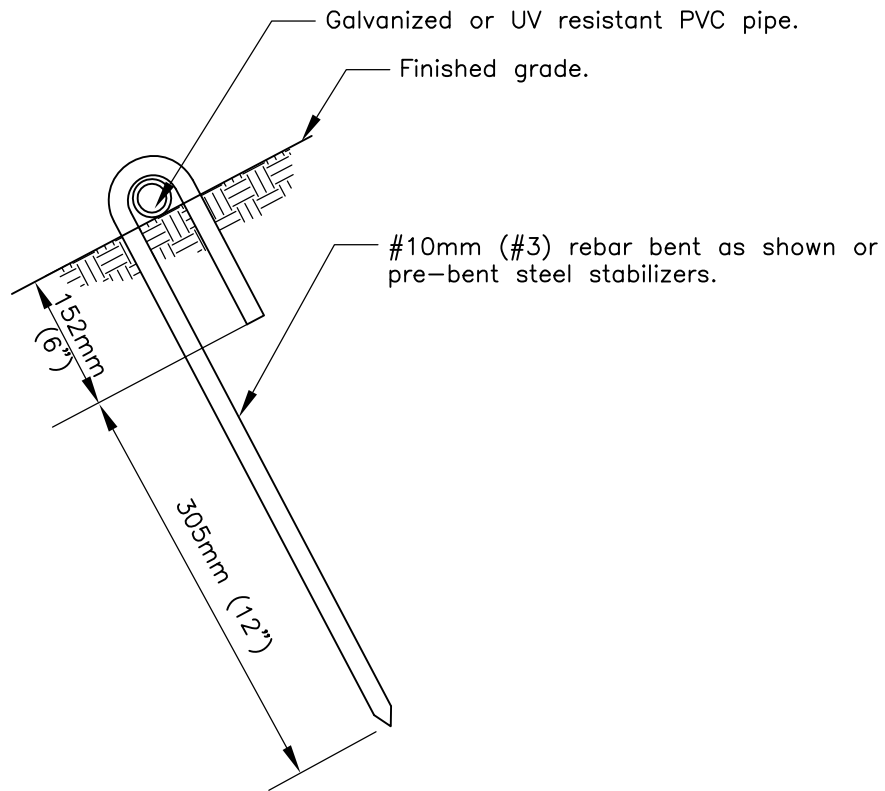
AUTOMATIC CONTROLLER INDOOR WALL MOUNT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 05-27-2004

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER 1-18

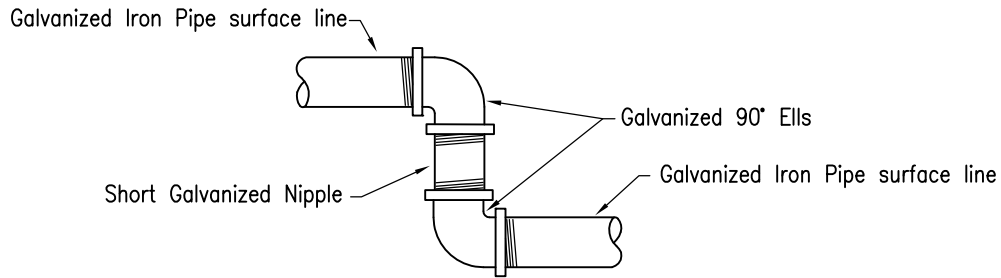


SIDE VIEW

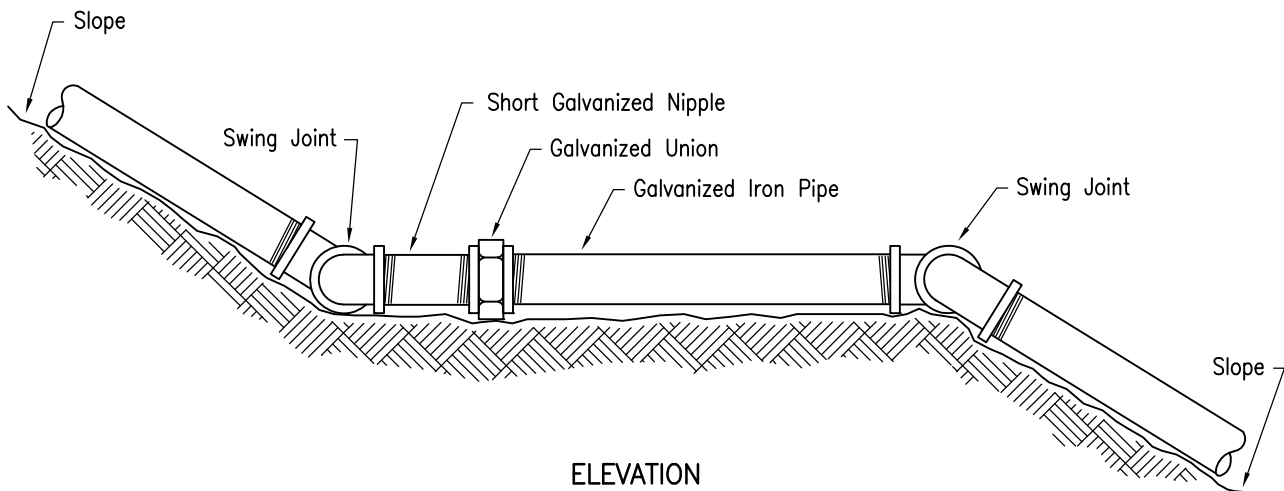
NOTE

Stabilizers shall be placed no greater than 4.50 m (15') apart, at each riser and at all fittings.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		ON-GRADE PIPE STABILIZATION
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date	
UPDATE		M. Caro	05/04		DRAWING NUMBER 1-20



SWING JOINT DETAIL
PLAN

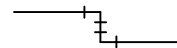


ELEVATION

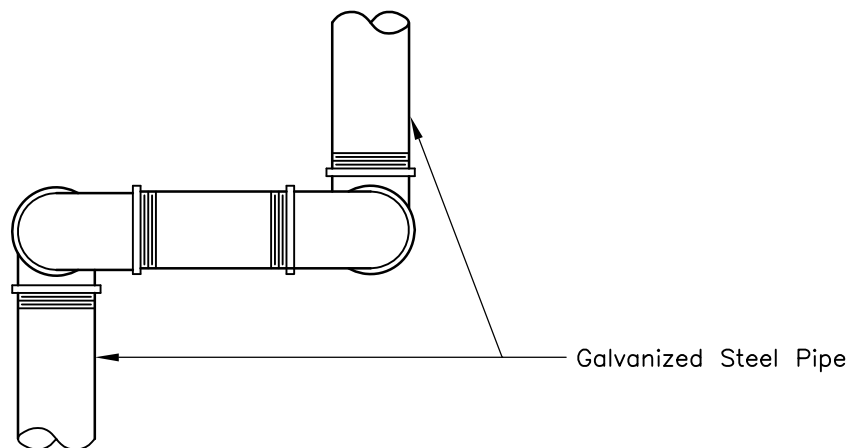
NOTE

Swing Joints shall be used at each change of grade.

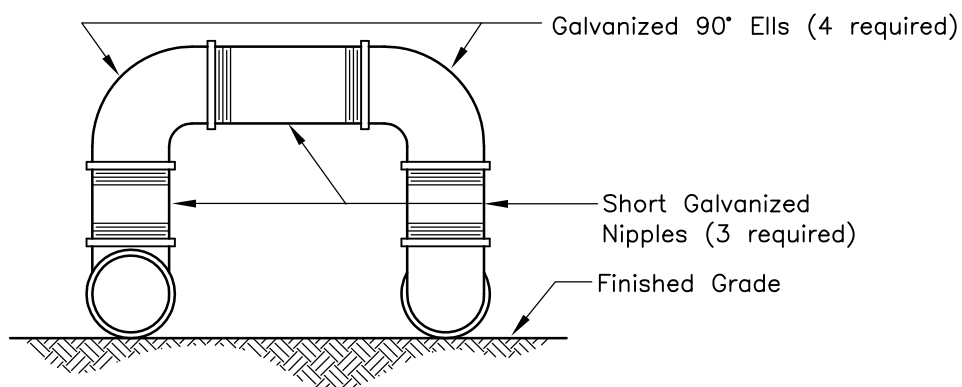
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SWING JOINT AND PIPE INSTALLATION ON SLOPES ABOVE GROUND PIPE INSTALLATIONS	<i>T. Stanton</i> 3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER 1-23



PLAN

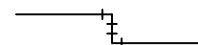


ELEVATION

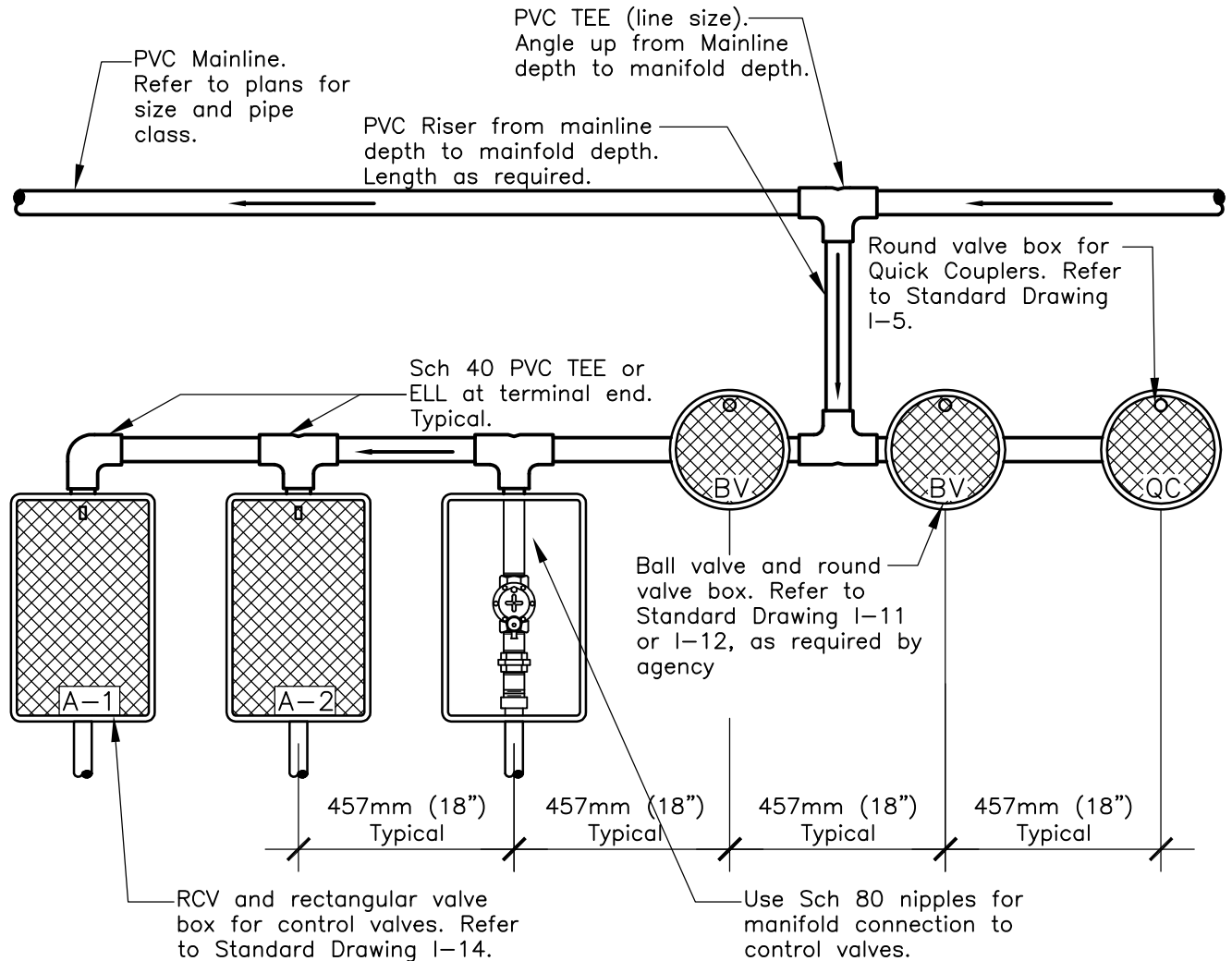
NOTES

1. Double swing joint shall be used where changes of grade and alignment occur simultaneously.
2. Double swing joint shall be used for expansion joint on long runs of galvanized pipe. (91.44m (300') maximum runs)

LEGEND ON PLANS



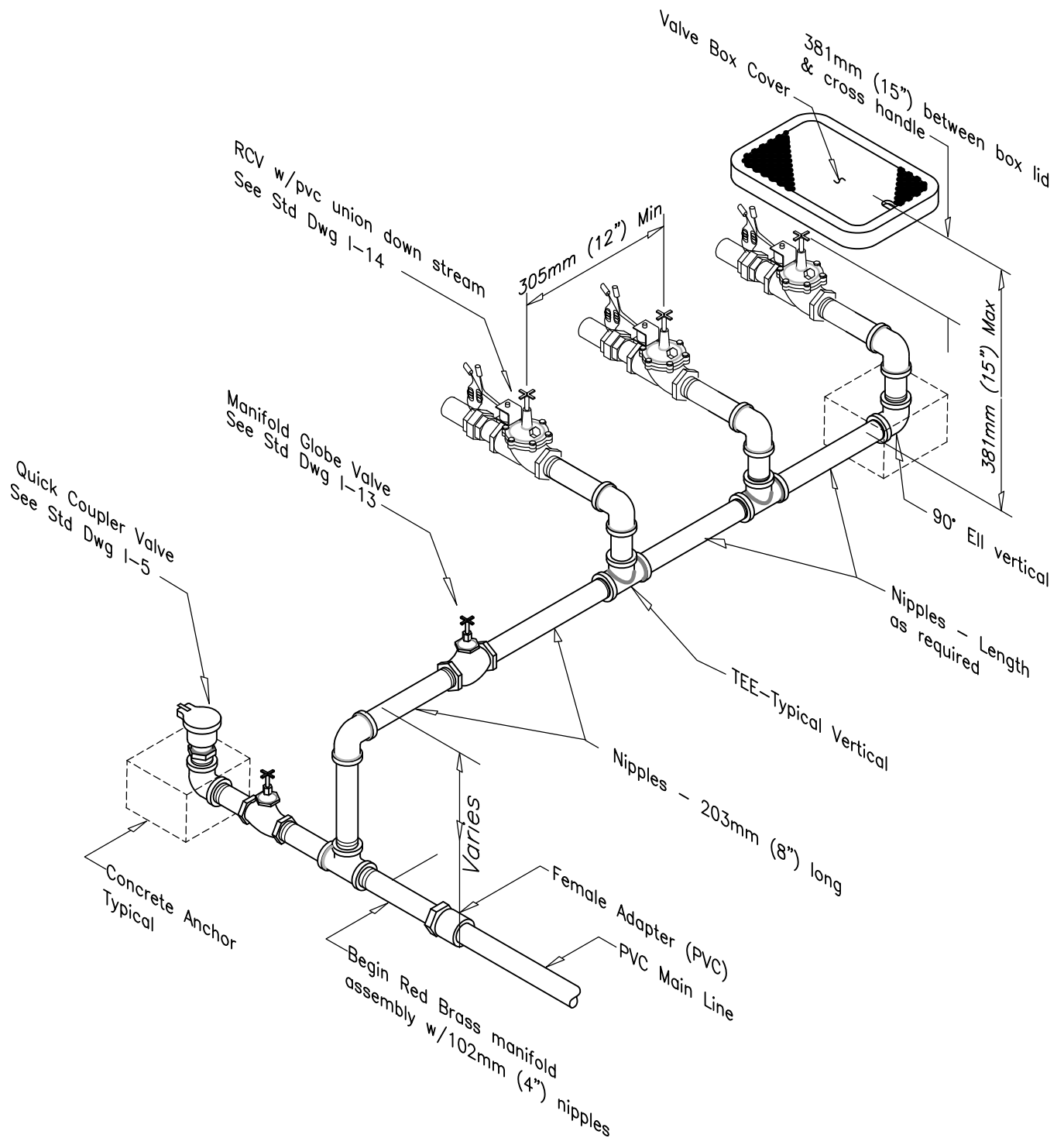
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	DOUBLE SWING JOINT ABOVE GROUND PIPE INSTALLATIONS	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
				DRAWING NUMBER	1-24



NOTES

1. All PVC Pipe used in manifold assemblies shall of the same class as specified for the mainline, unless otherwise specified.
2. All valve boxes shall be heat branded with the appropriate identification. Refer to plans and specifications.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	REMOTE CONTROL VALVE MANIFOLD ASSEMBLY WITH P.V.C. PIPE	 04/28/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	04/05		
					DRAWING NUMBER I-32



Revision	By	Approved	Date
ORIGINAL		Parkinson	05/92
Add Metric		T.Stanton	03/03
Updated		M.Caro	04/05

SAN DIEGO REGIONAL STANDARD DRAWING

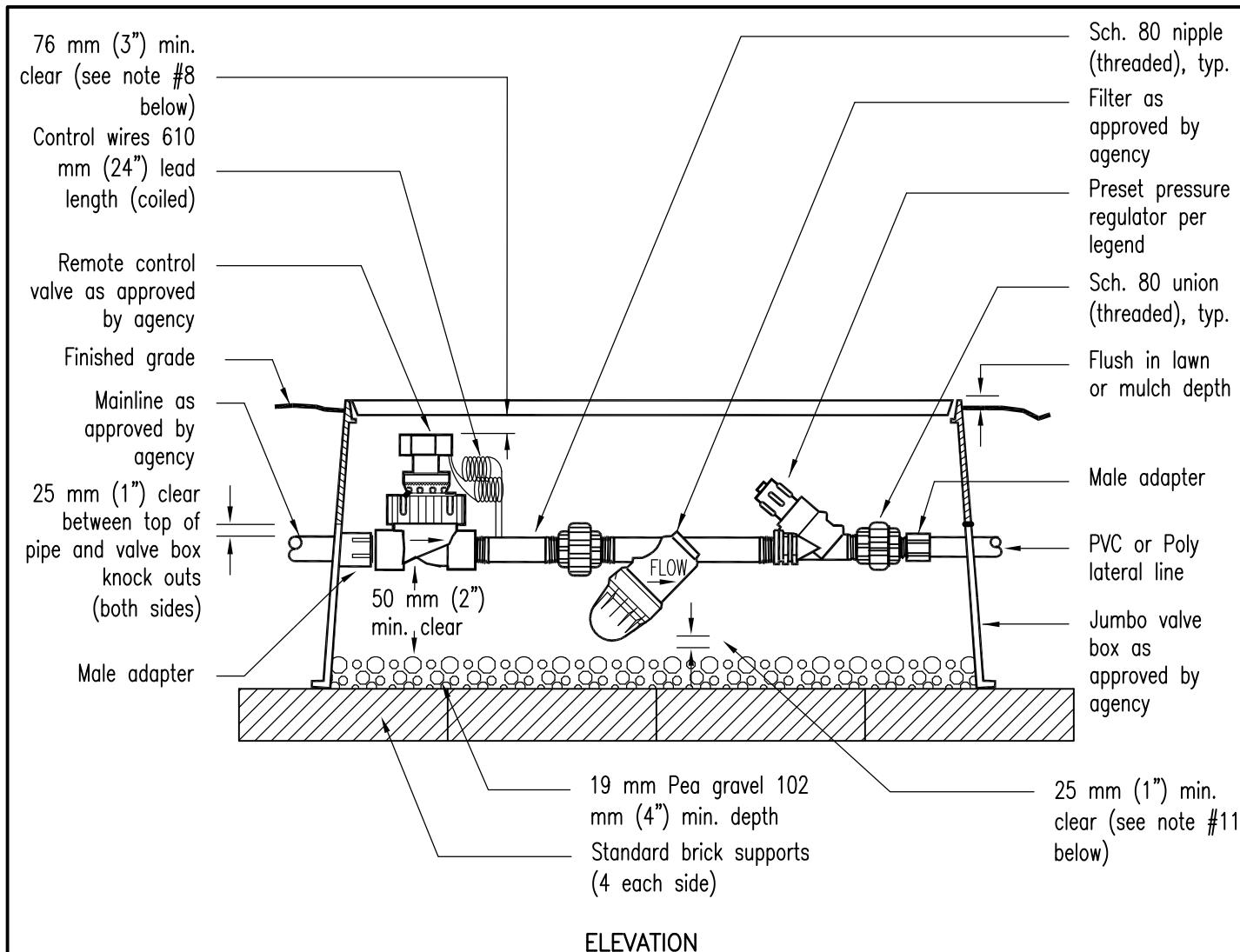
REMOTE CONTROL VALVE MANIFOLD ASSEMBLY WITH BRASS PIPE

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 04/28/2005

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER 1-33



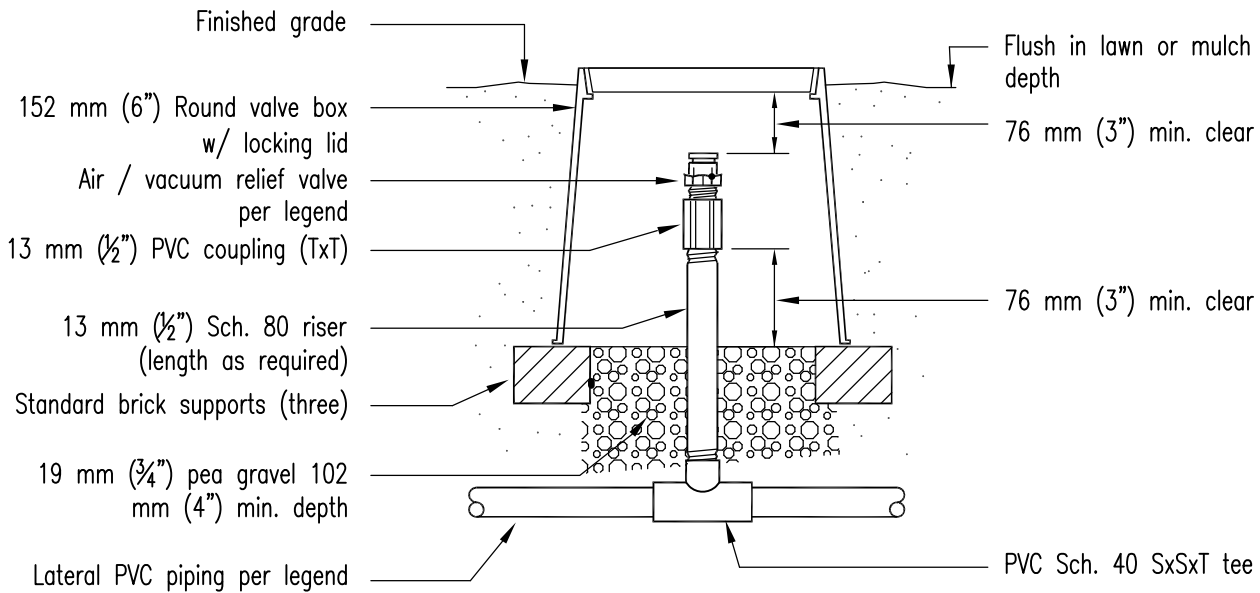
NOTES:

1. Splicing shall be made in valve boxes and pull boxes only. See Standard Drawing I-15 for splice/soldering notes.
2. All splices shall be made with a properly set mechanical splice connector entirely enclosed in self-curing resin and shall be completely water-proof.
3. Spare wires terminating in valve boxes shall have their ends insulated, the same as for a splice.
4. When two or more valves are installed in the same location, see Standard Drawing I-32 or I-33, per agency standards.
5. Valve/controller identification shall be labeled on the valve box and tagged on the valve per agency requirements.
6. Knock outs shall not be enlarged unless approved by agency.
7. Install only one valve assembly per box.
8. 76 mm (3") min. clear from bottom of box lid to highest point of valve assembly.
9. Valve boxes shall be set perpendicular to hardscape, a max. 305 mm (12") from edge of hardscape, 51-76 mm (2-3") above finished grade in shrub/groundcover areas, per mulch depth. If necessary to be set in turf, valve boxes shall be set flush with finished grade.
10. Close nipples shall not be used.
11. Filter shall be installed to allow for maintenance access.

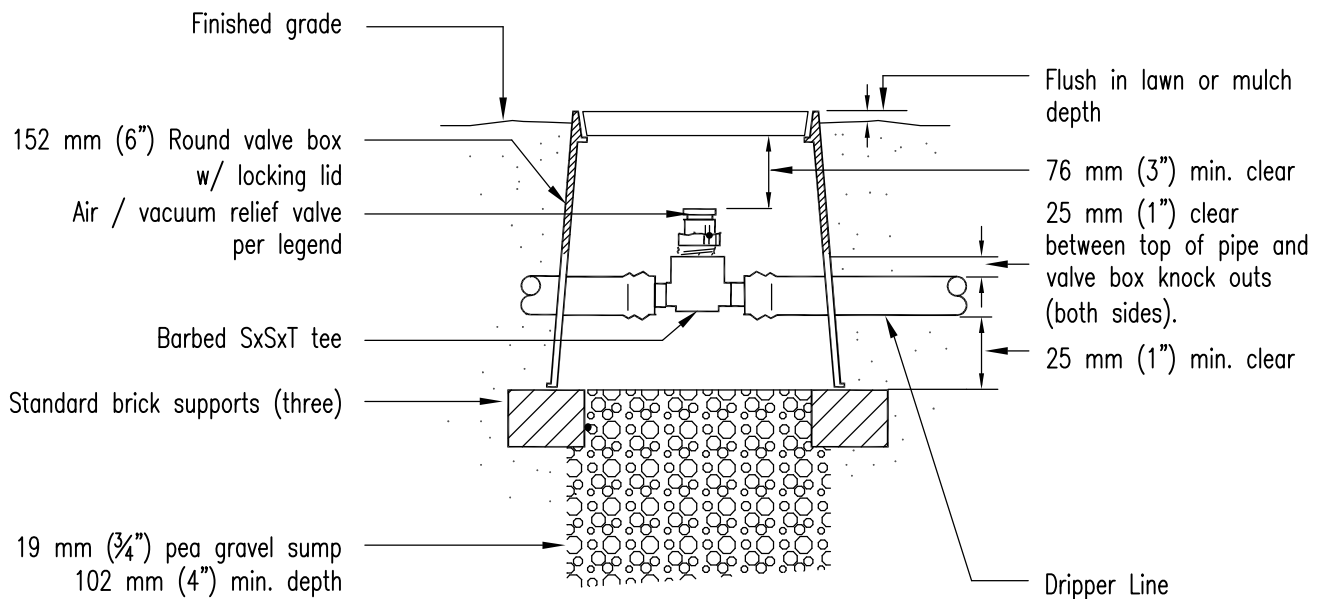
LEGEND ON PLANS

▽
Or approved agency symbol

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Caro	1/06		
				REMOTE CONTROL VALVE DRIP IRRIGATION	 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER I-35



PLUMBED TO PVC



PLUMBED TO DRIPPER LINE

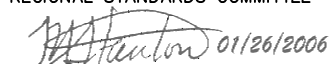
NOTES:

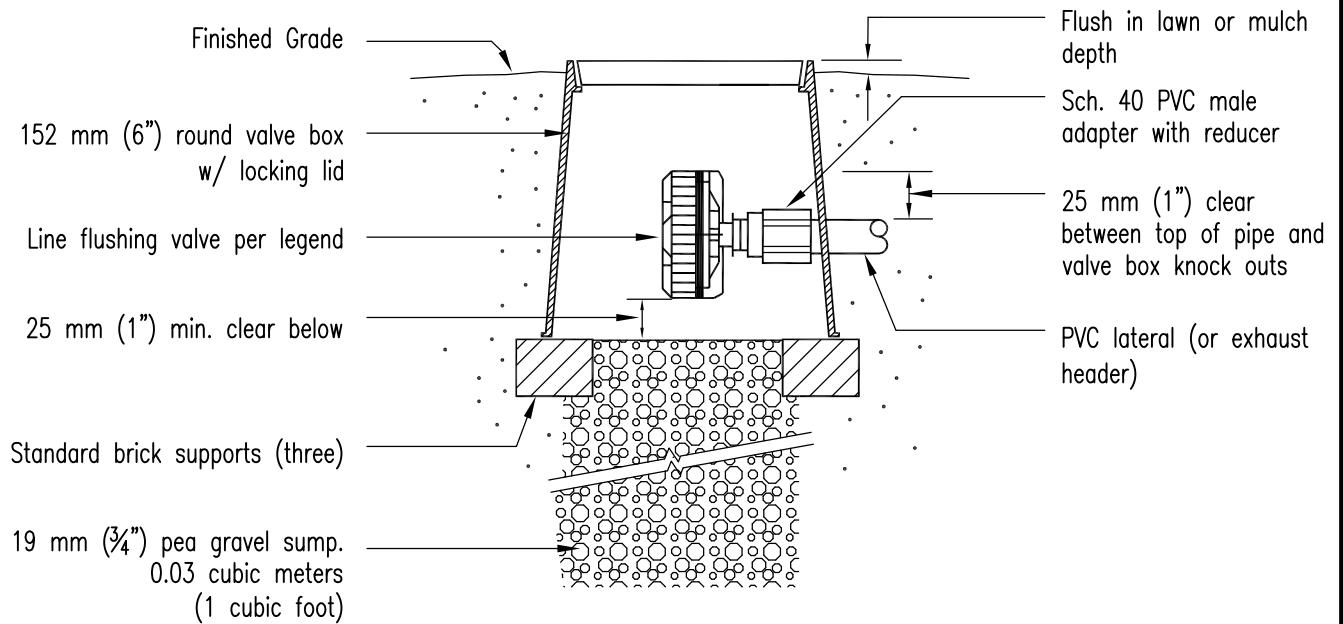
1. Install air/vacuum relief valve at high point(s) in valve circuit.
2. Heat-brand valve box lid "AR" or as per agency requirement.
3. Valve shall be centered in box.

LEGEND ON PLANS

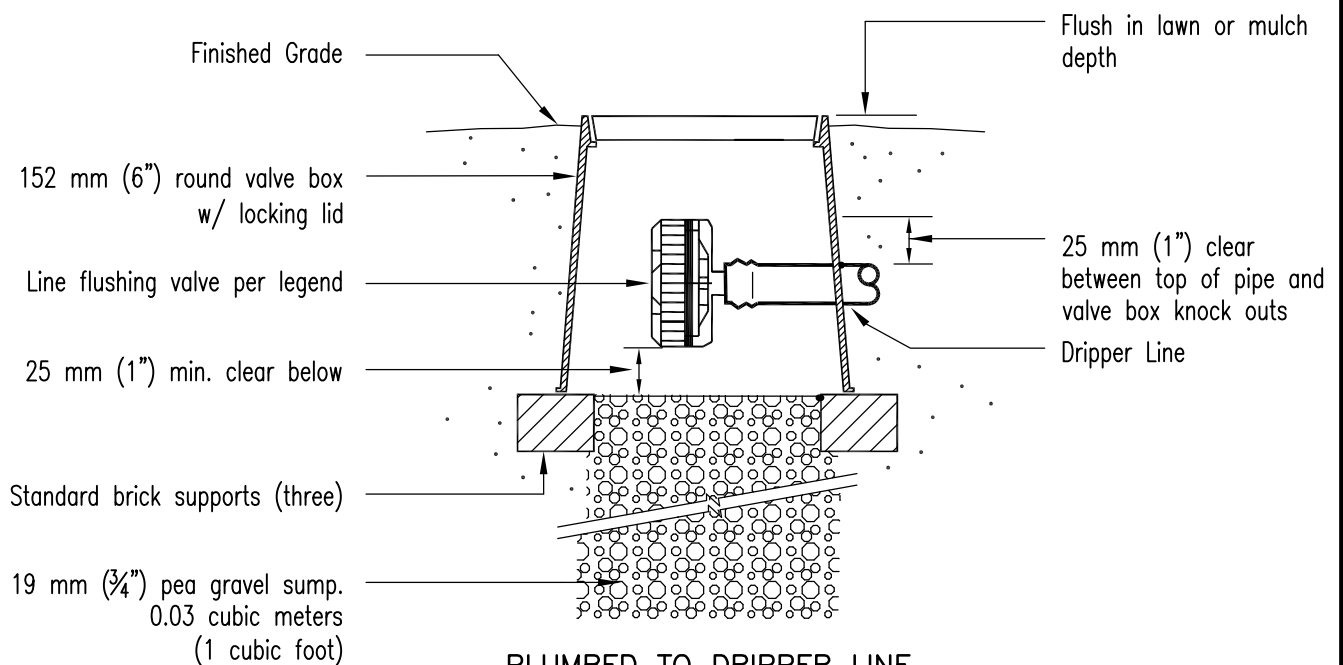
(A)

Or approved agency symbol

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Caro	1/06		
				AIR/VACUUM RELIEF VALVE	 Chairperson R.C.E. 19246 Date
				DRAWING NUMBER 1-36	



PLUMBED TO PVC



PLUMBED TO DRIPPER LINE

NOTES:

1. Install flush valve(s) at furthest point(s) in system from the control valve and at low points as needed per plans.
2. Heat brand valve box lids "FV" or as per agency requirement.
3. Valve shall be centered in box.

LEGEND ON PLANS



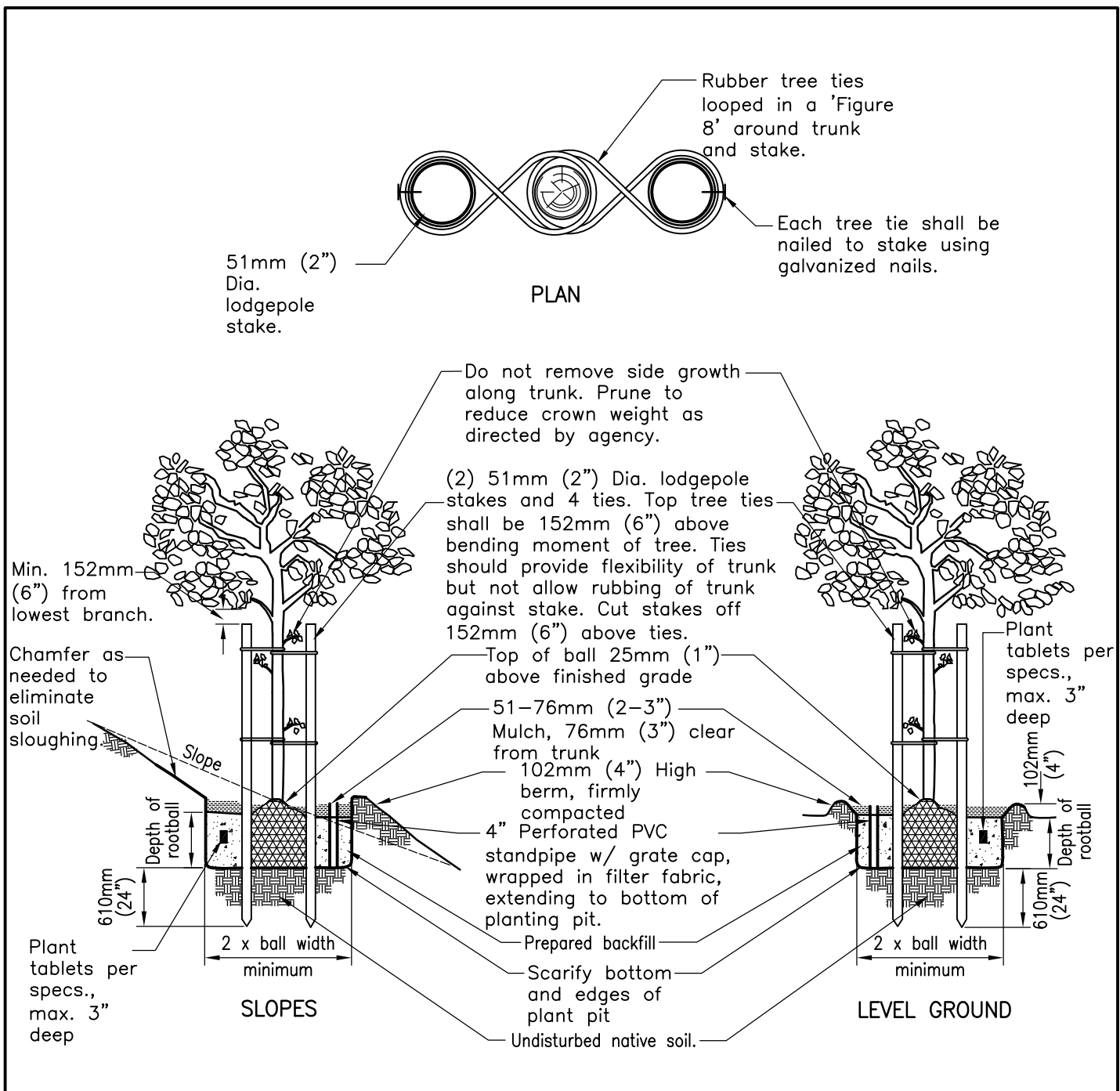
Or approved agency symbol

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Caro	1/06		
				DRIP IRRIGATION FLUSH VALVE (AUTOMATIC)	 Chairperson R.C.E. 19246 Date
				DRAWING NUMBER	1-37

LANDSCAPING

LANDSCAPING

L

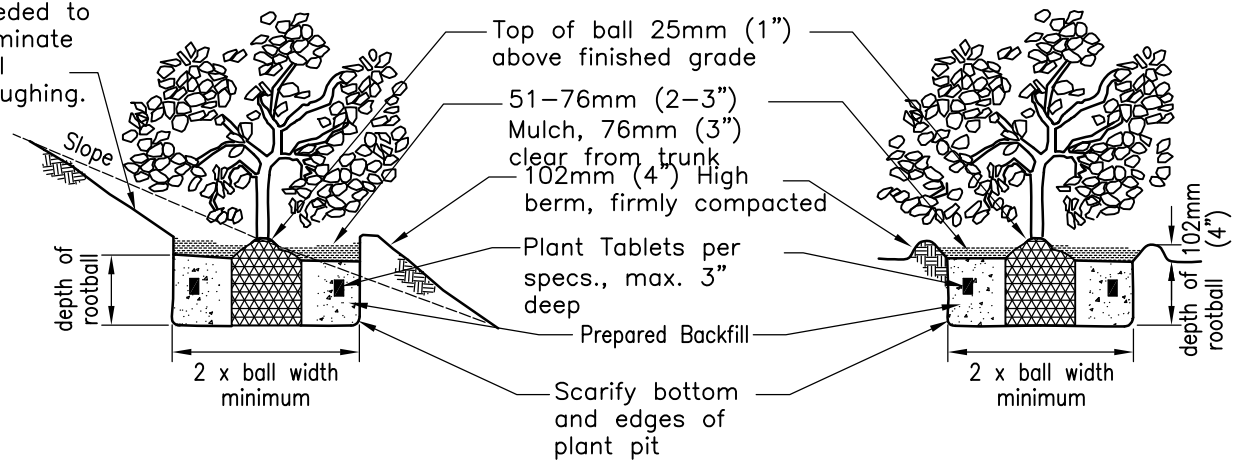


NOTES

1. Double stake #15 (15 gal.) and larger trees.
2. For single staked trees, place stake on windward side of tree.
3. Locate stakes outside of rootball.
4. Lodgepoles treated with Chromated Copper Arsenate (CCA) are not allowed.

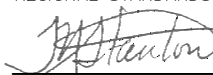
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		TREE PLANTING AND STAKING	 02/24/2005
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
UPDATE		M. Caro	02/05	DRAWING		L-1
				NUMBER		

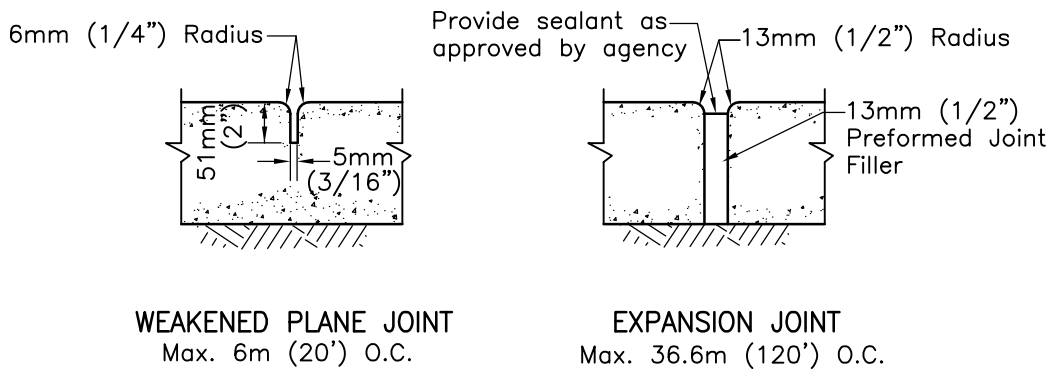
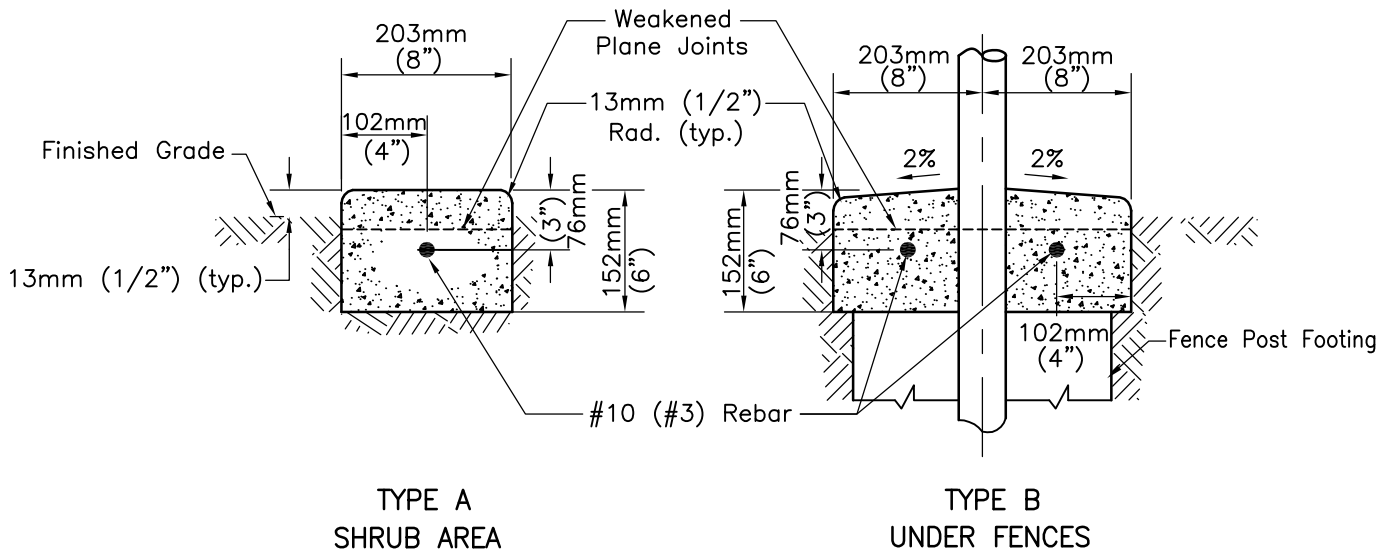
Chamfer as needed to eliminate soil sloughing.



SHRUB PLANTING - SLOPES

SHRUB PLANTING - LEVEL GROUND

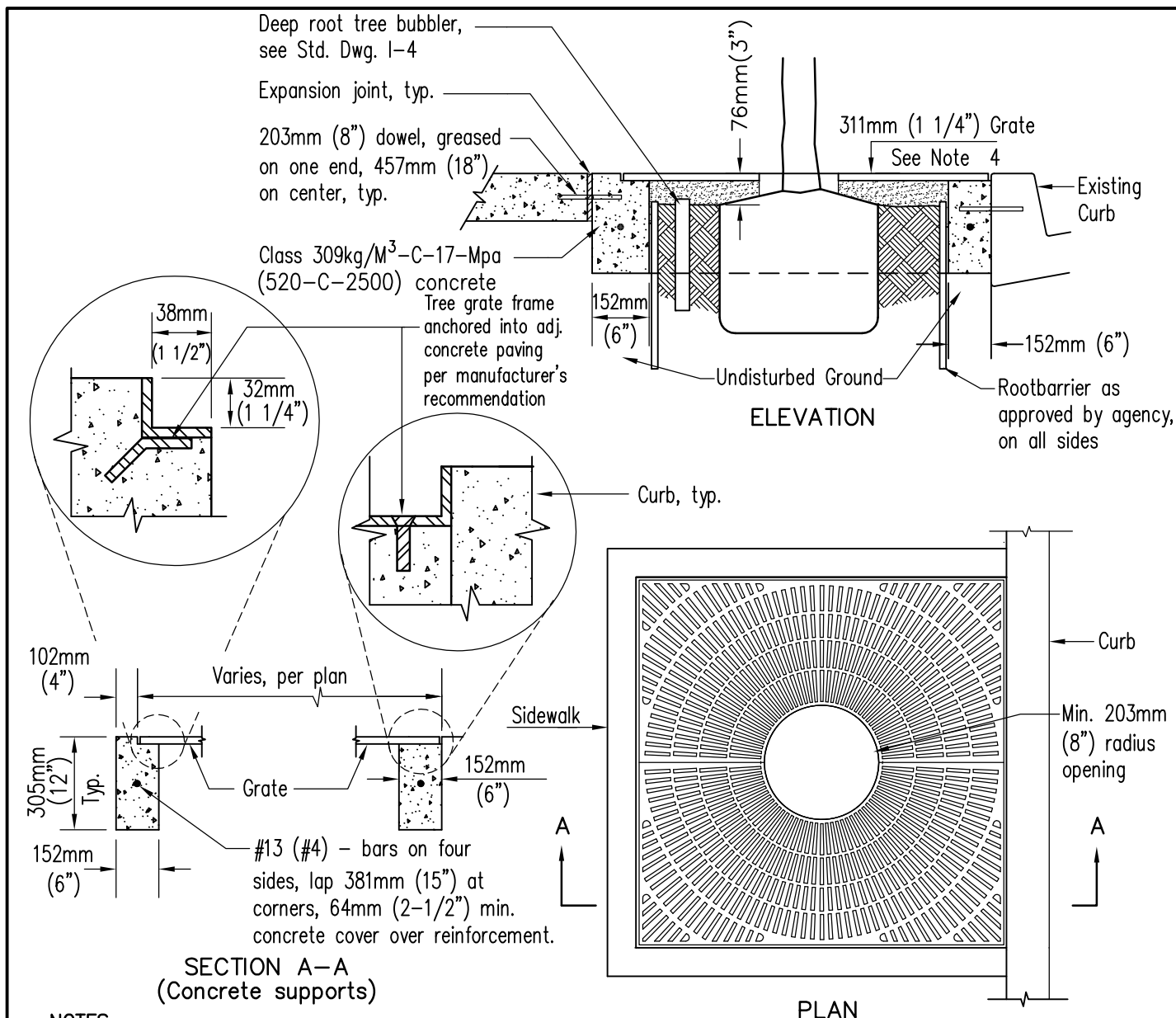
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SHRUB PLANTING	 02/24/2005 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	02/05		
				DRAWING NUMBER	L-2



NOTES

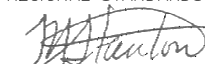
1. Rebar shall be continuous with 305mm (12") overlap at splices.
2. Concrete shall be class 308kg/M³-C-17-Mpa (520-C-2500) and same color as any adjacent concrete.
3. Install weakened plane joints at each fence post.
4. Install expansion joints where the mowing strip abuts any concrete improvement and at location approved by agency.

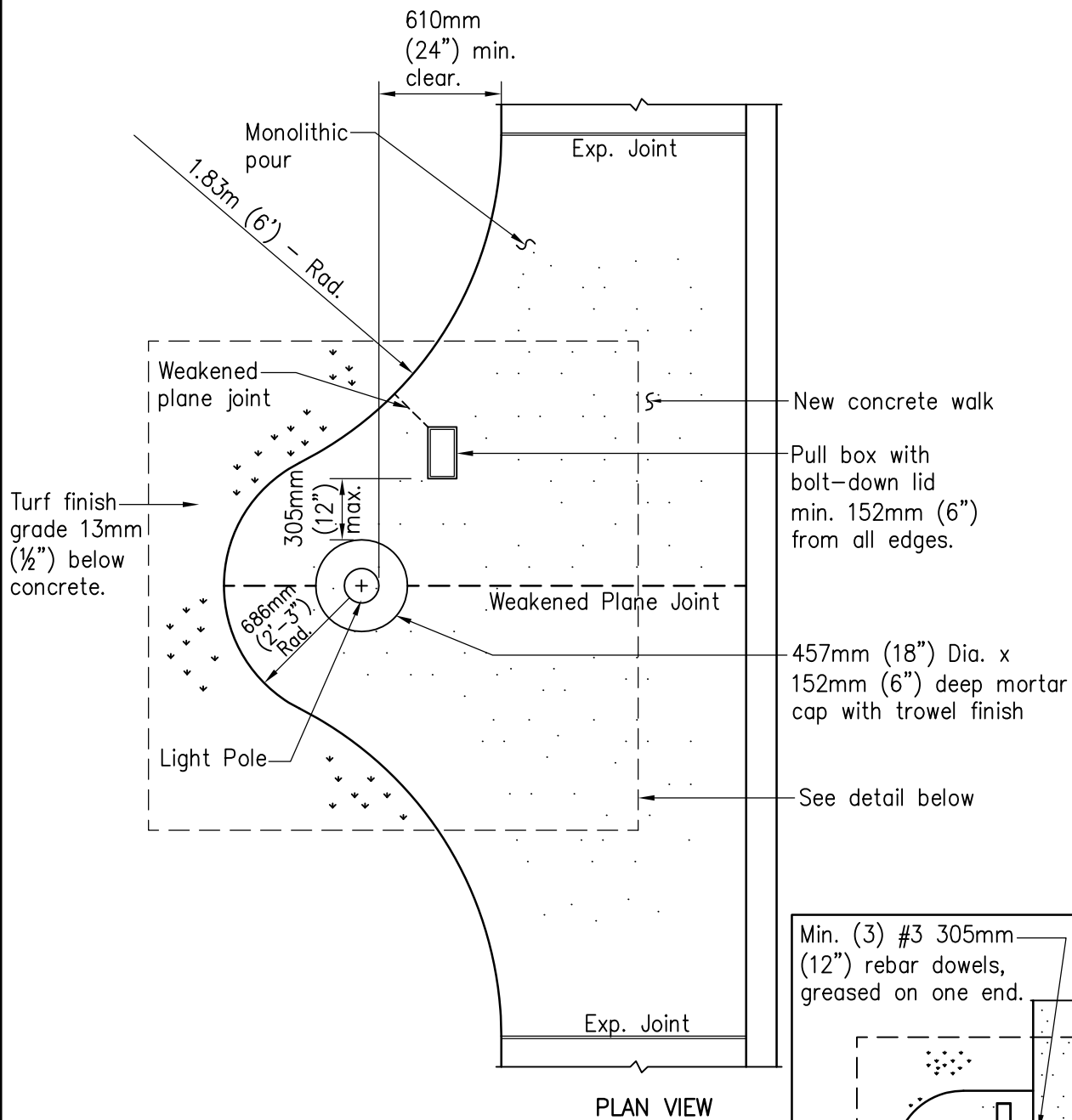
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
ORIGINAL		H.Hecht	10/82	CONCRETE MOWING STRIP	
Add Metric		T. Stanton	03/03		
UPDATE		M. Caro	02/05		
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				 02/24/2005 Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER L-3	



NOTES:

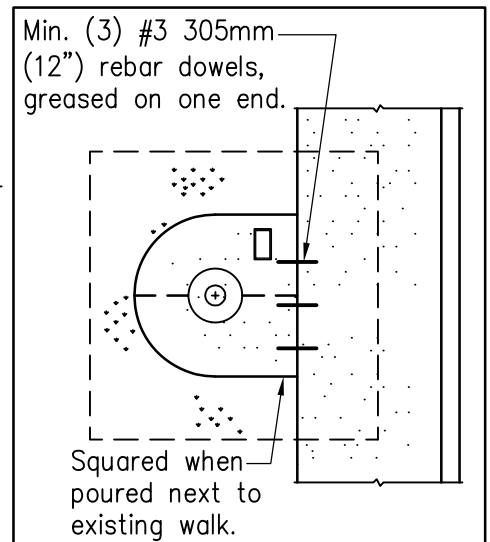
1. Sidewalk to be removed for each tree planting shall be saw cut full depth.
2. Fill below grate with shredded bark mulch. Do not fill tree grate opening.
3. If the grate is to be secured, all bolts, nuts and washers shall be hot dipped galvanized.
4. Grates shall be min. 3.7 sq. m. (40 sq. ft.) in size, and two separate pieces, unless otherwise specified on the plans. Slot openings in grate design shall have 10mm (3/8") maximum width. Grate designs shall be in accordance with current A.D.A. standards as well as the latest edition of the Uniform Building Code, with a minimum uniform live load of 250 pounds per square foot in sidewalks, and have a method of symmetrical interior expandable rings/openings (detailed on the plans) as selected and approved by the agency.
5. Immediate notification shall be given to the Engineer of any below grade improvements encountered.
6. Set grate in frame prior to placement of pavement.
7. Tree shall be centered in grate opening.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	5/92		
Add Metric		T. Stanton	03/03	TREE GRATE	 01/26/2006 Chairperson R.C.E. 19246 Date
UPDATE		M. Caro	1/06		
					DRAWING NUMBER L-4



NOTES

1. See Electric Plans for fixture/pole/footing and pull box details.
2. Use monolithic pour for new construction.
3. Pole pads shall drain at 2% minimum in same direction as sidewalk.
4. Concrete pad shall be the same as specified for sidewalk.
5. Locate light poles in shrub areas where possible.



PAD WHEN ADJ. TO
EXISTING CONCRETE

Revision	By	Approved	Date
ORIGINAL		Parkinson	9/88
Add Metric		T. Stanton	03/03
UPDATE		M. Caro	08/05

SAN DIEGO REGIONAL STANDARD DRAWING

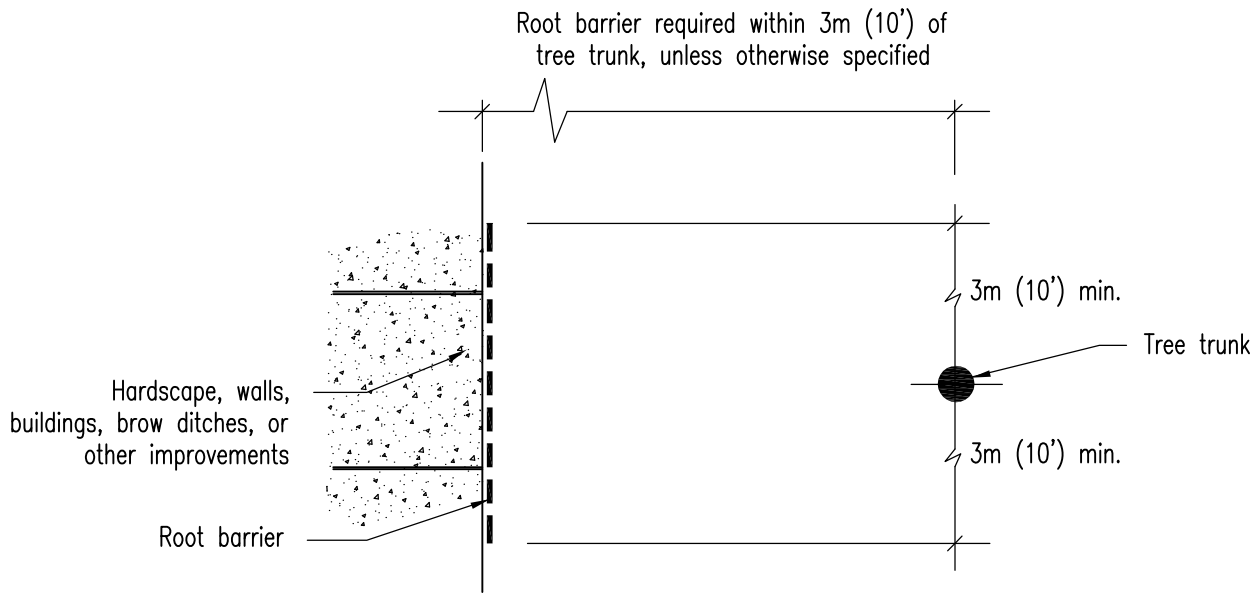
LIGHT POLE PAD IN TURF AREAS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

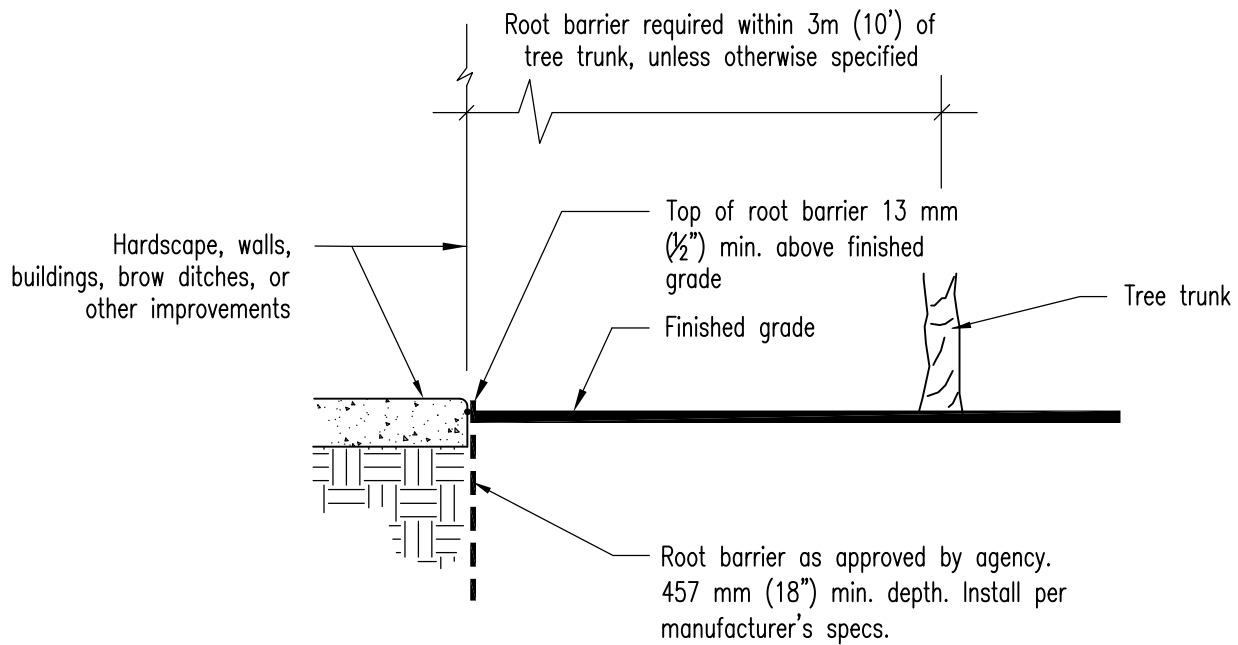
T. Stanton 08/25/2005

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER L-5



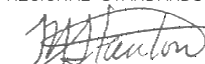
PLAN VIEW



SECTION

NOTE:

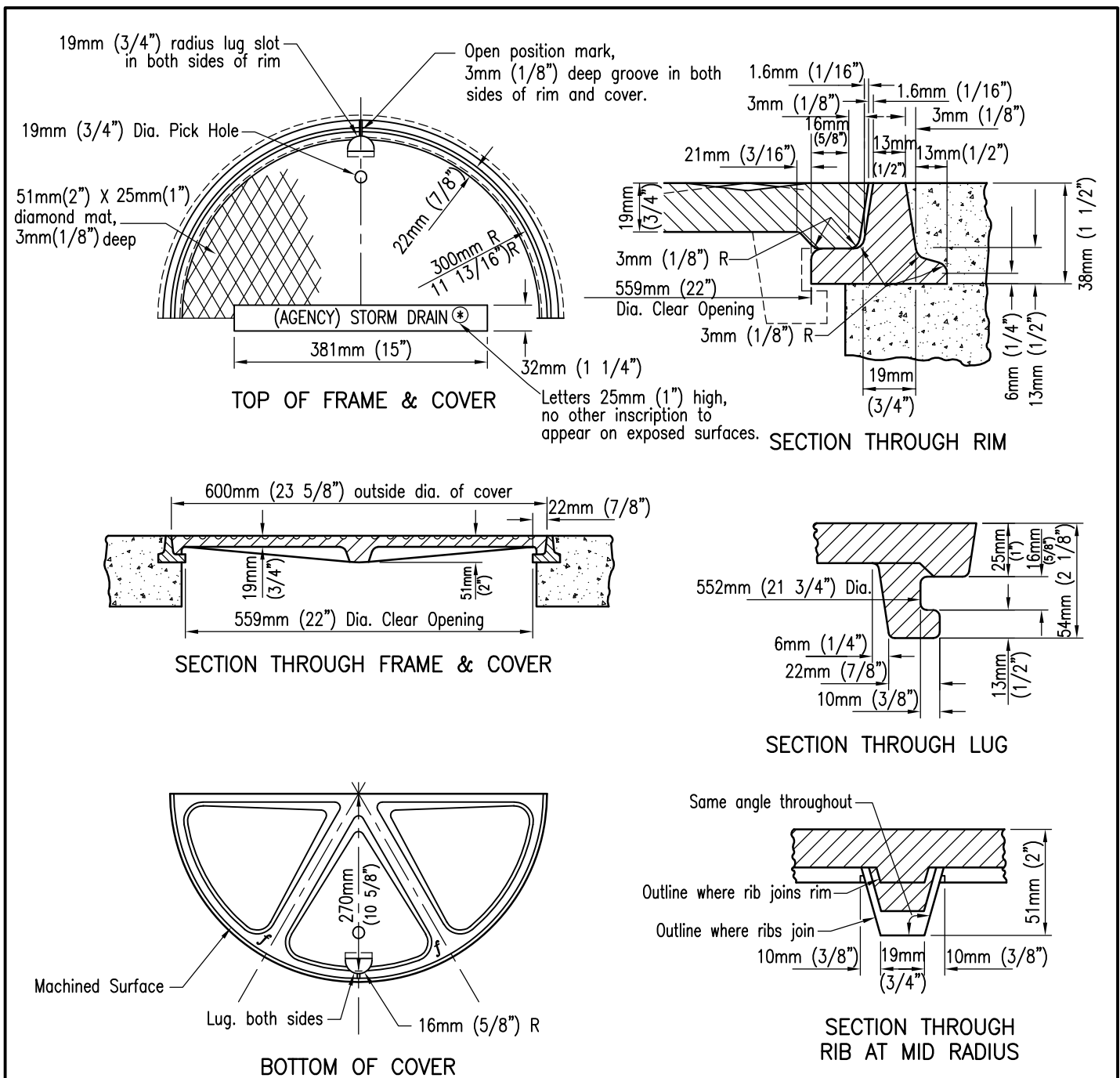
1. Root barrier shall be installed adjacent to the improvement and not around the rootball.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		M. Caro	2/06		
				ROOT CONTROL BARRIER	 02/23/2006 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER L-6

MISCELLANEOUS

M

MISCELLANEOUS



NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 30.
2. Frame and cover for use in non-traffic area only.
3. Weights: Frame 13.2kg (29) - 15kg (33) lbs.
Cover 43kg (95) - 50kg (110) lbs.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

*

FOR	MARK
Sewer Projects	Sewer
Storm Drain Projects	Storm Drain
Water Projects	Water

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	.61m (24") MANHOLE FRAME AND COVER LIGHT DUTY	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-2



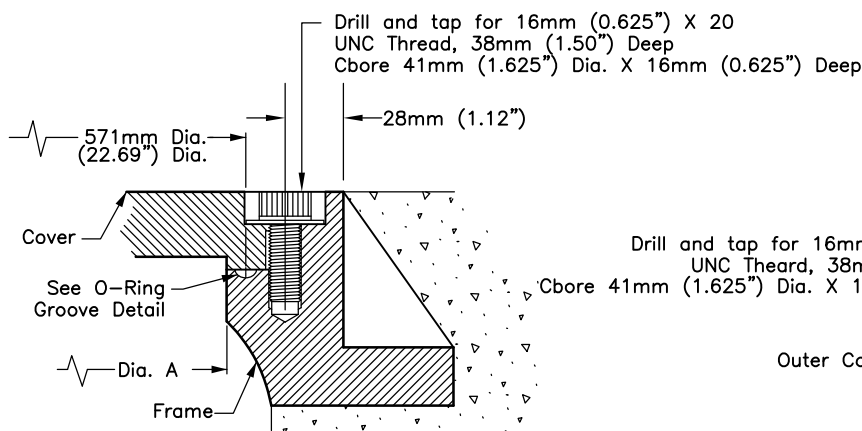
Diagram illustrating the cross-section of a roof assembly, showing the following layers and dimensions:

- Top layer: 3mm (1/8")
- Second layer: 11mm (7/16")
- Third layer: 13mm (1/2")
- Bottom layer: 6mm (1/4") max.

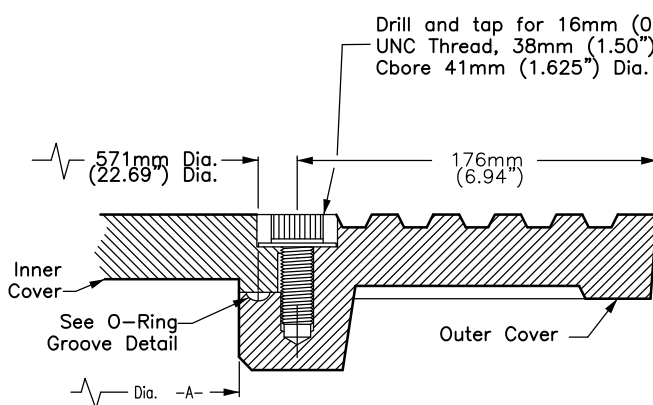
Additional labels on the left side of the diagram include:

- lbs.
- lbs.
- lbs.

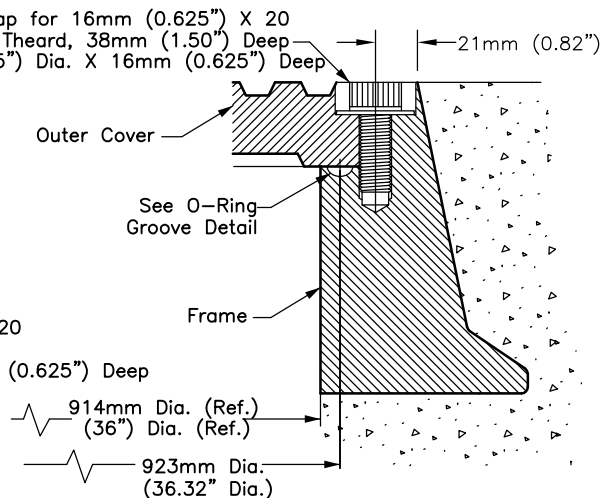
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		914mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS HEAVY DUTY
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-3



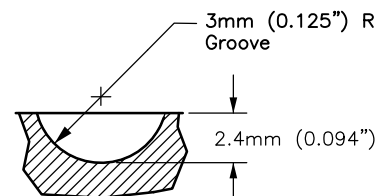
M-1 Detail:
COVER TO FRAME



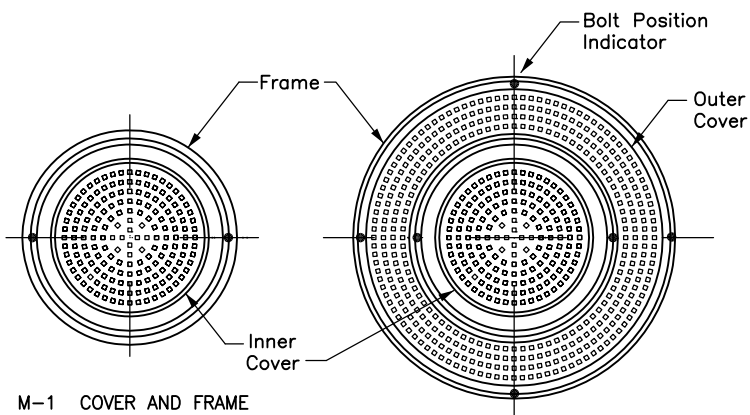
M-3A Detail:
INNER COVER TO OUTER COVER



M-3B Detail:
OUTER COVER TO FRAME



NEOPRENE O-RING
GROOVE DETAIL



M-1 COVER AND FRAME
BOLT PLACEMENT
(See Note 3)

M-3 CONCENTRIC COVERS AND FRAME
BOLT PLACEMENT
(See Note 3)

NOTES:

1. 16mm (0.625") X 20 UNC THREAD, 316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND 38mm (1.50") O.D. X 17mm (0.687") I.D. X 0.078 THICK 316 STAINLESS STEEL WASHER.
2. 6mm (0.25") NEOPRENE O-RING GASKET SHALL BE GLUED INTO MACHINED GROOVE. GLUE SHALL MEET THE REQUIREMENTS OF MIL-M-81288 (AMEND. 1)
3. BOLTDOWN PATTERNS:
 - M-1 DETAIL (610mm (24") COVER & FRAME): INSTALL TWO (2) BOLTS AT 180 DEGREES.
 - M-3A DETAIL (CONCENTRIC COVERS): BETWEEN INNER AND OUTER COVERS INSTALL TWO (2) BOLTS AT 180 DEGREES.
 - M-3B DETAIL (OUTER COVER & FRAME): BETWEEN OUTER COVER & FRAME INSTALL FOUR (4) BOLTS AT 90 DEGREES.

Revision	By	Approved	Date
ORIGINAL		Parkinson	2/95
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE COVER – LOCKING DEVICE

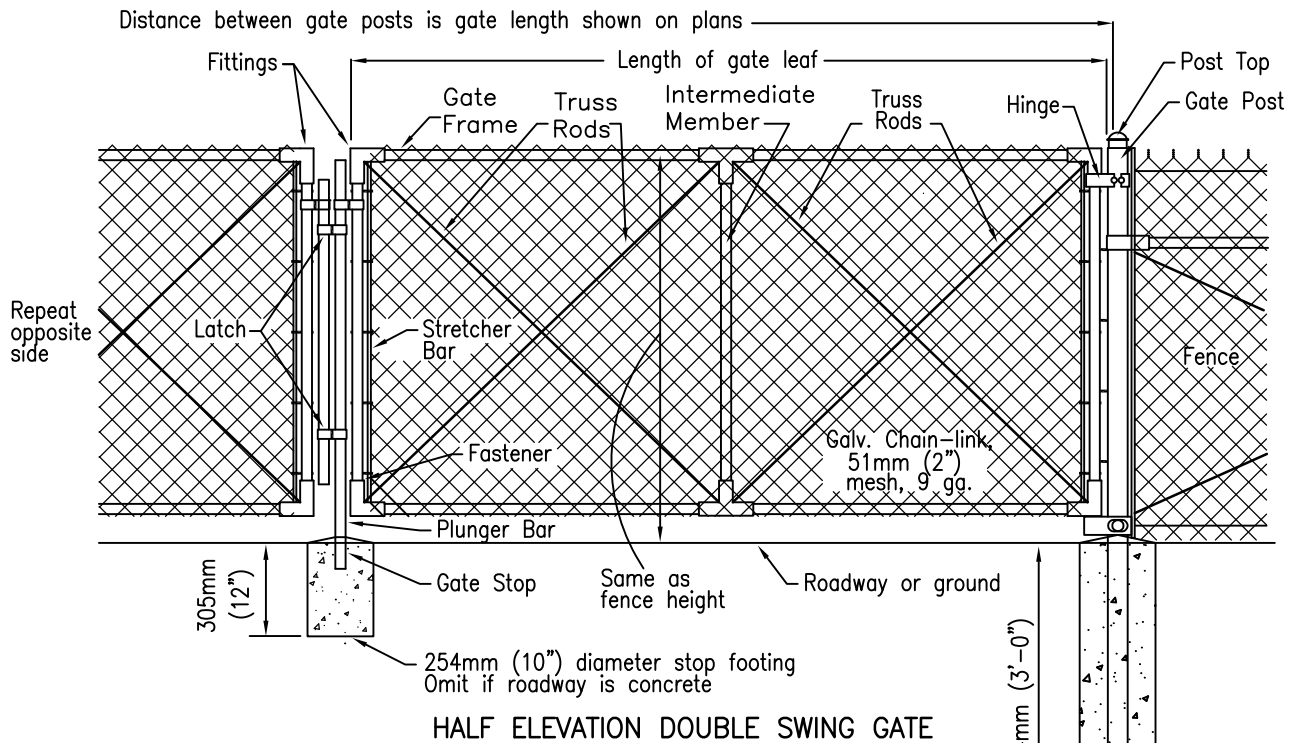
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER

M-4

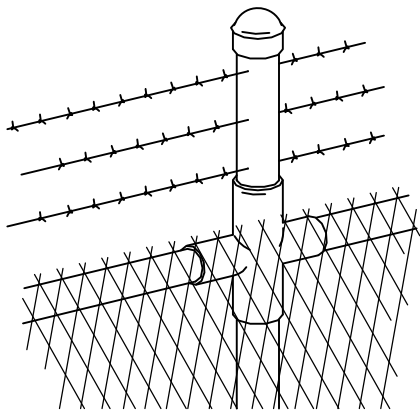


NOTES

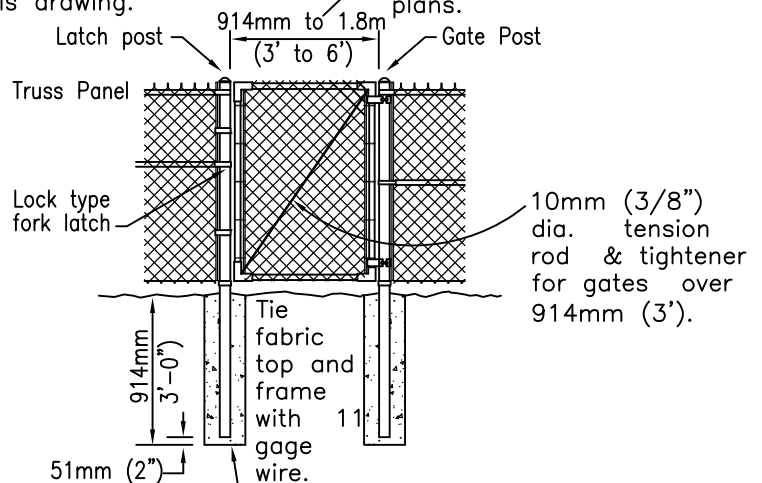
1. All footings shall be $309\text{kg}/\text{M}^3$ -C-22-Mpa (520-C-2500) concrete.
2. The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions:
 - a. Barbed wire
 - b. Extension post
3. Chain link fence shall conform to Section 206-6 of the Standard Specification for Public Works Construction unless specifically noted on this drawing.

Diameter of footing = 4 times outside diameter of post.

Clear opening shown on plans.



EXTENSION POST AND BARBED WIRE



WALK GATE

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		A. Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK GATE

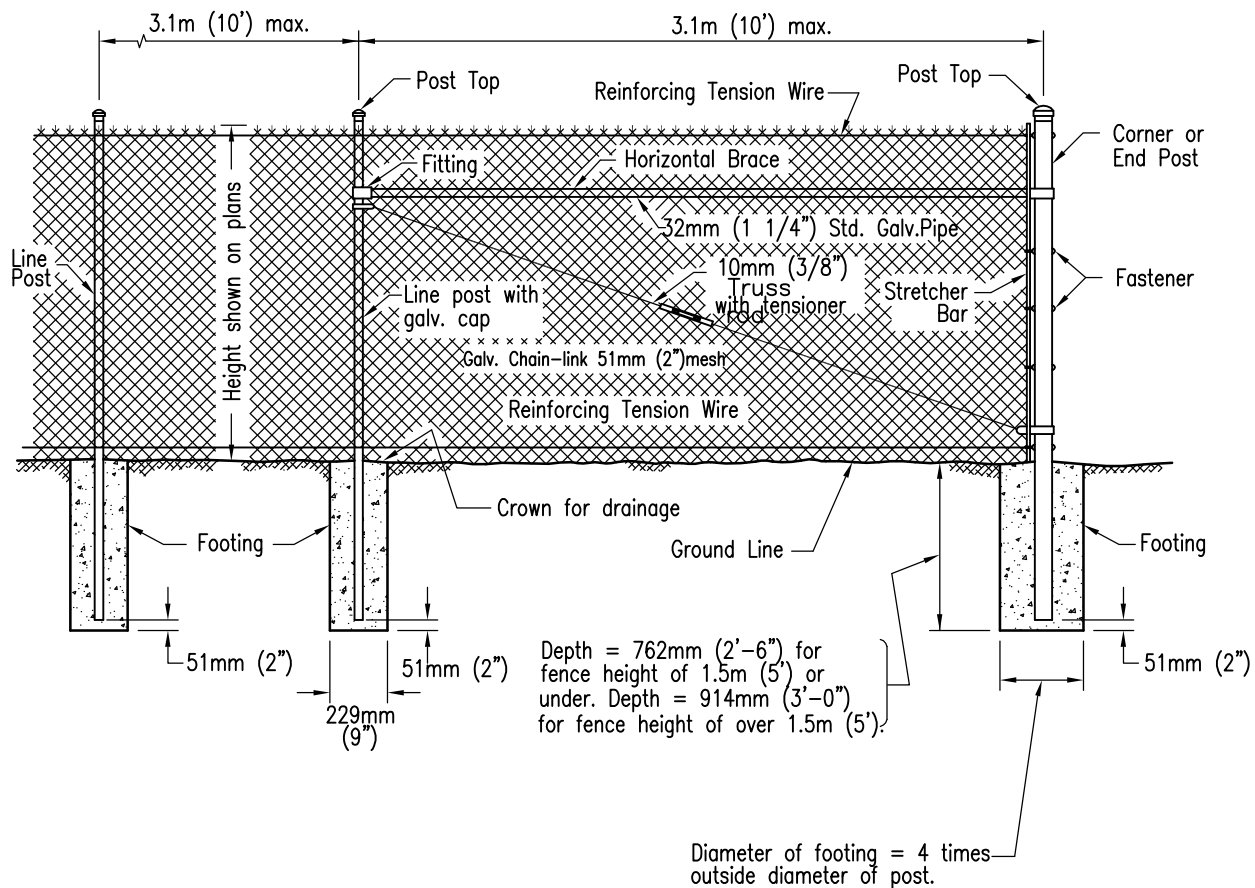
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

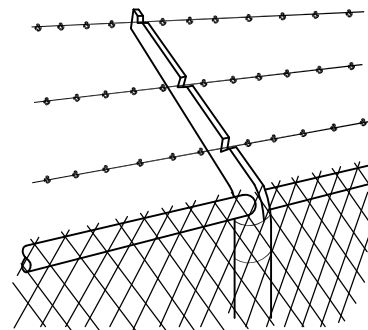
**DRAWING
NUMBER**

M-5



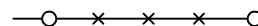
NOTES

- All footings shall be 309kg/M³-C-22-Mpa (520-C-2500) concrete.
- The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions.
 - Barbed Wire
 - Extension Arm
 - Top Horizontal Rail
- Chain link fence shall conform to Section 206-6 of the Standard Specifications for Public Works Construction unless specifically noted on this drawing.
- See Standard Drawing M-20 for additional details.



EXTENSION ARM AND BARBED WIRE

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		A. Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK FENCE

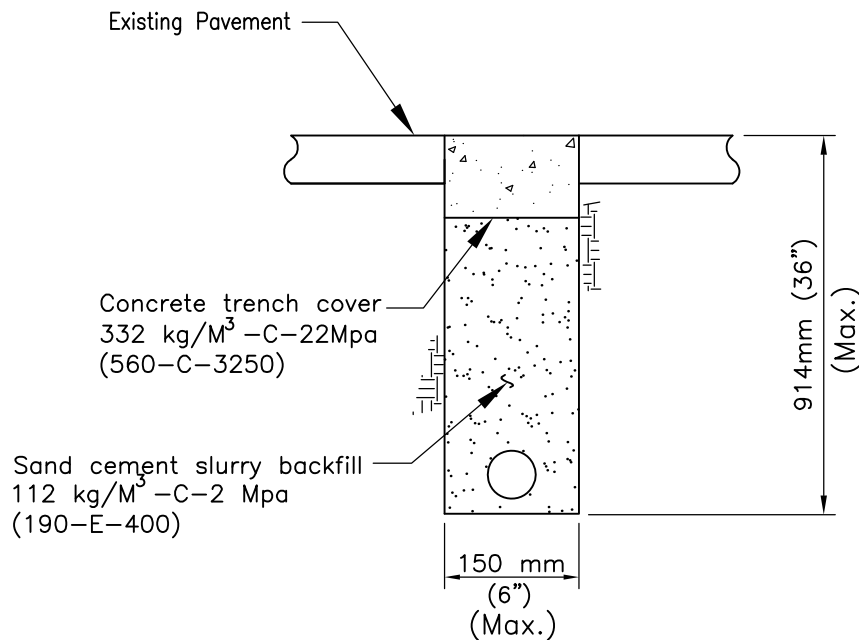
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

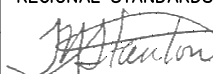
DRAWING
NUMBER

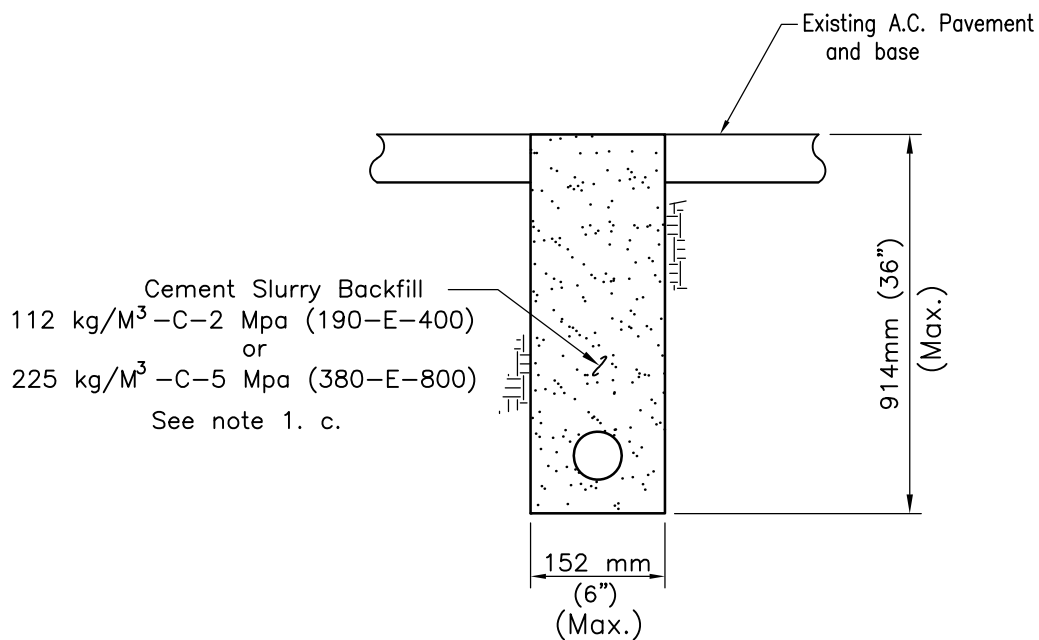
M-6



NOTES

1. Concrete encasement or sand cement slurry backfill shall have a minimum slump of 102mm (4").
2. Sand cement slurry backfill shall be thoroughly consolidated to encase conduits. Tampers or vibrators shall be used.
3. Concrete shall be screeded off to match pavement grade and floated to assure proper edge match.
4. Existing pavement will not require saw cutting when using rockwheel for excavation except when the existing pavement is concrete and trench finish is concrete.
5. All cuts shall be parallel or perpendicular to street centerline, when practical.
6. Allow concrete backfill or concrete trench cover 7 calendar days minimum, but no longer than 30 calendar days to cure and dry before applying any road surface finishes.
7. In major or prime arterial streets, an approved set accelerating admixture, such as calcium chloride, may be used only with prior approval of the Agency's Engineer otherwise the contractor shall protect the trench with the approval of the agency's Engineer.
8. See drawing G-33 for narrow trench resurfacing.
9. See table on drawing M-15 for standard minimum conduit depths.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Hashemian	9/02		NARROW TRENCHES TRENCHING & BACKFILLING	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		M-7

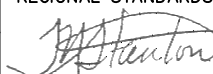


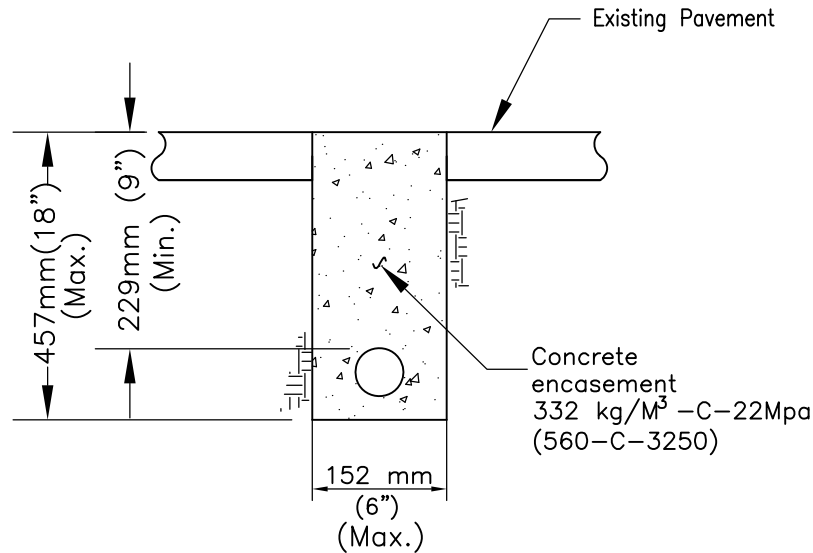
NOTES

1. Cement Slurry Backfill:

- a. Cement slurry backfill shall have a maximum slump of 102 mm (4").
- b. Cement slurry backfill shall be thoroughly consolidated to encase conduits. Tampers or vibrators shall be used.
- c. Cement slurry backfill shall be as follows:
 Alleys and local residential streets Class 112 kg/M³ - C-2 Mpa (190-E-400)
 All other streets Class 225 kg/M³ - C-5 Mpa (380-E-800)

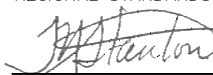
2. Existing A.C. pavement will not require sawcutting when using rockwheel for excavation.
3. All cuts shall be parallel or perpendicular to street centerline, when practical.
4. See drawing G-33 for narrow trench resurfacing.
5. See table on drawing M-15 for standard minimum conduit depths.

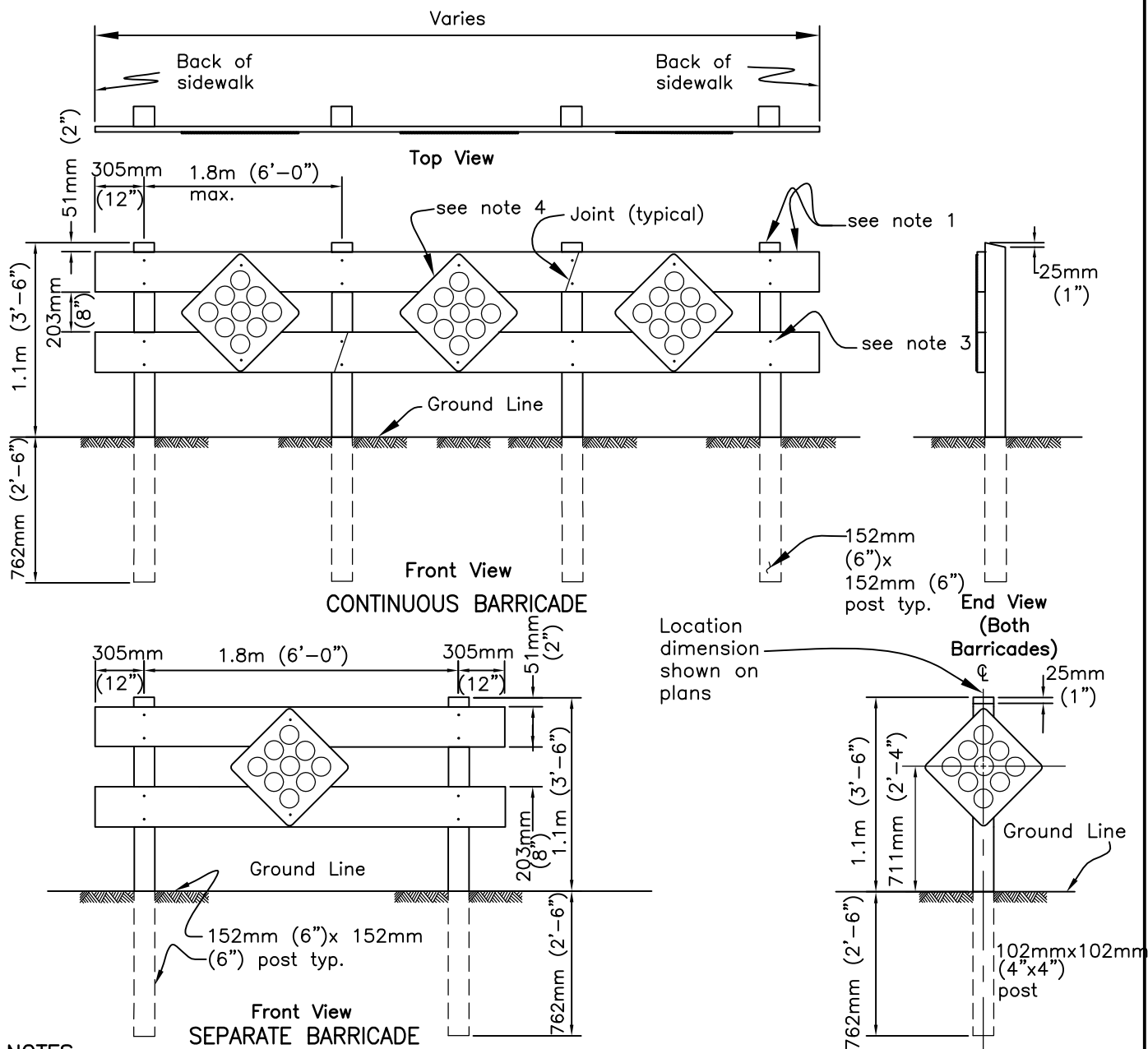
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Hashemian	9/02		NARROW TRENCHES TRENCHING & BACKFILLING	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING		M-7A
				NUMBER		



NOTES

1. Concrete encasement or backfill shall have a minimum slump of 102 mm (4").
2. Concrete encasement and/or sand cement slurry backfill shall be thoroughly consolidated to encase conduits. Tampers or vibrators shall be used.
3. Concrete shall be screeded off to match pavement grade and floated to assure proper edge match.
4. Existing pavement will not require saw cutting when using rockwheel for excavation except when the existing pavement is concrete and trench finish is concrete.
5. All cuts shall be parallel or perpendicular to street centerline, when practical.
6. Allow concrete backfill or concrete trench cover 7 calendar days minimum, but no longer than 30 calendar days to cure and dry before applying any road surface finishes.
7. In major or prime arterial streets, an approved set accelerating admixture, such as calcium chloride, may be used only with prior approval of the Agency's Engineer otherwise the contractor shall protect the trench with the approval of the Agency's Engineer.
8. This type of trench shall be permitted for supply cables of 750 volts or less. See California Public Utility Commission General Order No. 128, Rule 33.4 D.(1)(b) and where the conduit can not be placed at the proper recommended depth.
9. See drawing G-33 for narrow trench resurfacing.
10. This detail shall be used only when there is underground conflicts. See table on drawing M-15 for standard minimum conduit depths.

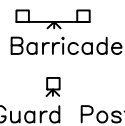
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Hashemian	9/02		
Add Metric		T. Stanton	03/03	NARROW TRENCHES TRENCHING & BACKFILLING SHALLOW CONDUIT DEPTH	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
				DRAWING NUMBER	M-8



NOTES

- Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 51mm (2") x 203mm (8") select grade Douglas Fir, surfaced four sides.
- All exposed portions of barricades shall be painted with two coats of white exterior enamel over prime coat.
- Connections shall be made with 10mm (3/8") x 152mm (6") galvanized lag screws with one (1) washer each.
- Reflector sign fasteners to be 10mm (3/8") x 38mm (1 1/2") galvanized lag screws.
Reflector signs - California Type N. Size 457mm (18") x 457mm (18") - Yellow with nine (9) - 83mm (3 1/4") reflectors (center mount).
 - Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow. Reflector material shall be plastic or other approved reflectorized material.
 - Sign material shall be aluminum alloy 6061-T6 or 5052-H38, aluminum thickness 1.6mm (0.063").
- 1.8m (6') long hat section metal post per Caltrans Std. Plan A74-A optional for guard post.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

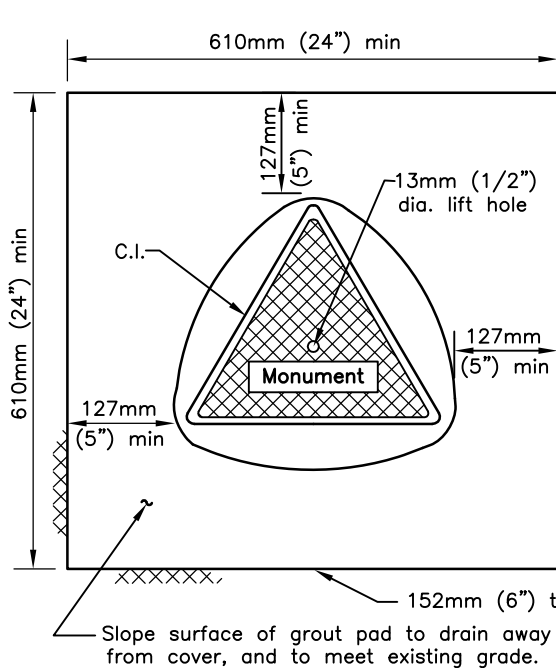
SAN DIEGO REGIONAL STANDARD DRAWING

GUARD POST AND BARRICADE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

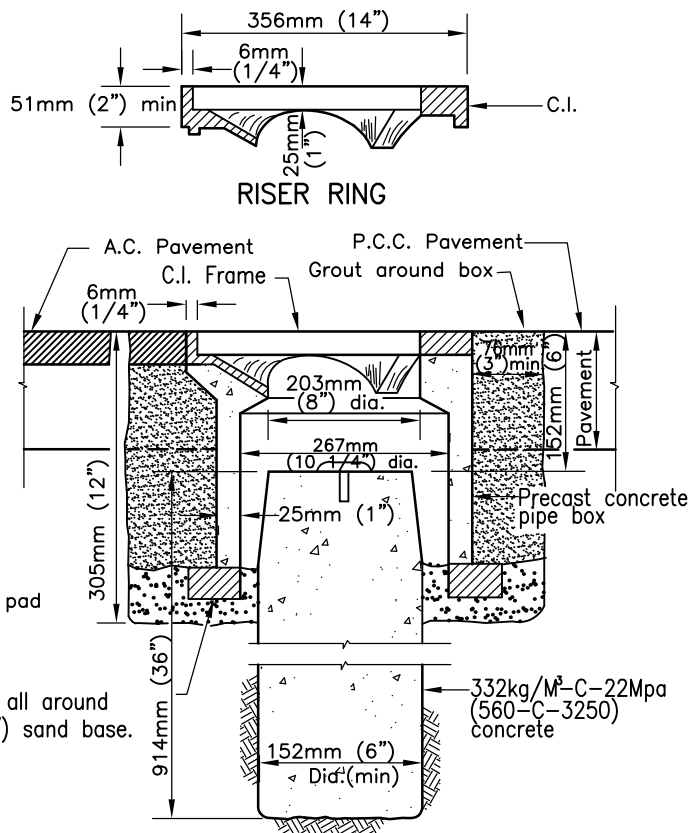
T. Stanton 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-9



PLAN-IN UNPAVED AREA

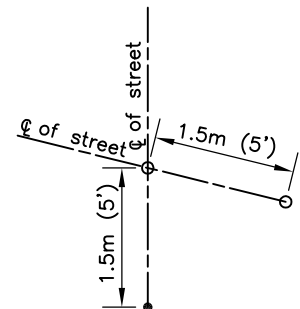
Brick support all around on 51mm (2") sand base.



TYPICAL MONUMENT SECTION IN PAVED AREA

NOTES

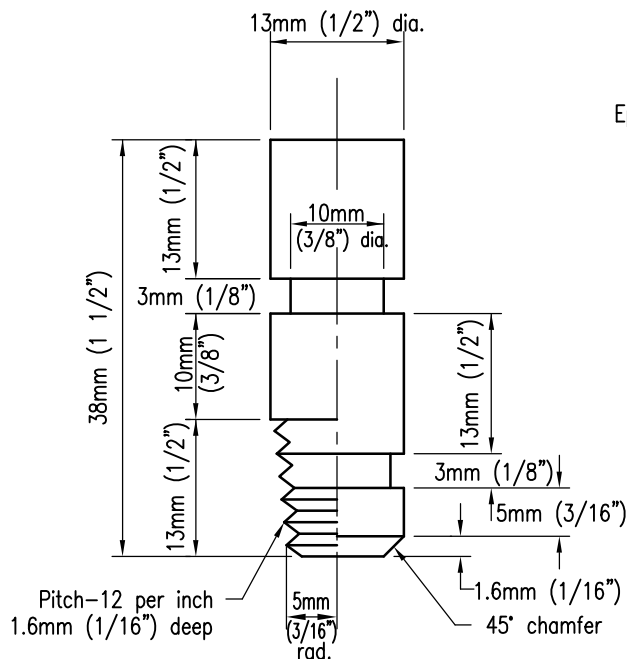
1. Cover and frame to be cast integrally with pipe box.
2. Monument base may be cast in place or precast.
3. Form and taper exposed upper 152mm (6") of cast-in-place base to a top diameter of 127mm (5"). (Precast base shall be sand backfilled).
4. Monument marker shall be a domed brass, 76mm (3") in diameter.
5. Monument Location:
 - a) Set on all centerline intersections unless actual location is modified by the Agency and shown in modified location on map. When centerline intersection is impractical, offset 1.5m (5') on centerline of major street, (see detail at right). If neither centerline can be occupied, two monuments will be set in line around the front on the perimeter of a 3m (10') diameter circle, whose center is the point.
 - b) Set on centerline at intervals not exceeding 305m (1000') on straight runs.
 - c) Set on centerline at points of curvature.
 - d) Set on center at center points of cul-de-sacs.
 - e) Set on centerline when center point of cul-de-sac is offset from centerline.
 - f) These standards may be modified at the discretion of the Agency in cases where strict compliance therewith results in more monuments than it considers necessary. The following technique for reducing the number of monuments will be routine.
 - g) Substitution of one monument on the "Point of Intersection" for monuments at the "Beginning of Curve" and the "Ending of Curve" when the "Point of Intersection" falls within the pavement area.
 - h) Deletion of any monument otherwise required by these standards when its position can be determined by turning one angle from a point on a straight line between two other monuments, providing such point is not more than 91.4m (300') from the point on which the deleted monument would have been placed.



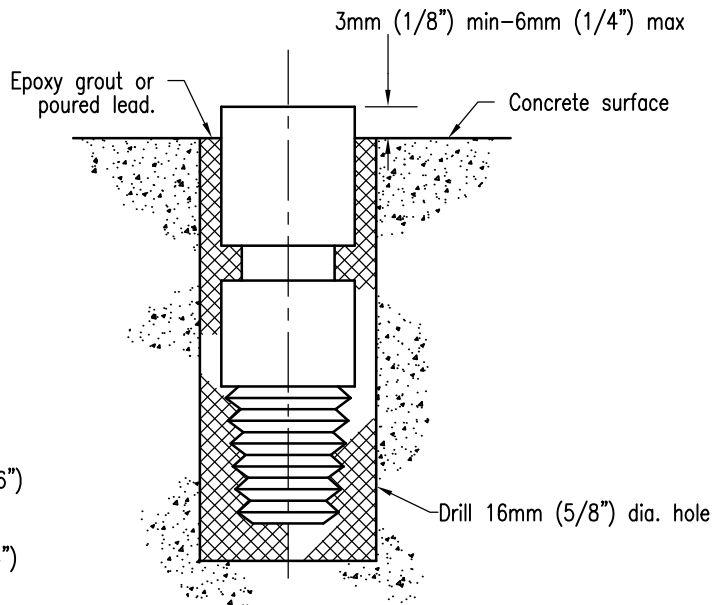
Alteration location of monument. Tie distances shown on final subdivision map if alternate location is used.

LOCATION OF STREET SURVEY MONUMENT

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	STREET SURVEY MONUMENT		 3/10/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
						DRAWING NUMBER M-10



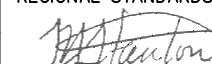
TYPE-A TYPE-B
ELEVATION

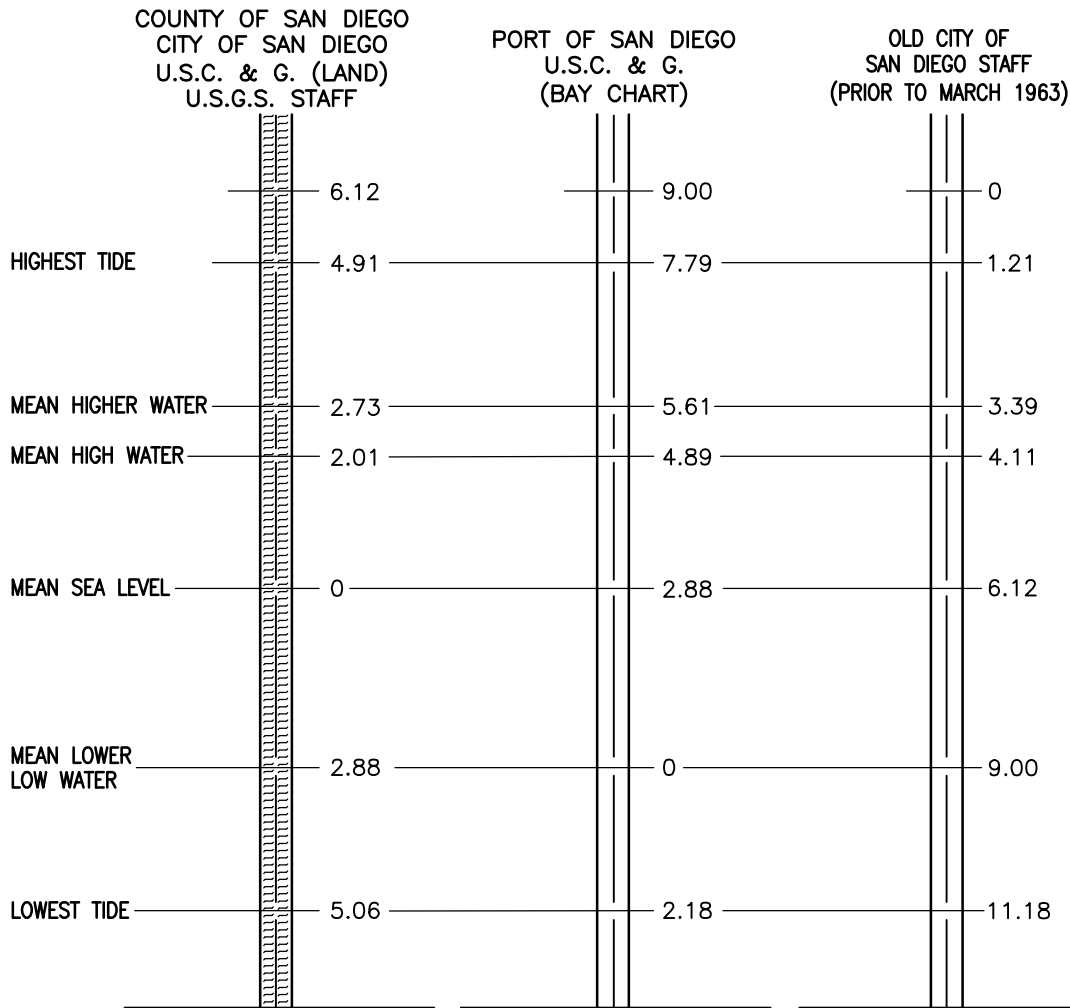


INSTALLATION IN EXISTING CONCRETE
(Typical for Type A or B)

NOTES

1. Material- Brass A.S.T.M. B-16. All machine tolerances $\pm 0.4\text{mm}$ (1/64") machine finish.
2. May be installed in fresh concrete at time of installation of concrete structure.
3. Location-in most stable, permanent location in vicinity, such as in base for street light standard or traffic signal (behind sidewalk), in curb (not near joint, on curve or near trees), on top of drainage headwall, in foundation for building or retaining wall or in concrete pads for transformers, pump stations etc.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		BENCH MARK – BRASS PLUG	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		M-11

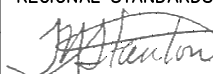


LEGEND

U.S.C. & G. = United States Coast and Geodetic Survey.
 U.S.G.S. = United States Geological Survey.
 MEAN HIGH WATER = Mean of all high water in San Diego Bay.
 MEAN HIGHER WATER = Mean of all higher water in San Diego Bay.
 Bay charts and topography up to the mean
 high tide based on zero at the mean lower
 low water.

SOURCE

Data based on U.S.C. & G. "Sea level Datum of 1923".

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		DATUMS	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		M-12

FOUND MONUMENTS

Found monuments must denote the character of the monument, how it is identified and the record, or no record as applicable.

SET MONUMENTS – Criteria for Locating and Character

On subdivision boundaries, permanent monuments are required; and must be shown on the map at intervals as specified by the local agency. The location of such points that are unacceptable or will be destroyed by construction may be established by ties to permanent reference monuments shown on the final map.

A permanent monument shall be no less substantial than the following:

a. An iron pipe of minimum two inch diameter not less than 610mm (2') in length placed upright in the ground so that the top of said pipe is flush with the surface. Said pipe shall be filled with a metal or cement plug at least three inches in depth and centered with a metal tack and disc; or

b. A metal plug with tack and disc set flush with the surface in portland cement concrete sidewalk, curb or pavement; or other monument satisfactory to the City Engineer or County Surveyor. The metal plug shall be anchored 25mm (1") deep in sidewalk.

Lot corners and points of curves along street and alley right of way lines where portland cement concrete sidewalks, curbs or pavement exist, or will be constructed as part of the subdivision requirements, shall be identified with tack and disc set flush with the surface along an extension of the lot line at an approved offset, to be measured radially or at right angles to the right of way line in said sidewalk, curb pavement. In case the sideline of the lot is not radial or at right angles to the right of way line a disc shall be set along an extension of the sideline at an offset to be measured radially or at right angles to the right of way line. Where no such concrete work exists, and none will be required to be constructed, all lot corners, angle points and points of curve shall be marked with a monument no less substantial than a one-half inch steel rod or pipe, 457mm (18") long, set flush with the surface.

LEGEND



Fd 51mm (2") Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted



Fd Street Survey Monument Stamped RCE XXXX or LS XXXX



Set 51mm (2") x 610mm (24") Iron Pipe Marked RCE XXXX or LS XXXX



Set Lead and Disc Stamped RCE XXXX or LS XXXX



Set 13mm (1/2") x 457mm (18") Iron Pipe Marked RCE XXXX or LS XXXX



Set Street Survey Monument Stamped RCE XXXX or LS XXXX per Standard Drawing M-10

The addition of other symbols is permissible where such will result in a clearer map.

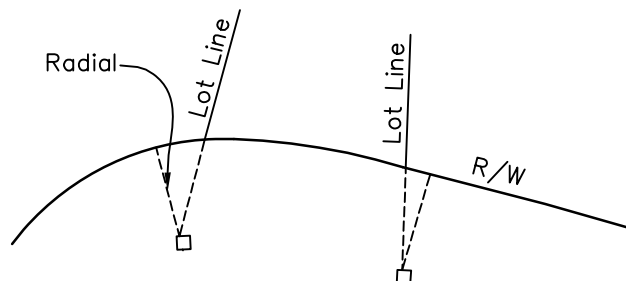
The following notes should be used in the legend where applicable.

Unless otherwise shown on this map:

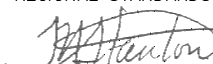
1. All lot corners except as described below will be monumented by a 13mm (1/2") by 457mm (18") iron pin stamped (RCE or LS number).

2. Lot corners along the sideline of dedicated street right of way will be monumented by a disc stamped (RCE or LS number), set along an extension of the lot line at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially, or at right angles, to the right of way line. (See example below.)

3. All points of curve of the sidelines of dedicated streets will be monumented by a disc stamped (RCE or LS number), set at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially.



EXAMPLE OF OFFSET DISCS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	SURVEY MONUMENTS		 Chairperson R.C.E. 19246 Date 3/10/2003
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
						DRAWING NUMBER M-13

1 Gram = 15.4324 grains
 1 Gram = 0.0353 oz.
 1 Kg. = 2.2046 lb.
 1 Kg. = 0.0011 ton
 1 Ton (met) = 1.1023 ton

WEIGHT

1 Grain = 0.0648 g.
 1 Once = 28.3495 g.
 1 Pound = 0.4536 kg.
 1 Ton = 907.1848 kg.
 1 Ton = 0.9072 ton (met)

1 Sq. cm. = 0.1550 sq. in.
 1 Sq. m. = 10.7639 sq. ft.
 1 Sq. m. = 1.1960 sq. yd.
 1 Hectare = 2.4710 acres
 1 Sq. km. = 0.3861 sq. mile
 1 Sq. km. = 247.10 acres

AREA

1 Sq. in. = 6.4516 sq. cm.
 1 Sq. ft. = 0.0929 sq. m.
 1 Sq. yd. = 0.8361 sq. m.
 1 Acre = 0.4047 hectare
 1 Sq. mile = 2.5900 sq. km.
 1 Acre = 0.0040 sq. km.

1 Cu. cm. = 0.0610 cu. in.
 1 Cu. m. = 35.3134 cu. ft.
 1 Cu. m. = 1.3079 cu. yd.

VOLUME

1 Cu. in. = 16.3872 cu. cm.
 1 Cu. ft. = 0.0283 cu. m.
 1 Cu. yd. = 0.7646 cu. m.

1 Liter = 61.0250 cu. in.
 1 Liter = 0.0353 cu. ft.
 1 Liter = 0.2642 gal. (U.S)
 1 Liter = 0.0284 Bu.

CAPACITY

1 Cu. in. = 0.0164 liter
 1 Cu. ft. = 28.3162 liters
 1 Gal. = 3.7853 liters
 1 Bu. = 35.2383 liters

1 MM. = 0.0394 in.
 1 CM. = 0.3937 in.
 1 Meter = 3.2808 ft.
 1 Meter = 1.0936 yd.
 1 Km. = 0.6214 mile

LENGTH

1 In. = 25.4000 mm.
 1 In. = 2.5400 cm.
 1 Ft. = 0.3048 m.
 1 Yd. = 0.9144 m.
 1 Mile = 1.6093 km.

MULTIPLE
 1000000
 1000
 100
 10

PREFIX
 mega
 kilo
 hecto
 deka

METRIC PREFIX

MULTIPLE
 1/10
 1/100
 1/1000
 1/1000000

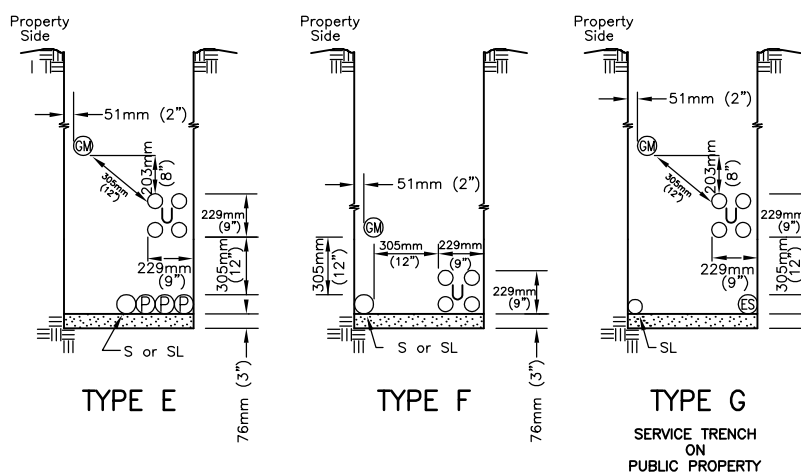
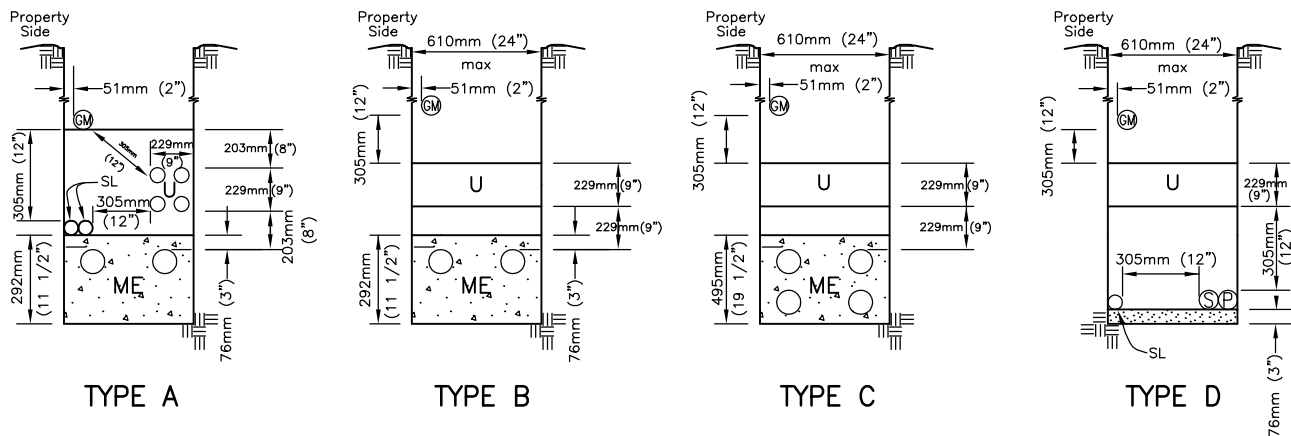
PREFIX
 deci
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 micro

TEMPERATURE

Degrees Fahrenheit = $9/5$ (Degrees Celsius) + 32

Degrees Centigrade = $5/9$ (Degrees Fahrenheit - 32)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75	METRIC EQUIVALENTS		 3/01/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
Edited		T. Stanton	08/09				
						DRAWING NUMBER M-14	

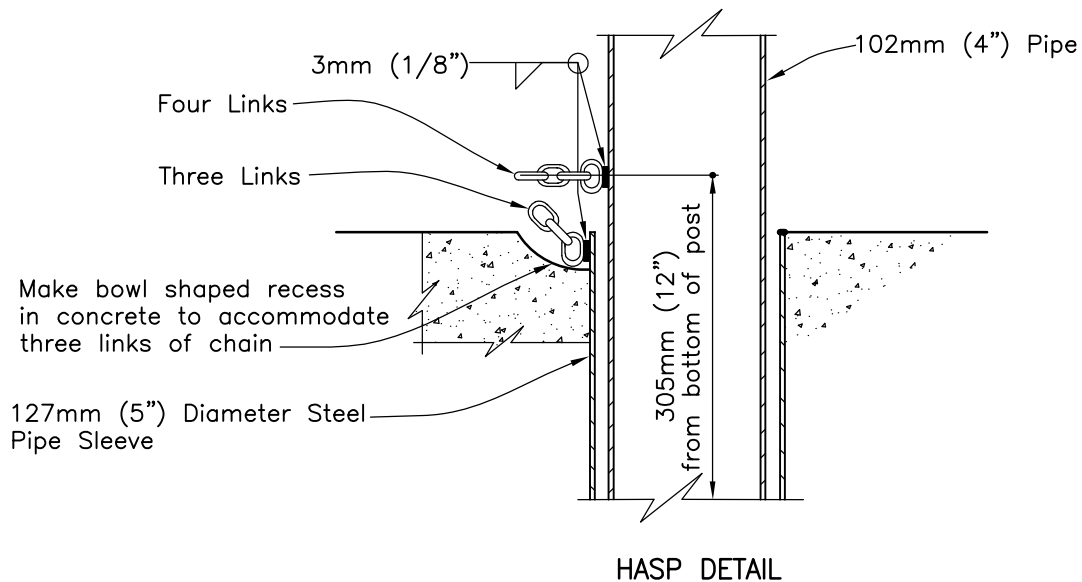
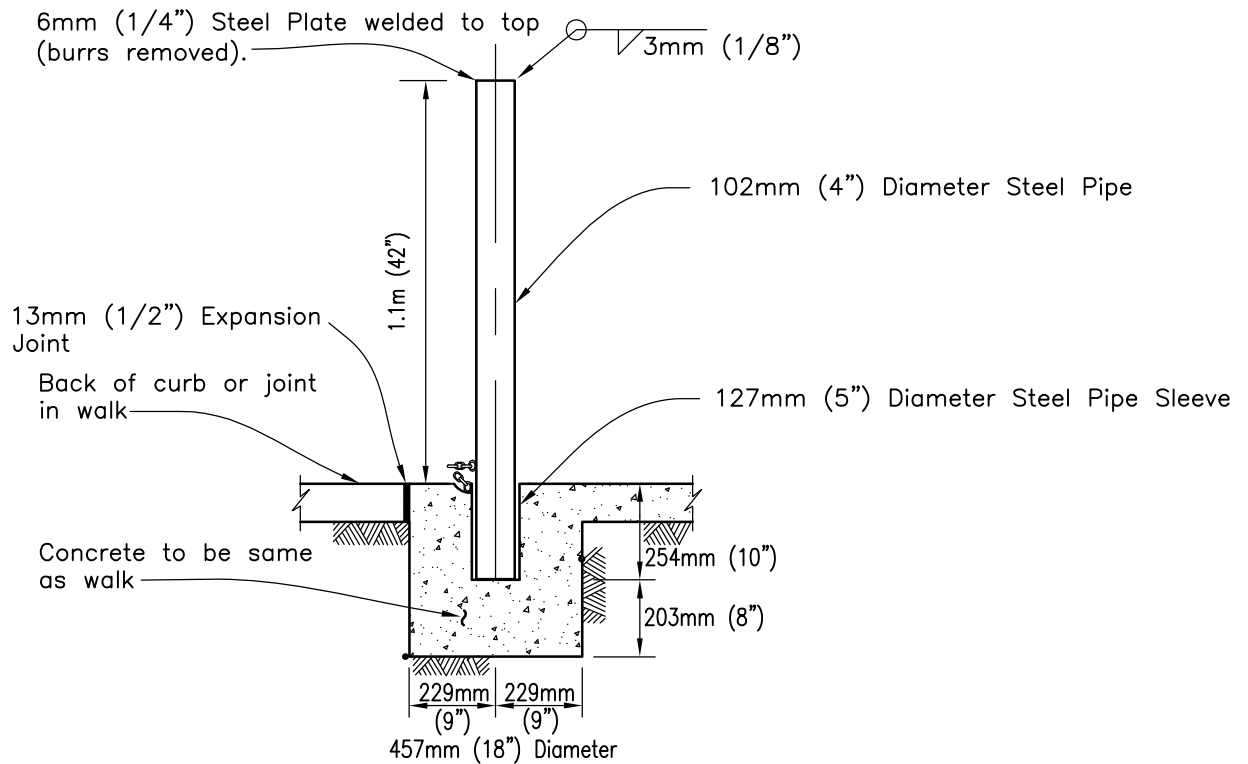


Legend		Minimum Cover
GM	Gas Main	762mm (30")
GS	Gas Service	762mm (30")
P	Primary Electric	1.1m (42")
S	Secondary Electric	762mm (30")
ES	Electric Service	762mm (30")
ME	Multiple Electric (P, S or ES in Spacers) Concrete Encased	610mm (24")
SL	Street Light (not series)	762mm (30")
U	CATV	610mm (24")
	TELCO	610mm (24")

NOTES

1. All dimensions are typical unless otherwise noted.
2. Generally utilities are to be installed under the applicable specifications for the particular utility and the specifications of the owner Agency.
3. The location of utilities as shown by the Standard Drawing shall in no way violate existing codes or regulations applicable to individual utilities.
4. Installation of sewer and/or water utilities are not permitted in the joint trenches shown above.
5. Minimum depth of gas pipe may, subject to gas company inspectors approval, be reduced to 610mm (24") where necessary to clear structure crossings.
6. Depth and width of trench varies.
7. CATV main or trunk line conduit required along all streets, except cul-de-sac streets less than 305m (1,000') in length which may be served by feeder lines only.
8. CATV 38mm (1-1/2") feeder conduit shall run across streets with each power service line and capped at edge of sidewalk.
9. All CATV terminals and conduits shall be terminated at generally accepted locations and marked. A map shall be filed with the appropriate agency showing the locations of the CATV system.
10. In no case shall CATV conduits be placed within 305mm (12") of gas lines, also conduits are not to be placed directly over gas lines.
11. Catv conduit may be placed with the TELCO conduit provided the TELCO minimum depth is held.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	9/88	JOINT TRENCH LOCATIONS		 3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03			
Reviewed		T. Stanton	04/06			
						DRAWING NUMBER M-15

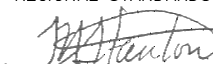


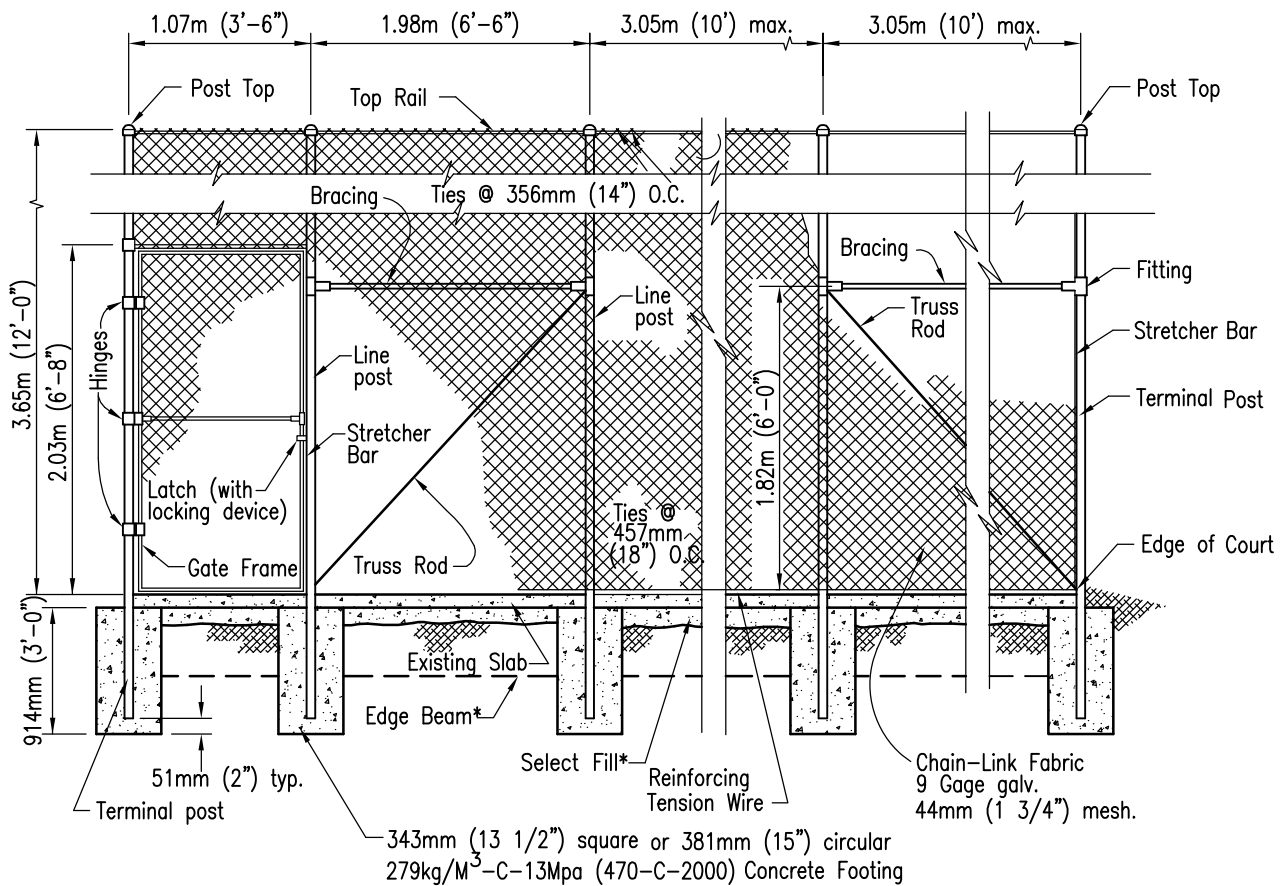
NOTES

1. Chain to be 6mm (1/4") proof coil chain galvanized steel.
Weld four links to post and three links to pipe sleeve.
2. All metal to be hot-dip galvanized after fabrication.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Solomon	7/79		
Add Metric		T. Stanton	03/03	DEMOUNTABLE POST	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-16



* For Edge Beam, Slab, and Select Fill details, see plans.

ELEVATION

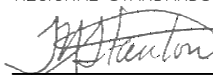
DESCRIPTION	MIN. SIZE IN KILOGRAMS / (INCHES)	MIN. WEIGHT PER LIN FT IN KILOGRAMS / (LBS).
Line Post	60mm (2.375) O.D.	1.65kg (3.65)
Terminal Post	73mm (2.875) O.D.	2.63kg (5.79)
Top Rail	42mm (1.660) O.D.	1.03kg (2.27)
Bracing	42mm (1.660) O.D.	1.03kg (2.27)
Gate Frame	42mm (1.660) O.D.	1.03kg (2.27)

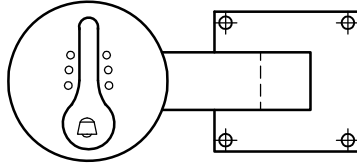
NOTE:

Chain link fabric shall be erected on the interior side of the courts.

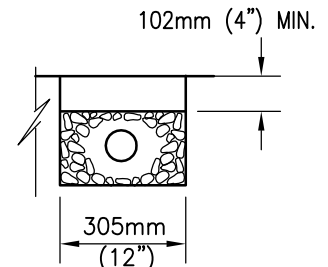
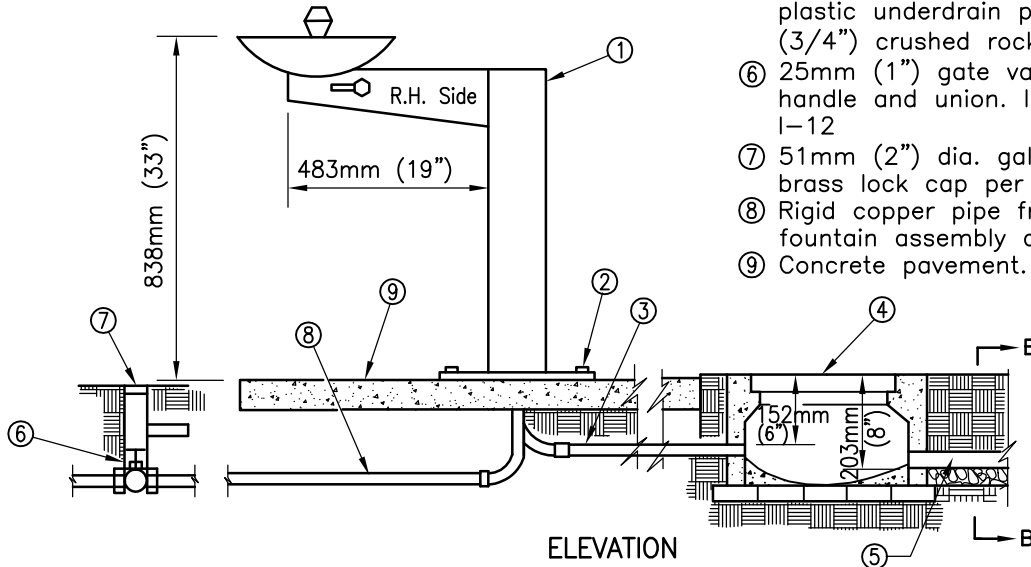
CAUTION:

This Standard Drawing is not to be used if any wind screen is to be applied to the fence.

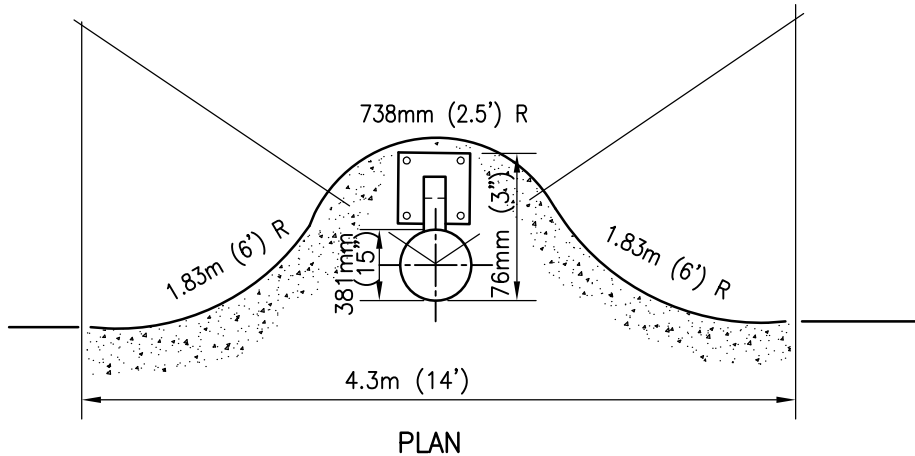
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Solomon	7/79	TENNIS COURT FENCE CHAIN LINK		 3/10/2003 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER M-17	



- ① Drinking Fountain – Haws model 3376 or approved equal.
- ② 10mm (3/8") dia. Expansion anchors with flat (recessed heads) screws 4 places.
- ③ 32mm (1 1/4") P.V.C. pipe with sweep 90° ell connection to fountain drain.
- ④ 241mm (9 1/2") x 406mm (16") concrete yard box with hinged locking top (Brooks No. 3HL or equal) set on red brick foundation.
- ⑤ 102mm (4") x 12.2m (40') perforated plastic underdrain pipe, encased in 19mm (3/4") crushed rock.
- ⑥ 25mm (1") gate valve with red brass cross handle and union. Install as per Std. Dwg. I-12
- ⑦ 51mm (2") dia. galv. pipe sleeve with red brass lock cap per Std. Dwg. I-12
- ⑧ Rigid copper pipe from gate valve to fountain assembly connection.
- ⑨ Concrete pavement.



SECTION B-B



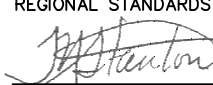
PLAN

NOTES

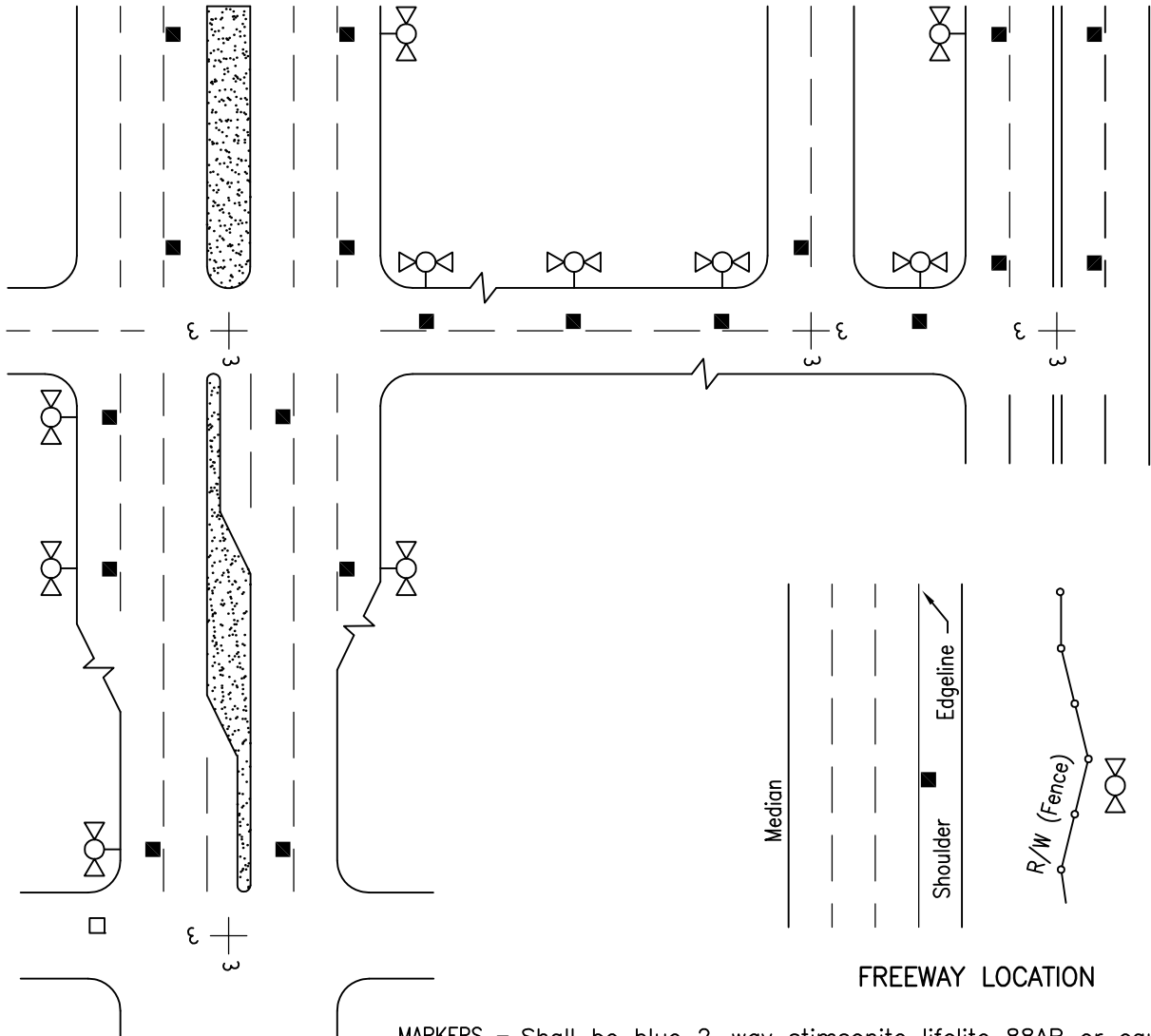
1. Install fountain so that right hand side faces prevailing wind.
2. Hand form a concrete bowl at bottom of yard box to facilitate sand clean out.
3. Perforated drain pipe and trench are to drain away from fountain at 1% min. slope. Keep drain in lawn areas.
4. Item no. 6 is a 25mm (1") gate valve. Use red brass bushing reducers to adapt to feed pipe.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		H. Hecht	10/82		
Add Metric		T. Stanton	03/03	DRINKING FOUNTAIN	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-18

STREET LOCATIONS



FREEWAY LOCATION

152mm (6") Traffic stripe

Marker ■
DETAIL

MARKERS - Shall be blue 2-way stimsonite lifelite 88AB or equal.

ADHESIVE - An ample amount of two (A&B) epoxy or equal.

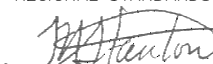
SURFACES - Clean and dry prior to installation per manufacturer's recommendations. Install markers with reflective surfaces facing oncoming vehicles and offset 51mm (2") from lane lines toward fire hydrant.

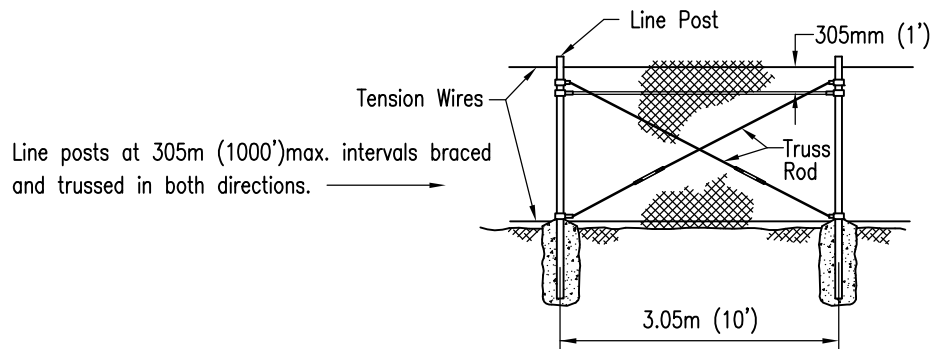
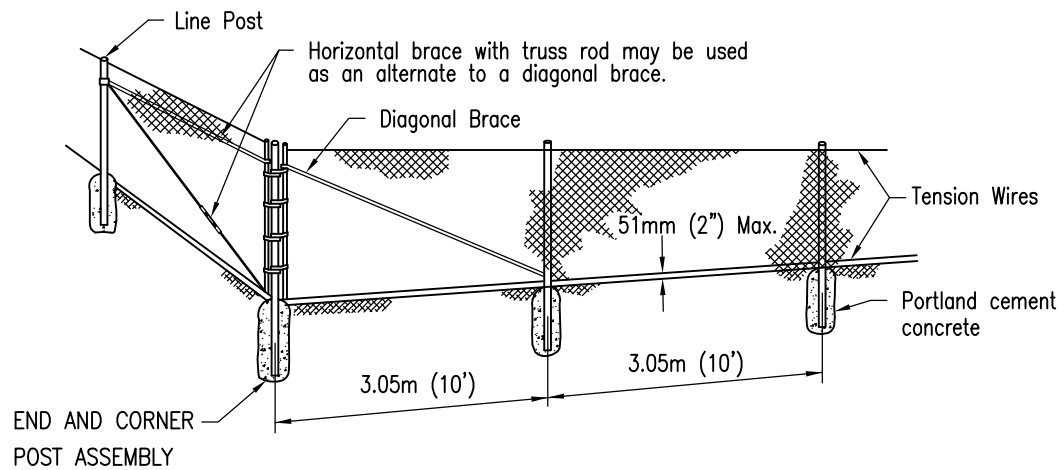
NOTES

1. Fire Department will provide location(s) for all markers in PRD's, Commercial Lots and other areas outside of Public Right of Way.
2. Markers must be installed at the new and relocated hydrants and within all resurfacing projects.
3. For streets without lane lines or streets with raised pavement markers and no painted lane lines, install markers 152mm (6") from centerline or existing markers.

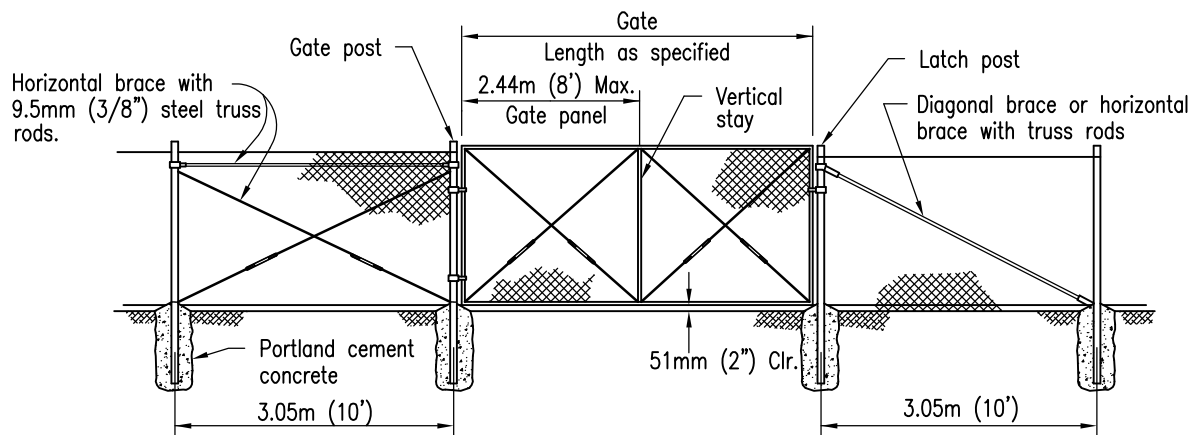
LEGEND ON PLANS

Marker ■
Fire Hydrant

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
ORIGINAL		H. Hecht	10/82	FIRE HYDRANT MARKERS	
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				 3/10/2003 Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER M-19	

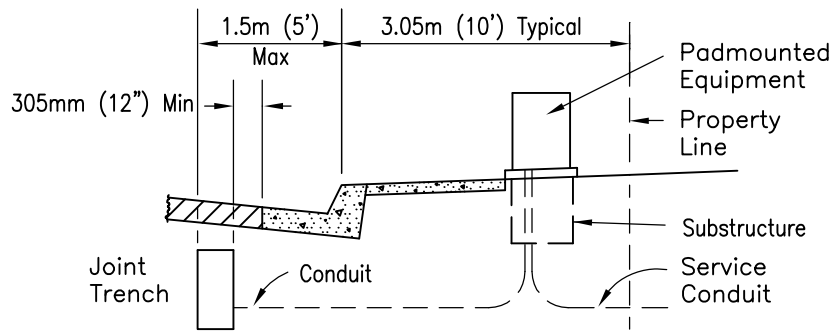


LINE POST BRACING

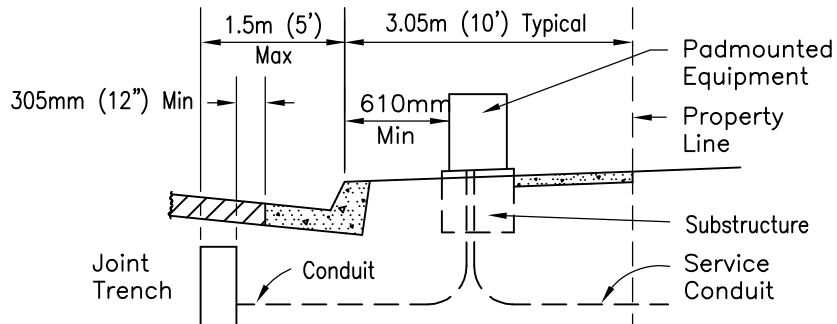


GATE ASSEMBLY

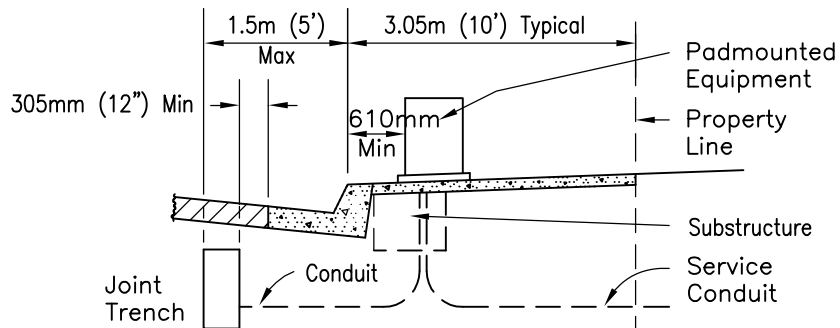
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Bahmanian	4/86	CHAIN LINK FENCE DETAILS		<i>T. Stanton</i> 3/01/2003
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06			DRAWING NUMBER M-20



SIDEWALK NEXT TO CURB



SIDEWALK NEXT TO PROPERTY LINE

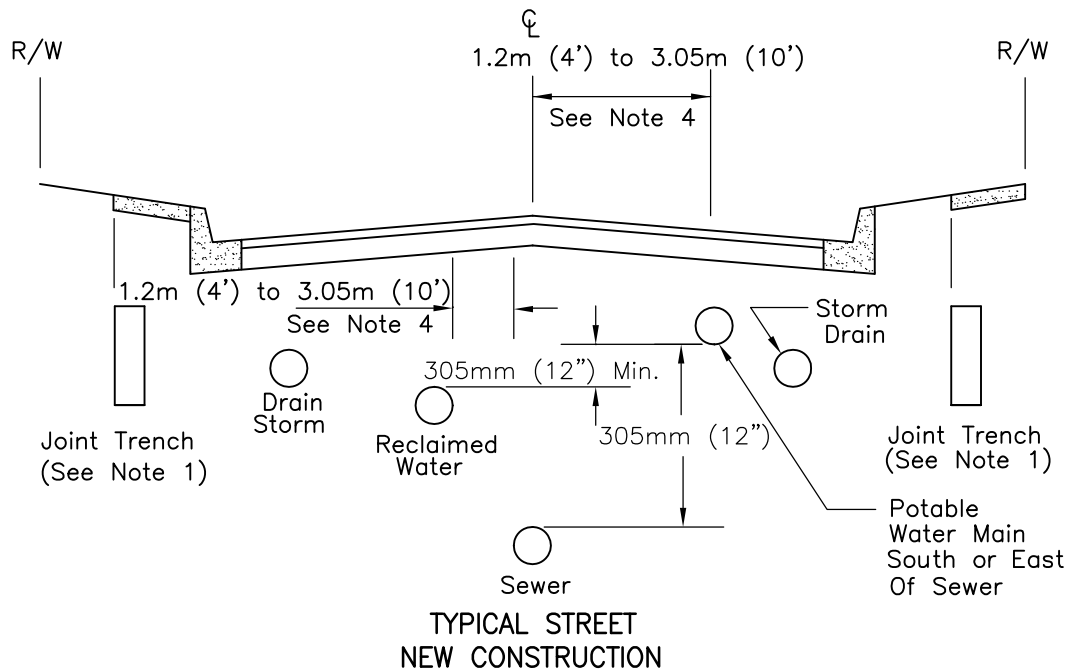
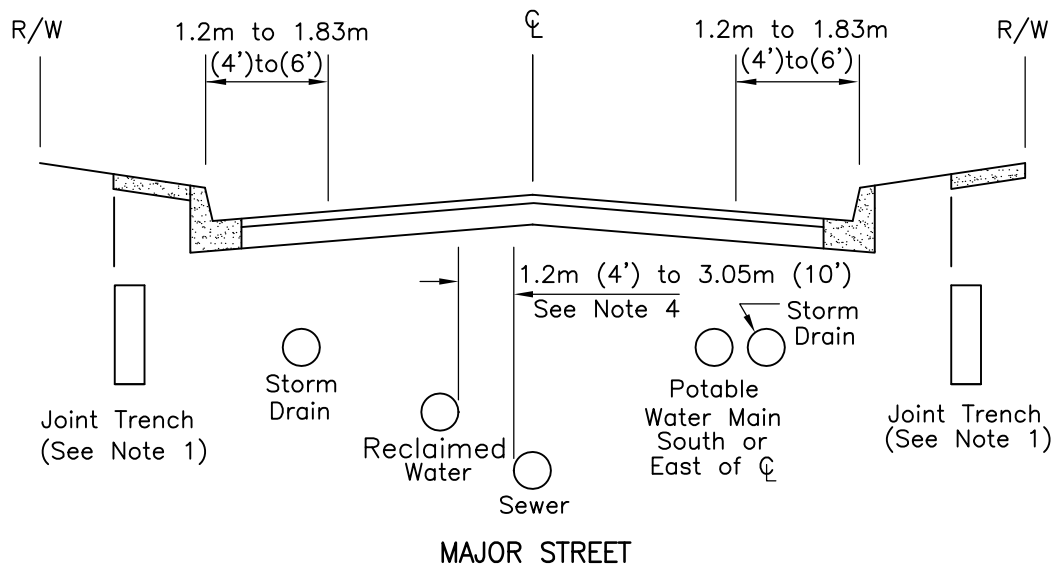


SIDEWALK NEXT TO CURB AND PROPERTY LINE

NOTES

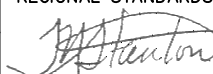
1. Sidewalk shall have a minimum of 1.2m (4') clear area (path, not including curb) passing pedestals, pullboxes and other structures.
2. See Standard Drawing M-15 for joint trench.

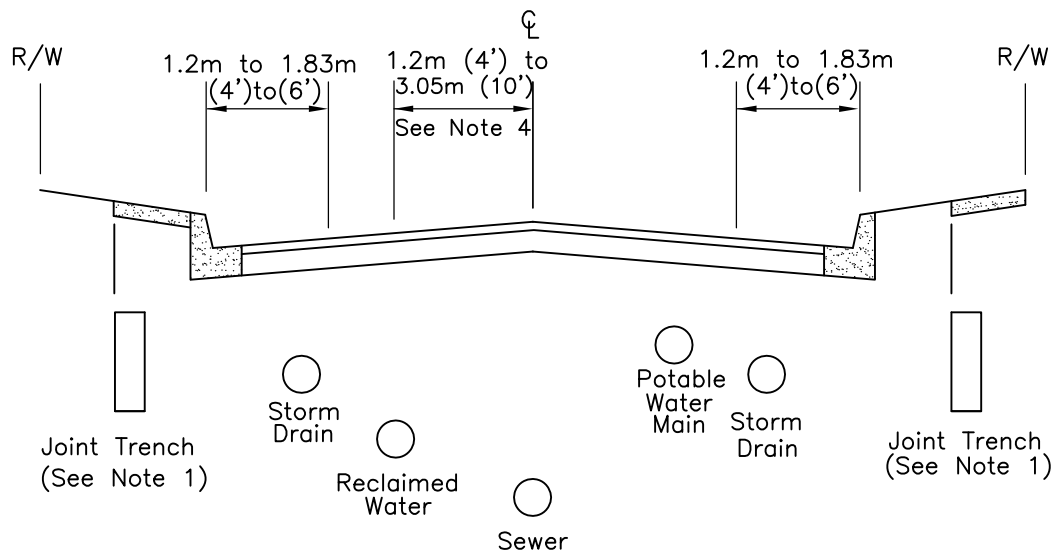
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	9/88		
Add Metric		T. Stanton	03/03	UNDERGROUND TYPICAL LOCATION CONVERSION/REPLACEMENT/UPGRADE	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-21



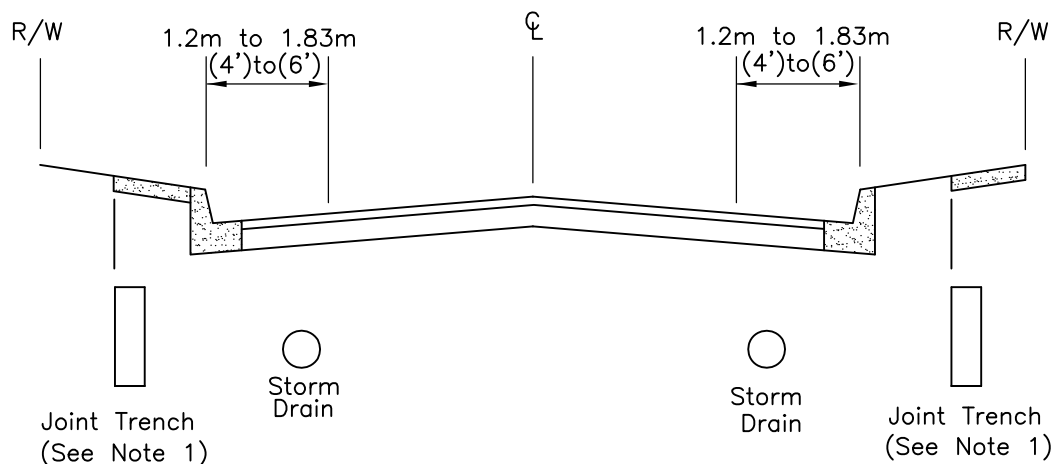
NOTES

1. At catch basin locations, joint trench shall be 1.2m (4'). minimum from back of curb to inside wall of trench. See Standard Drawing M-15 for configuration of utilities in joint trench.
2. Sewer and reclaimed water mains shall be designed to cross under potable water mains. The vertical separation between potable water and reclaimed water shall be a minimum of 305mm (12").
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 305mm (12").
4. Sewer and reclaimed water mains shall maintain a 3.05m (10'). minimum horizontal separation, O.D. to O.D., with any potable water or sewer/reclaimed main. This separation may be reduced utilizing special construction, with special approval from the Agency and the County Health Dept. For sewer or reclaimed water mains less than 610mm (24") in diameter, only Agency approval is required.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Parkinson	2/95		UTILITY LOCATIONS LOCAL AND MAJOR STREETS	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING		M-22
				NUMBER		



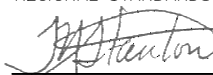
PRIME ARTERIAL

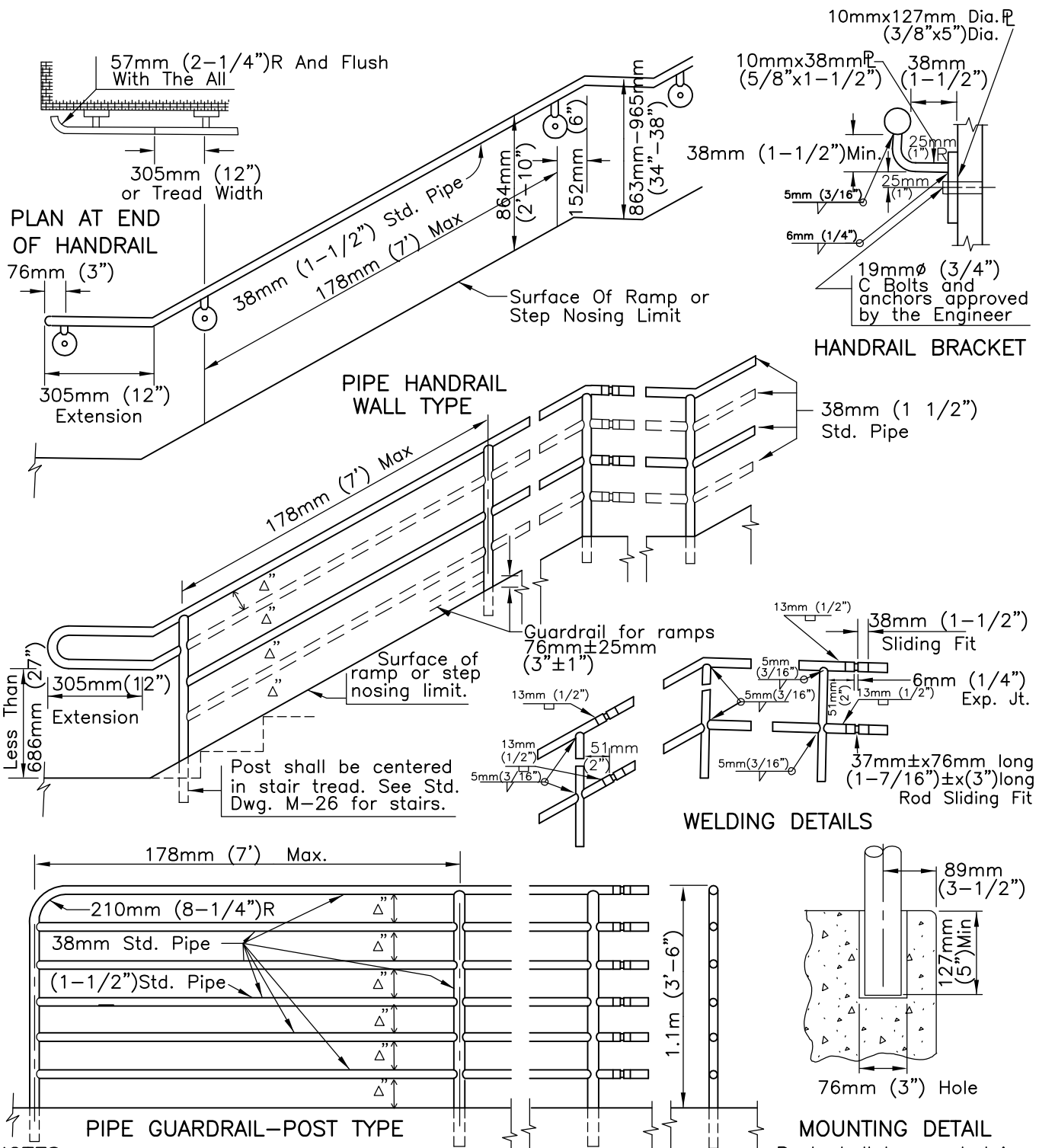


EXPRESSWAY

NOTES

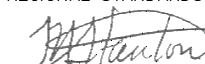
1. At catch basin locations, joint trench shall be 1.2m (4'). minimum from back of curb to inside wall of trench. See Standard Drawing M-15 for configuration of utilities in joint trench.
2. Sewer and reclaimed water mains shall be designed to cross under potable water mains. The vertical separation between potable water and reclaimed water shall be a minimum of 305mm (12").
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 305mm (12").
4. Sewer and reclaimed water mains shall maintain a 3.05m (10'). minimum horizontal separation, O.D to O.D., with any potable water or sewer/reclaimed main. This separation may be reduced utilizing special construction, with special approval from the Agency and the County Health Dept. For sewer or reclaimed water mains less than 610mm (24") in diameter, only Agency approval is required.

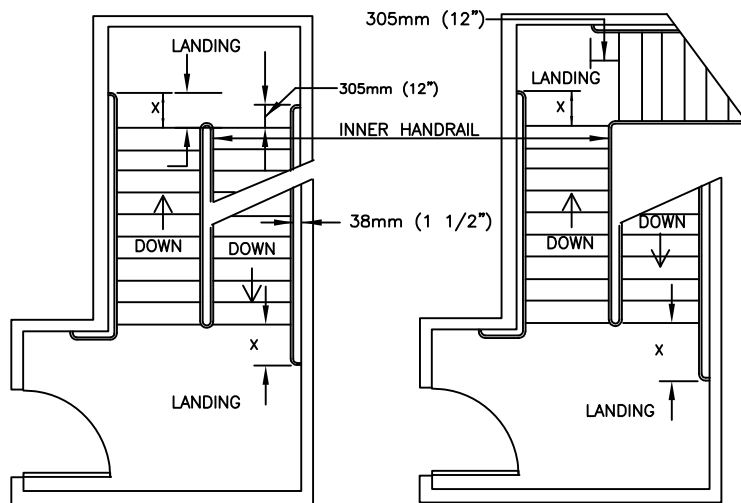
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G. Parkinson	2/95	UTILITY LOCATIONS PRIME ARTERIALS AND EXPRESSWAYS		 3/01/2003	Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER	M-23



NOTES

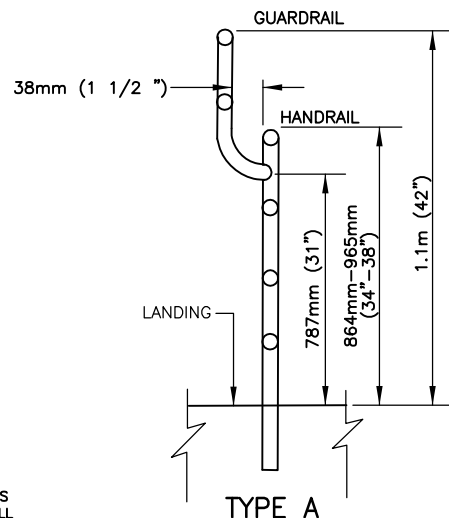
1. 6mm (1/4") Expansion joints @ 4.9m (16') ± centers.
2. Weld and grind smooth all connections.
3. All railing to be hot dip galvanized after fabrication.
4. Pipe shall seamless steel ASTM A53 Grade B.
5. Maximum = Δ102mm (4"). Guardrails and handrails for stairs and ramps more than 762mm (30") above have intermediate rails equally spaced such that a sphere 102mm (4") in diameter cannot pass through.
6. Handrail extension for stairs, at all bottom risers, shall be 305mm (12") plus one tread width.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G. Parkinson	2/95		
Add Metric		T. Stanton	03/03	PEDESTRIAN PROTECTIVE RAILING DETAILS No. 1	 Chairperson R.C.E. 19246 Date 3/01/2003
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-24

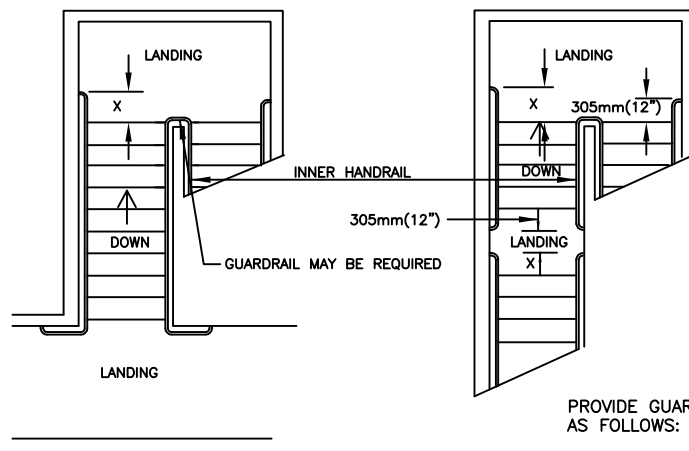


X IS THE MINIMUM HANDRAIL EXTENSION OF 12 INCHES PLUS THE WIDTH OF ONE TREAD AT EACH BOTTOM RISER.

NOTE: INNER HANDRAIL AT LANDINGS OF STAIRS THAT DOUBLE BACK OR IMMEDIATELY TURN SHALL BE CONTINUOUS, AND SHALL NOT EXTEND ONTO LANDING OR PATH OF TRAVEL.



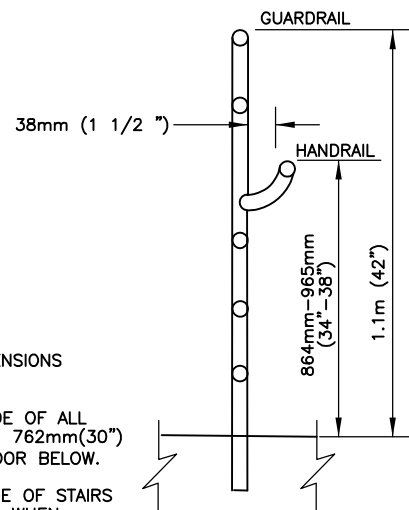
TYPE A
GUARDRAIL EXTENSION



STAIR HANDRAILS

PROVIDE GUARDRAIL EXTENSIONS AS FOLLOWS:

1. TYPE A ON OPEN SIDE OF ALL LANDINGS MORE THAN 762mm(30") ABOVE GRADE OR FLOOR BELOW.
2. TYPE B ON OPEN SIDE OF STAIRS (INCLUDING LANDINGS) WHEN SPECIFIED.

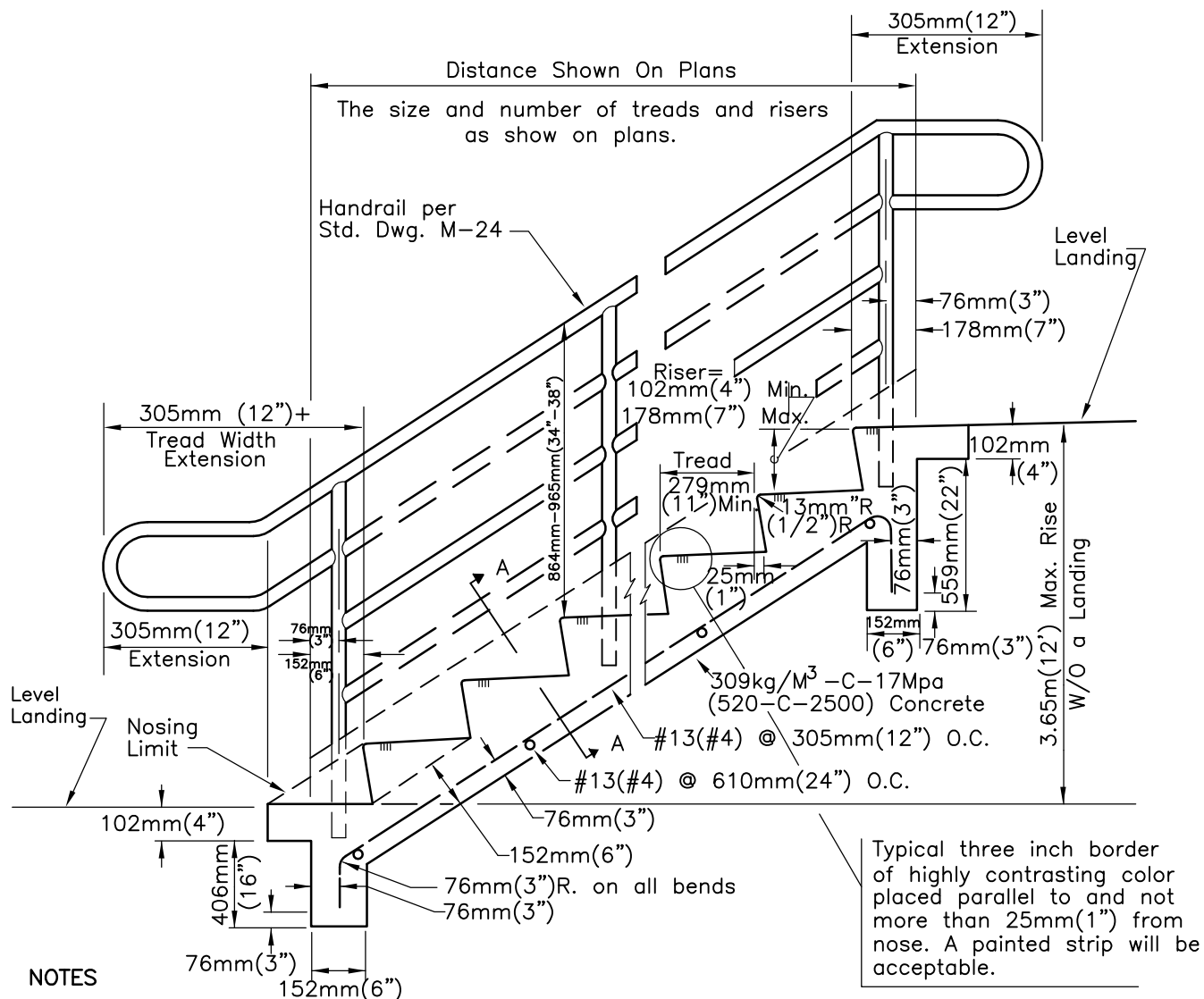


TYPE B
GUARDRAIL EXTENSION

NOTES

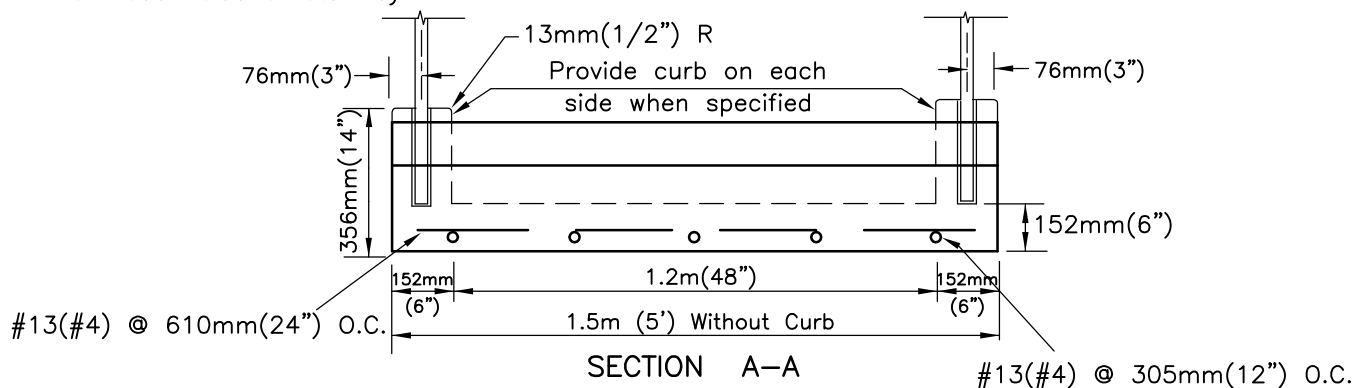
1. Post type guardrails, and handrails for stairs or landings 762mm(30") or less above grade or floor below shall have only one intermediate rail centered between the step nosing limit (or if specified the top of curb) and top of railing.
2. Post type guardrails, and handrails for stairs or landings more than 762mm(30") above grade or floor below shall have intermediate rails equally spaced such that a sphere 102mm(4") in diameter cannot pass through.
3. Where handrail extensions interfere with transverse walkways the horizontal portions shall not encroach but be turned away from stairs and parallel to walkway.
4. The top of guardrails for stairways, exclusive of their landings, may have a height as specified for handrails.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G.Parkinson	2/95	PEDESTRIAN PROTECTIVE RAILING DETAILS No. 2		 Chairperson R.C.E. 19246 Date	
Add Metric		T. Stanton	03/03				
Reviewed		T. Stanton	04/06				
						DRAWING NUMBER M-25	

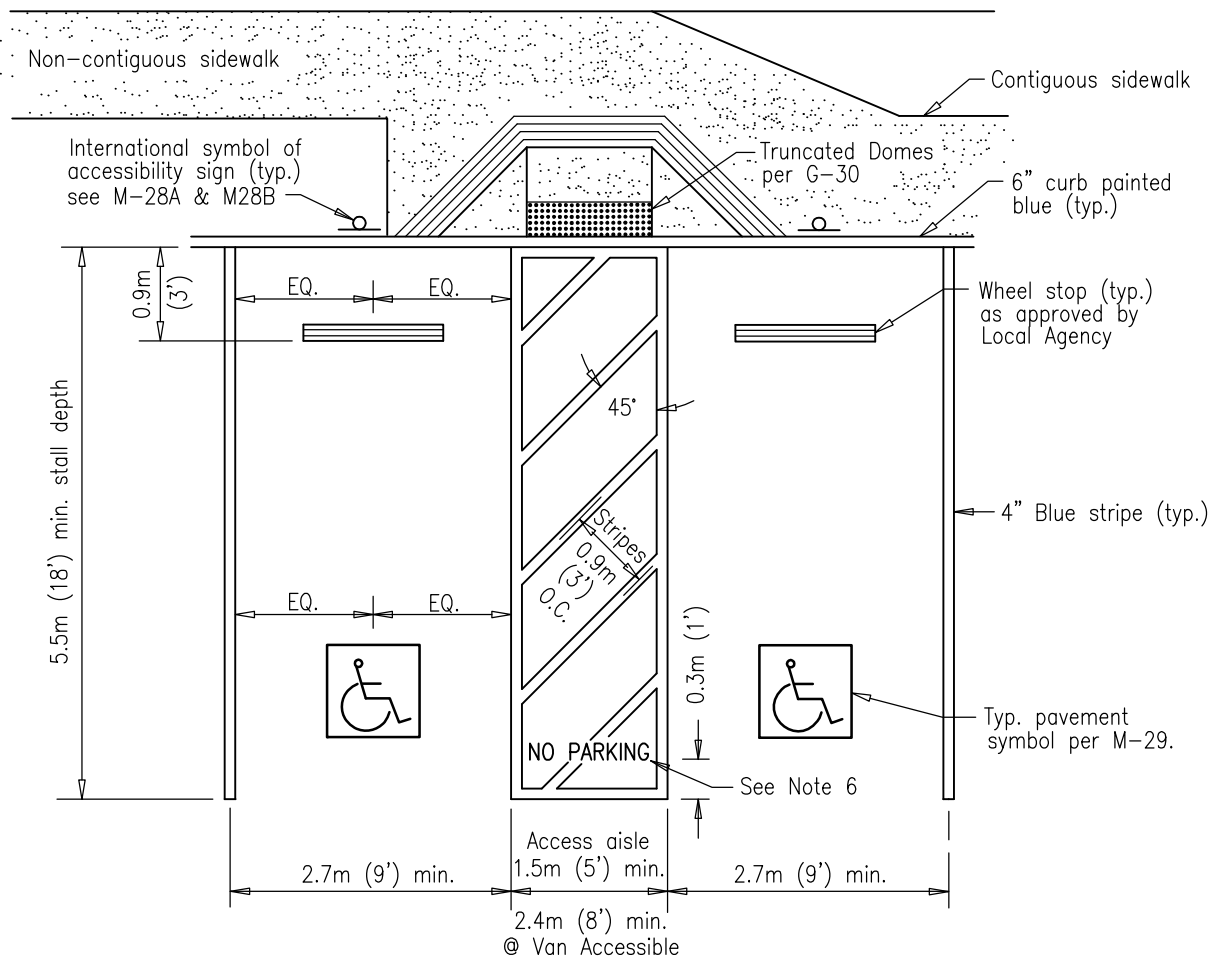


NOTES

1. Broom finish on treads, trowel finish on all other exposed surfaces.
2. 6mm (1/4") per 305mm (1') slope on treads for drainage.
3. Locate handrails on both sides.
4. Handrail may project into the required width a distance of 89mm (3-1/2") from each side of stairway.

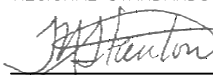


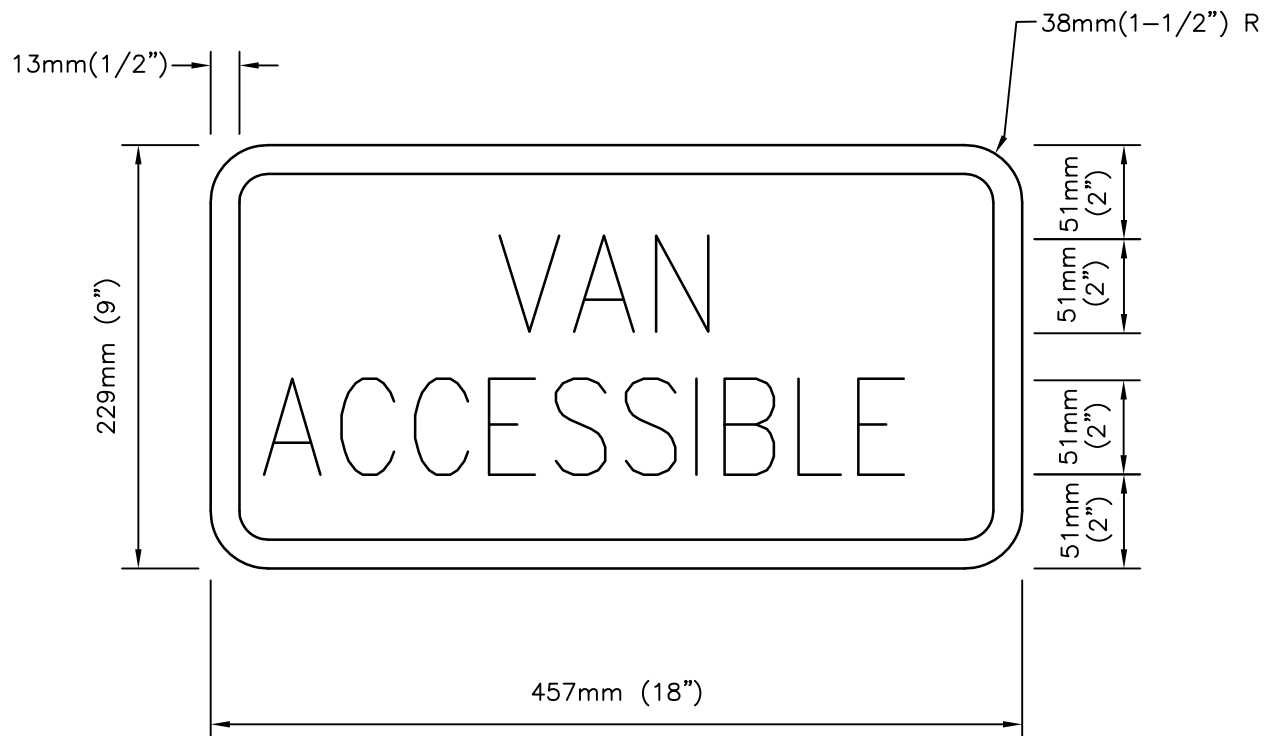
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	2/95		
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		
				CONCRETE STEPS	 3/01/2003
					Chairperson R.C.E. 19246 Date
					DRAWING NUMBER M-26



NOTES:

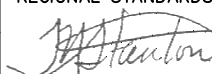
1. Provide for adequate drainage.
2. For appropriate ramp alternate to conform to topographical conditions, see standard drawings G-27 through G-30.
3. Blue color should match color No. 15090 in the Federal Standard 595a as specified in Section 522(b)2.
4. If only one accessible parking stall is going to be provided, the access aisle shall be 2.4m (8') (van accessible) and located on the passenger side.
5. Sidewalk cross slope shall not exceed 2.0%.
6. "NO PARKING" 12" high stencil marking, reflective white over blue stripes.

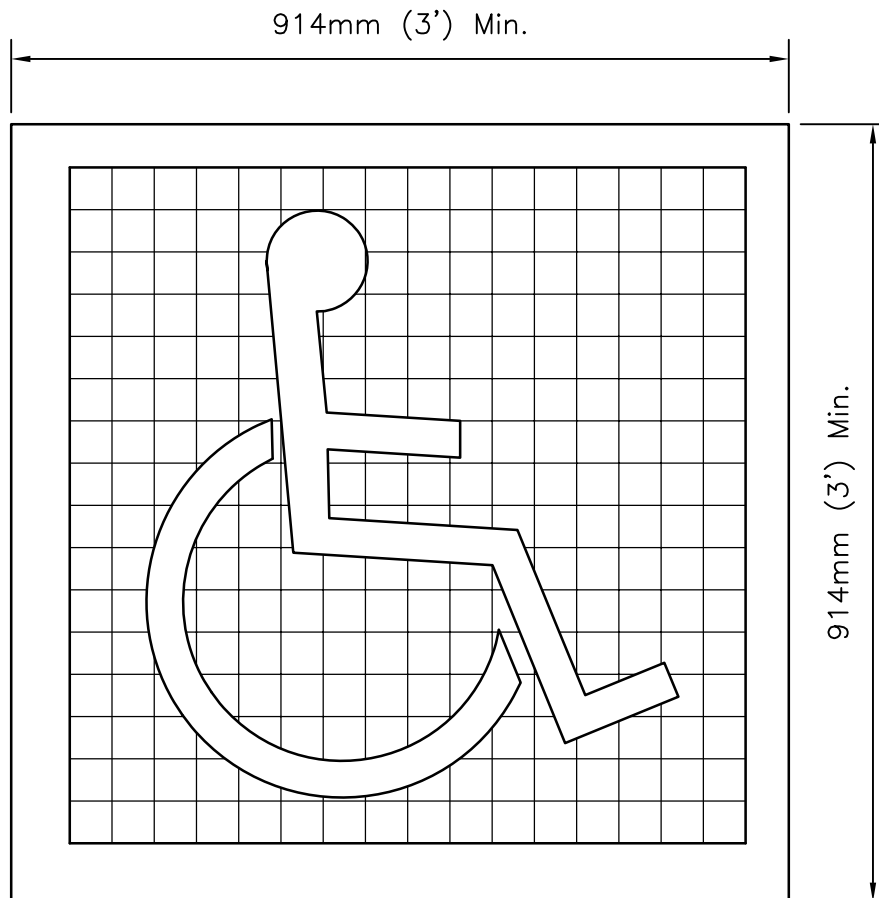
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	02/95		
Add Metric		T.Stanton	03/03	DISABLED PARKING STALL(S)	 04/27/2006 Chairperson R.C.E. 19246 Date
Update		D.Davis	04/06		
					DRAWING NUMBER M-27A



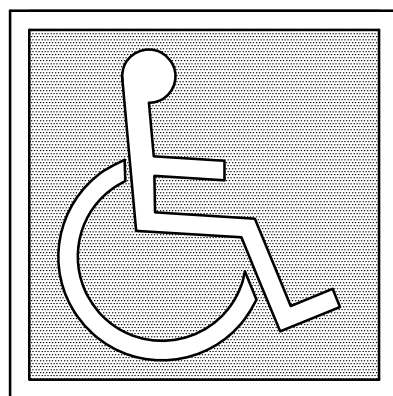
NOTES

1. Sign shall be constructed of aluminum, 1.57mm (0.062") minimum thickness.
2. Colors: Background—Reflectorized Blue
 Border and letters— Reflectorized White
 Blue color shall match color No. 15090 in the
 Federal Standard 595a as specified in Section 522(b)2.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G.Parkinson	2/95		VAN ACCESSIBLE SIGN FOR DISABLED PARKING SPACE	 3/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Reviewed		T. Stanton	04/06	DRAWING NUMBER		M-28B



(a) SYMBOL PROPORTIONS

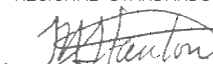


(b) DISPLAY CONDITIONS

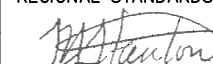
INTERNATIONAL SYMBOL
OF ACCESSIBILITY

NOTES

1. Pavement symbol shall be painted white on a blue background.
2. Blue color shall match color No. 15090 in the Federal Standard 595a as specified in Section 522(b)2.

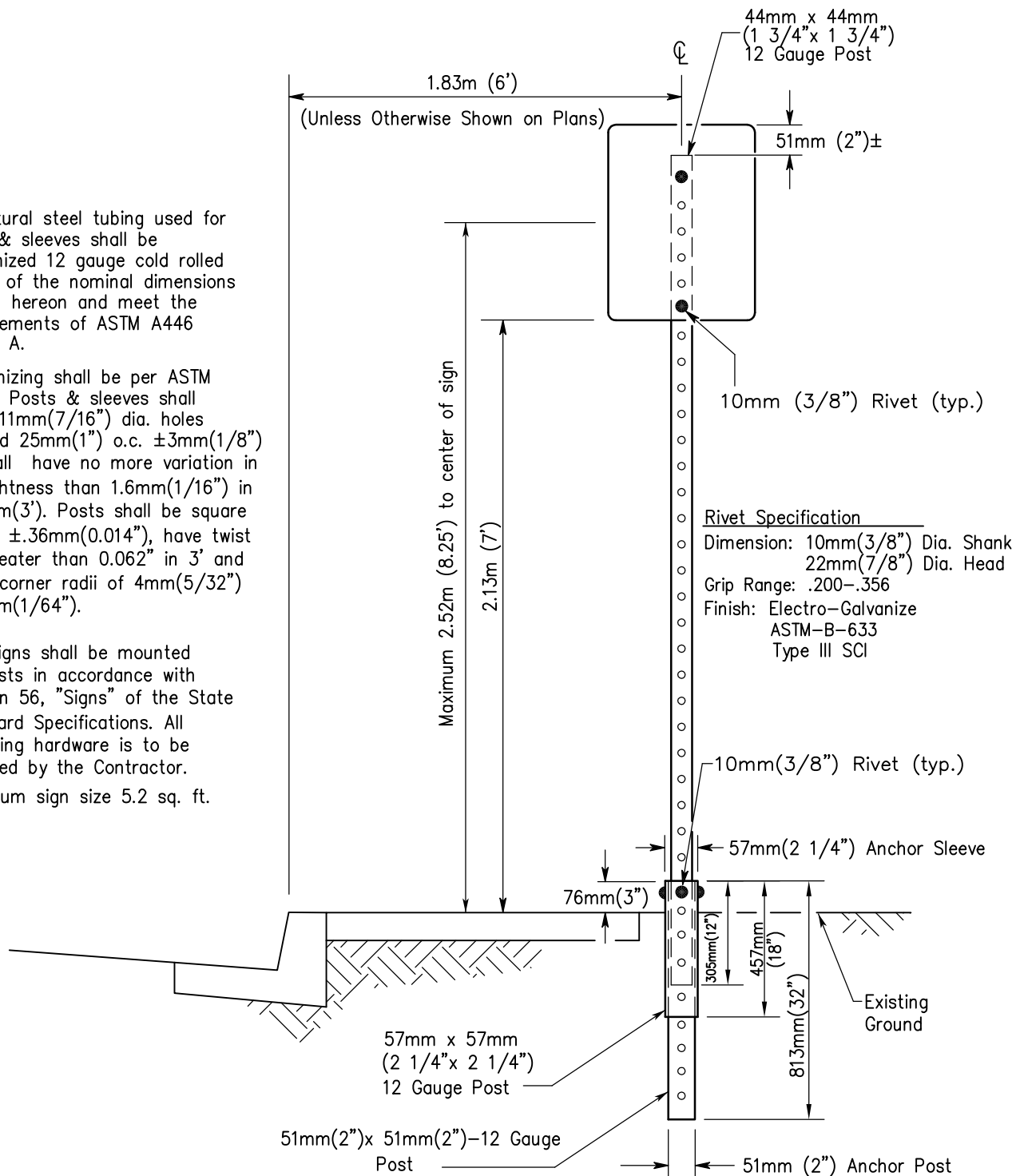
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G. Parkinson	2/95		
Add Metric		T. Stanton	03/03	PAVEMENT SYMBOL – DISABLED PARKING	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-29

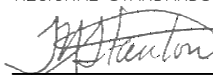
FOR GUARDRAIL STANDARDS USE:
Caltrans "Standard Plans for
Construction of Local
Streets and Roads"

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	5/92		 04/27/2006
Add Metric		T. Stanton	03/03	GUARD RAIL REFERENCE NOTE	
Remove GD Std. Dwgs.		T. Stanton	04/06		DRAWING NUMBER

NOTES

1. Structural steel tubing used for post & sleeves shall be galvanized 12 gauge cold rolled steel, of the nominal dimensions shown hereon and meet the requirements of ASTM A446 Grade A.
2. Galvanizing shall be per ASTM A525. Posts & sleeves shall have 11mm(7/16") dia. holes spaced 25mm(1") o.c. $\pm 3\text{mm}(1/8")$ & shall have no more variation in straightness than 1.6mm(1/16") in 914mm(3'). Posts shall be square within $\pm .36\text{mm}(0.014")$, have twist no greater than 0.062" in 3' and have corner radii of 4mm(5/32") $\pm .4\text{mm}(1/64")$.
3. The signs shall be mounted on posts in accordance with Section 56, "Signs" of the State Standard Specifications. All fastening hardware is to be provided by the Contractor.
4. Maximum sign size 5.2 sq. ft.

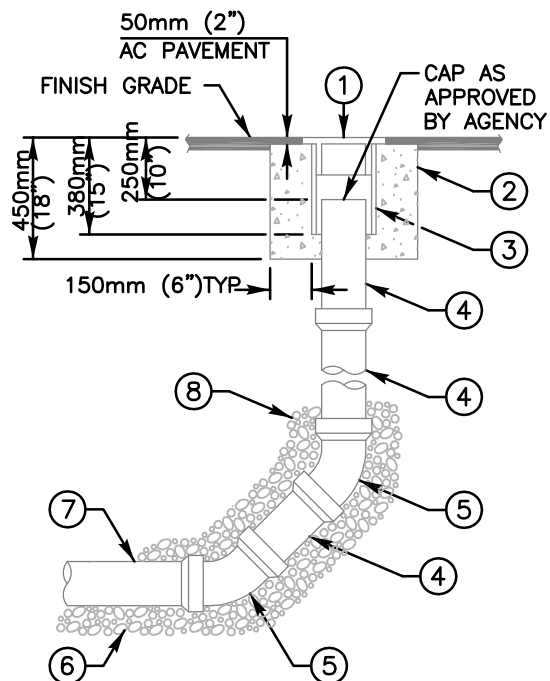


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	2/95		
Add Metric		T. Stanton	03/03	BREAK-AWAY SIGN POST	 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		
					DRAWING NUMBER M-45

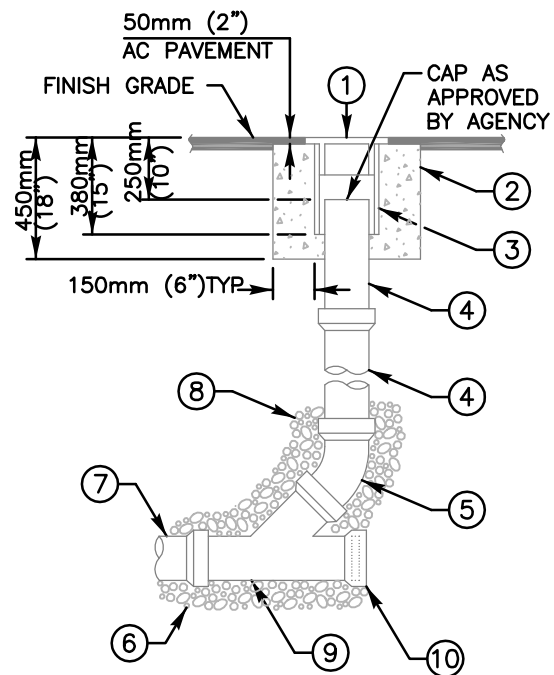
SEWERAGE SYSTEMS

SEWERAGE SYSTEMS

S



TYPE A
MAINS FOR 150mm (6")
AND 200mm (8")



TYPE B
SEWER LATERAL
CLEANOUT

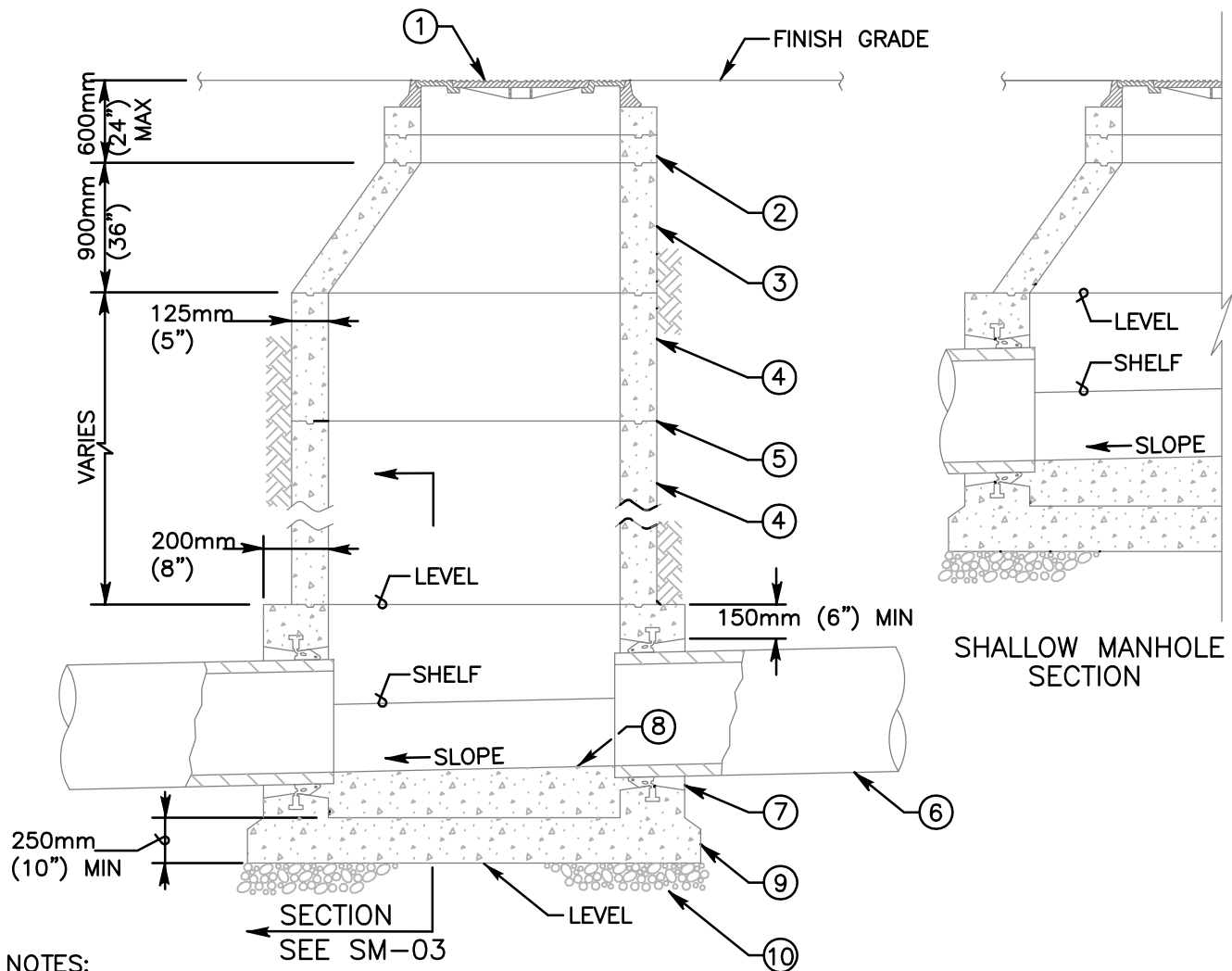
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CLEANOUTS TO BE INSTALLED AT THE END OF MAINS WHERE INDICATED ON THE PLANS
- 3) CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER MAIN UP TO 200mm (8")
- 4) BACKFILL TO TOP OF 45° BEND WITH 19mm (3/4") CRUSHED ROCK
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

— — — — —
LEGEND ON PLANS

ITEM NO		SIZE AND DESCRIPTION		ITEM NO		SIZE AND DESCRIPTION	
①	300mm (12") CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED	⑤	45° ELBOW	⑥	19mm (3/4") CRUSHED ROCK PIPE BEDDING	⑦	SEWER MAIN
②	CONCRETE RING	⑧	19mm (3/4") CRUSHED ROCK SEE NOTE 4	⑨	STANDARD WYE BRANCH	⑩	INSTALL PLUG AND CONCRETE LUG
③	300mm (12") PVC, C-900 x 380mm (15") LONG (CLEANOUT BOX)						
④	SIZE x REQUIRED LENGTH PVC PIPE						

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING SEWER CLEANOUT	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		 03/24/2005
Add Metric		T. Stanton	03/03		
Replaced S-03		J. Tomasulo	03/05		
				Chairperson R.C.E. 19246	Date
				DRAWING NUMBER	SC-01



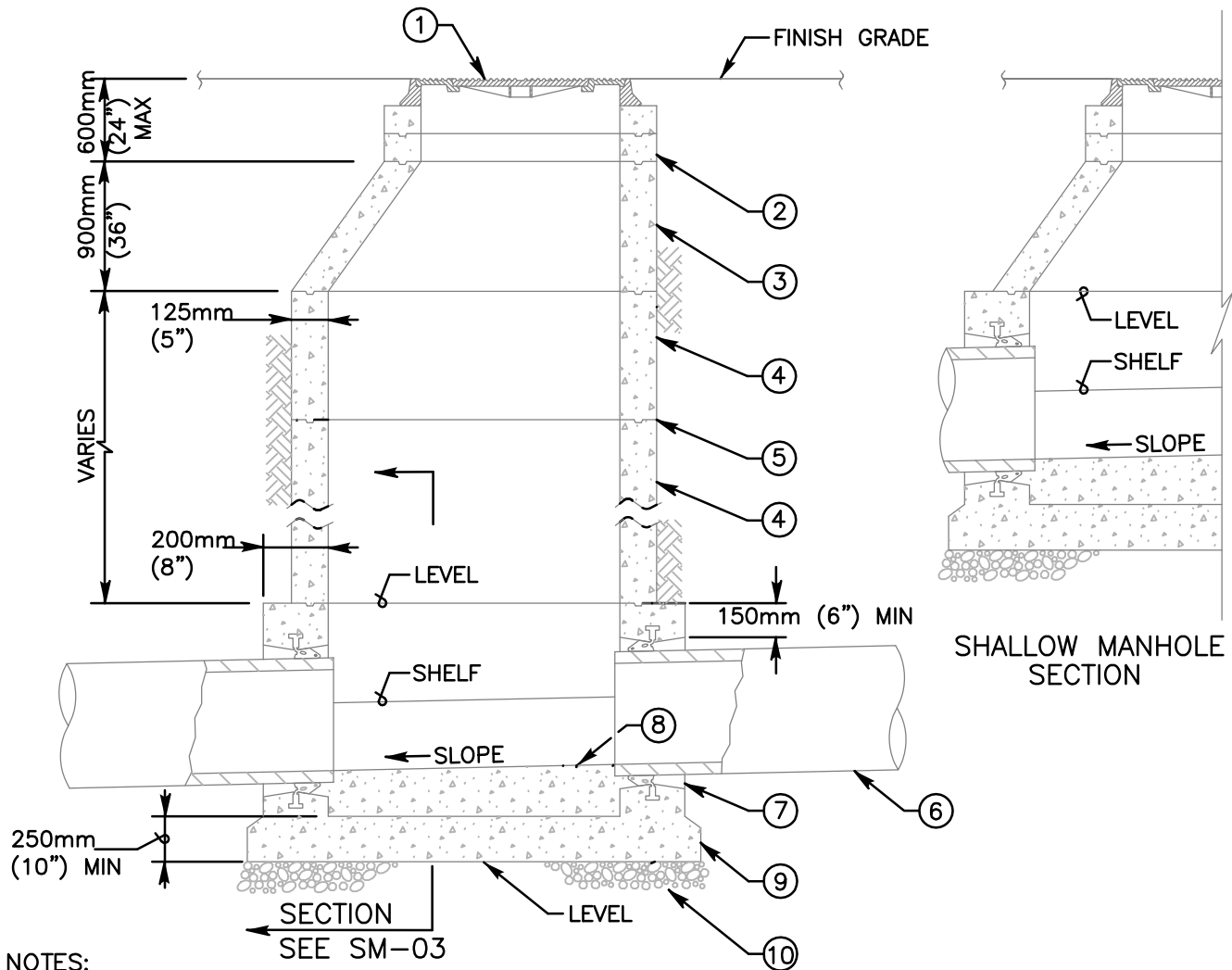
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

1200mm (48")

 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1200mm (48") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK
Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05
SAN DIEGO REGIONAL STANDARD DRAWING			
1200mm (48") DIAMETER PRECAST MANHOLE INSTALLATION			
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
 Chairperson R.C.E. 19246 Date 03/24/2005			
DRAWING NUMBER		SM-01	



NOTES:

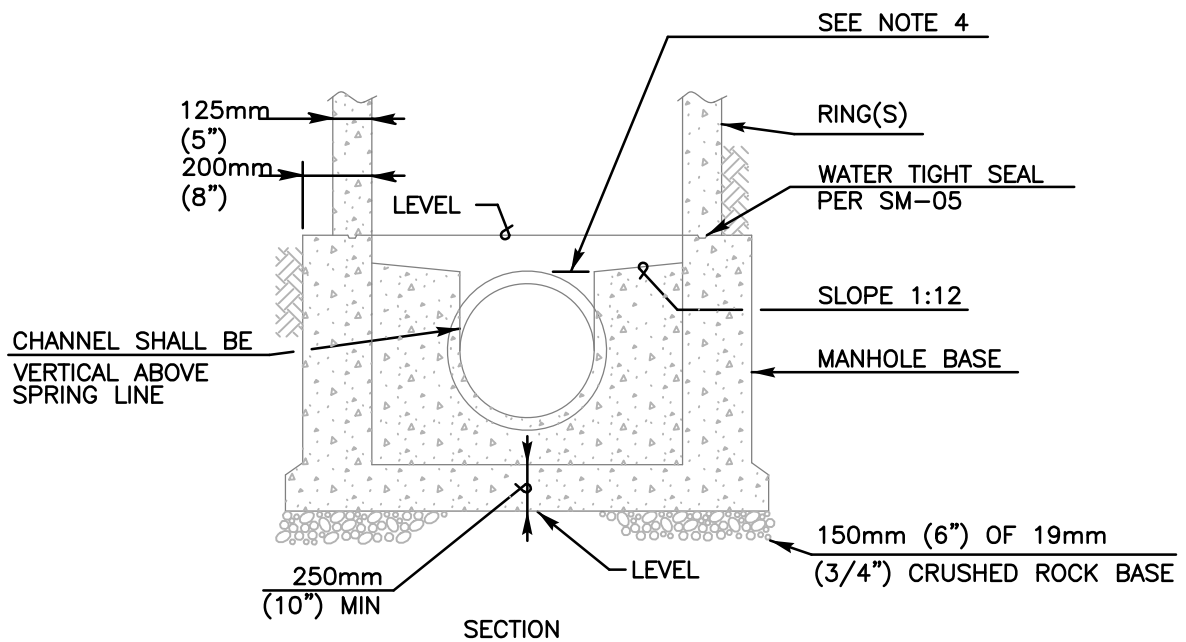
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

1500mm (60")

 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1500mm (60") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK

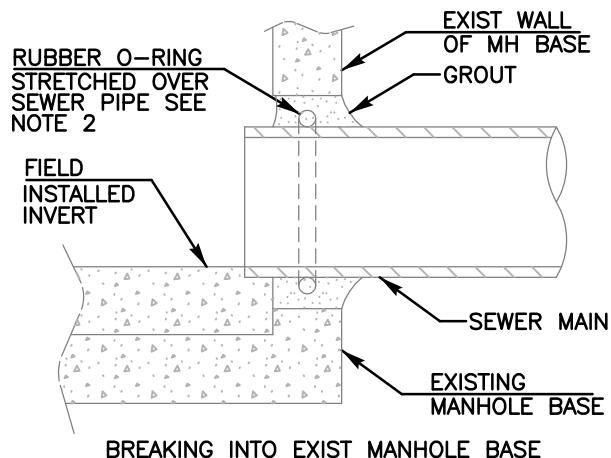
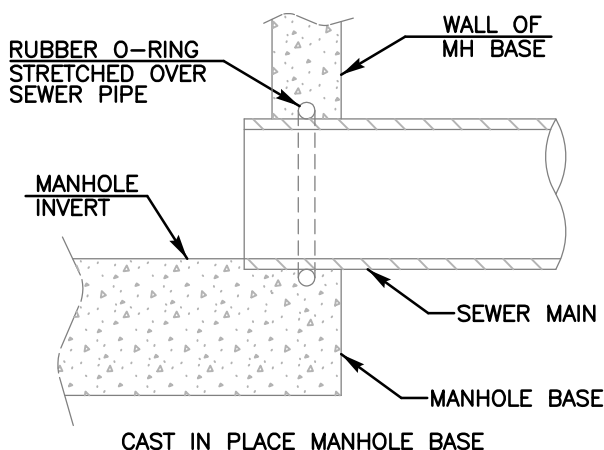
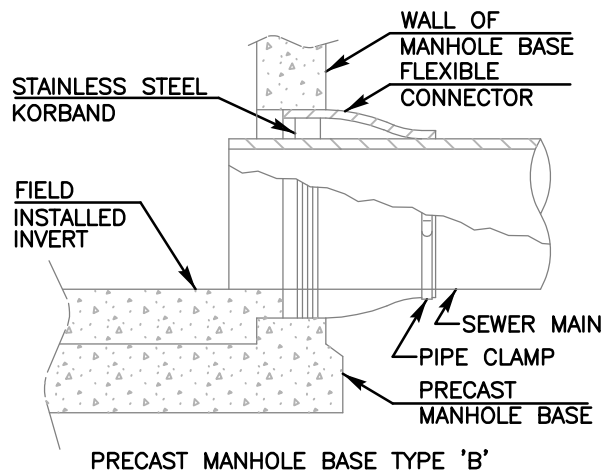
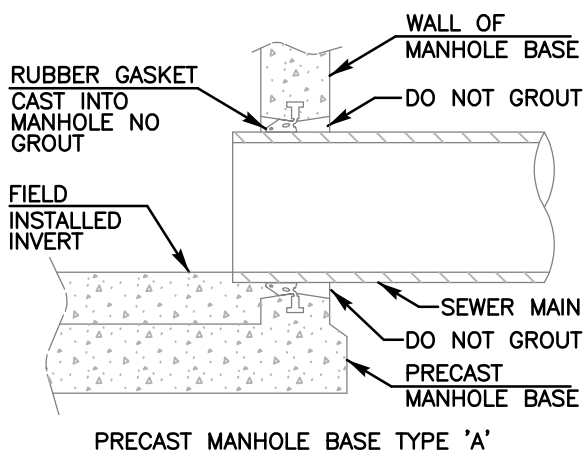
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	1500mm (60") DIAMETER PRECAST MANHOLE INSTALLATION	 Chairperson R.C.E. 19246 Date 03/24/2005
Replaced S-02		J. Tomasulo	03/05		
				DRAWING NUMBER	SM-02



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR MANHOLE INSTALLATIONS SEE SM-01 AND SM-02
- 3) MANHOLE BASES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED PER SM-07
- 4) LOWEST POINT ON SHELF SHALL BE EVEN WITH TOP OF PIPE
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

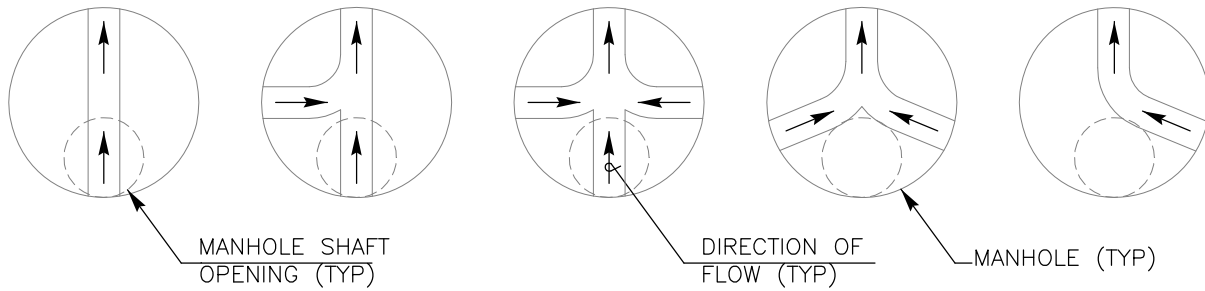
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SEWER MANHOLE BASE	<i>T. Stanton</i> 03/24/2005
Replaced S-02		J. Tomasulo	03/05		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER SM-03



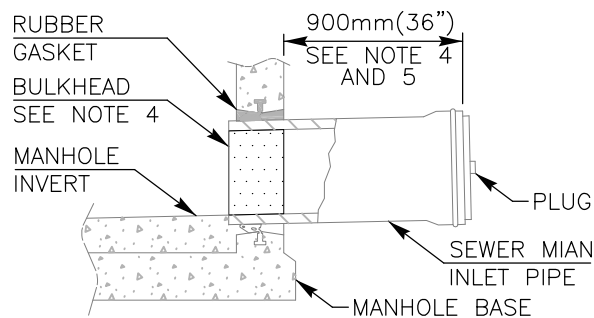
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE 'B') CAN BE USED WHEN BREAKING INTO EXISTING MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

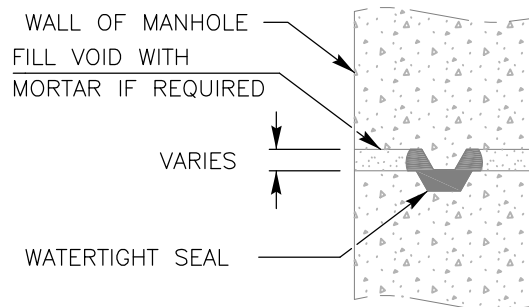
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		MANHOLE PIPE CONNECTORS	 03/24/2005
Add Metric		T. Stanton	03/03			
Replaced S-02		J. Tomasulo	03/05			
					Chairperson R.C.E. 19246 Date	
					DRAWING NUMBER SM-04	



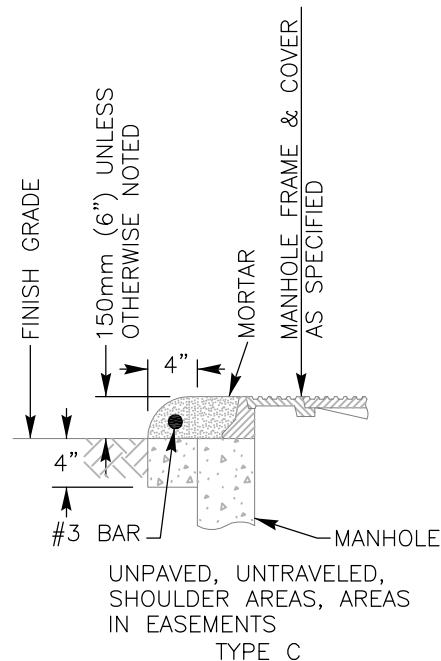
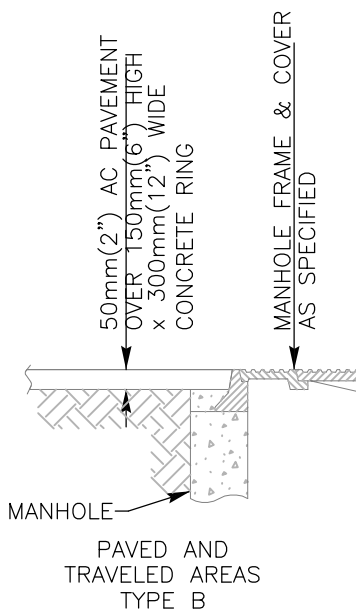
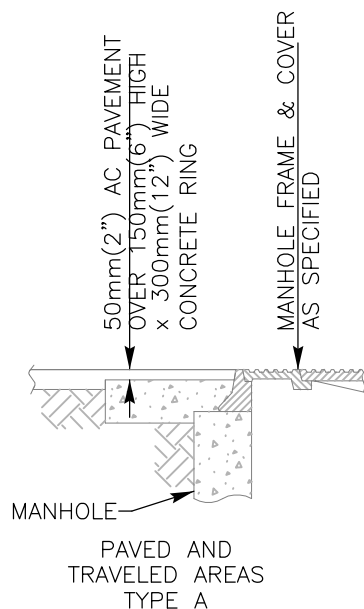
MANHOLE ACCESS LOCATION PLAN VIEW



MANHOLE STUB OUT FOR FUTURE CONNECTION

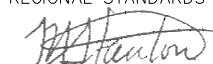


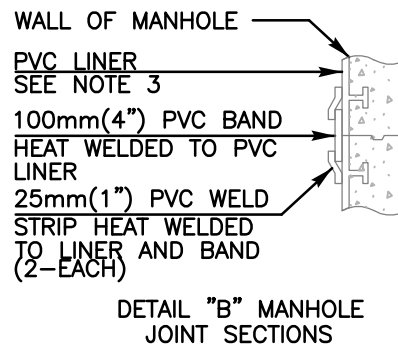
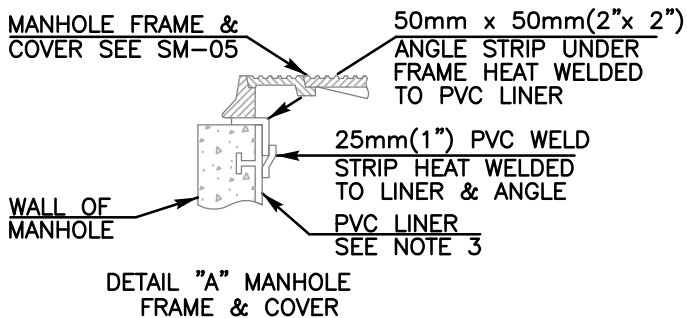
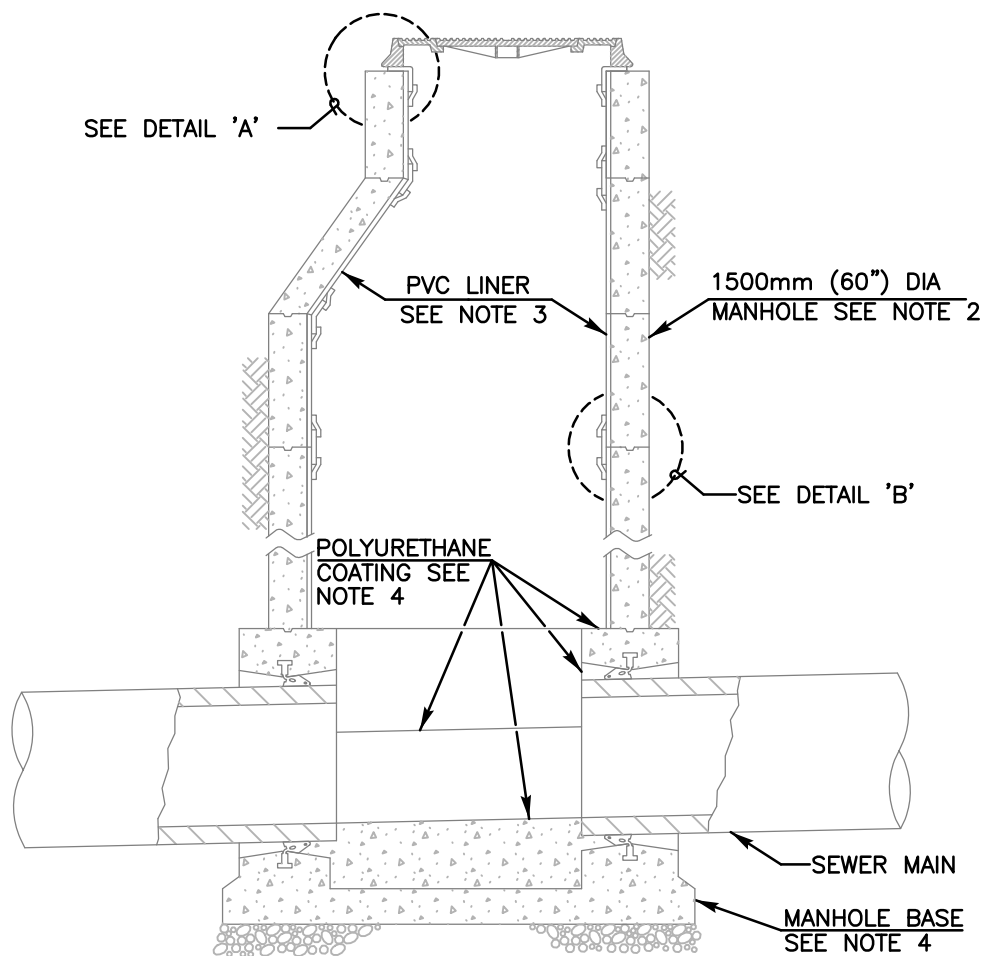
WATERTIGHT MANHOLE JOINT



NOTES:

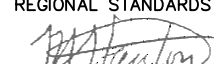
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UP STREAM SIDE OF MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) STUBS SHALL BE BULKHEADED AT THE MANHOLE END
- 5) SEWER MAIN TO BE LAID WITH BELLS UP-GRADE
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

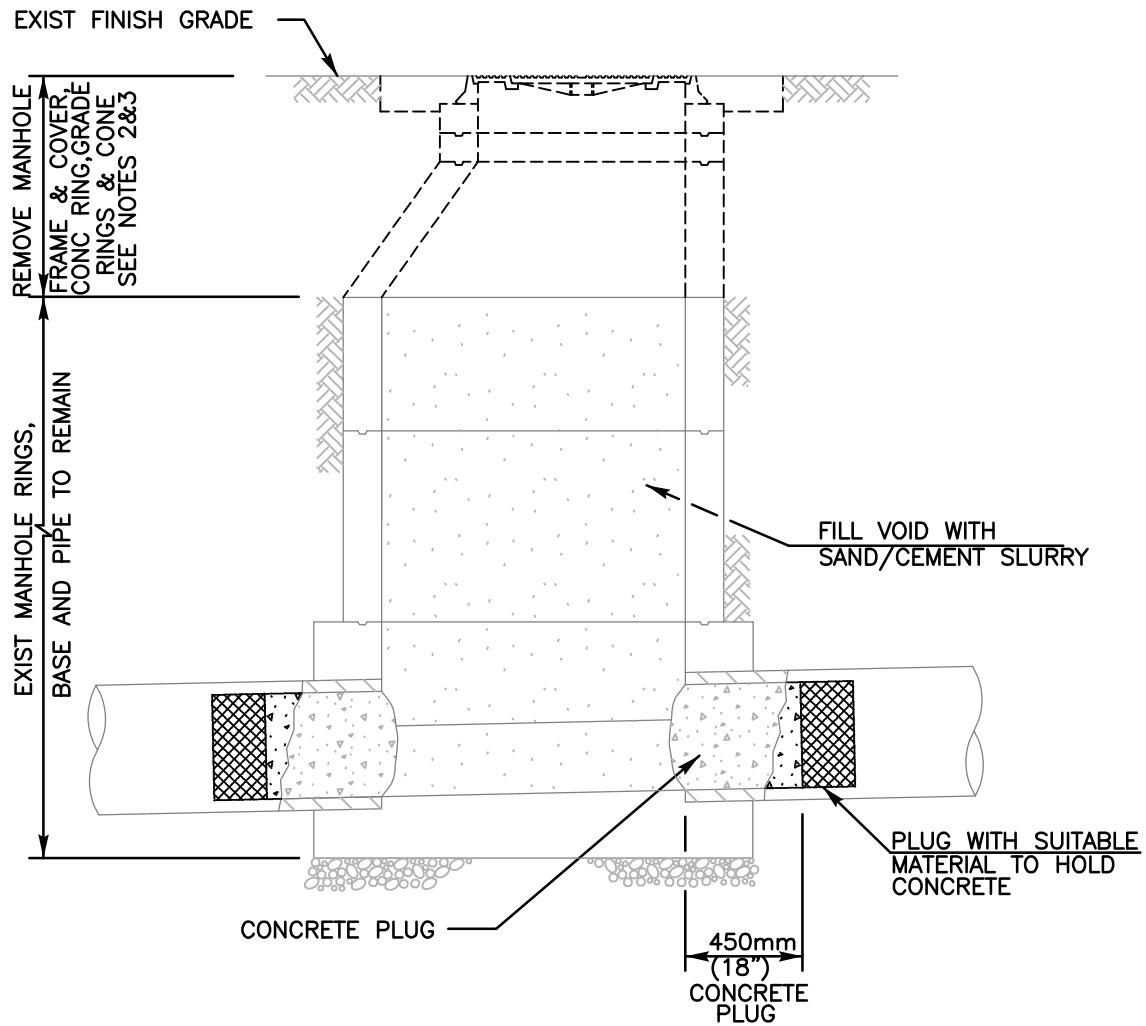
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	MANHOLE MISCELLANEOUS DETAILS	 03/24/2005 Chairperson R.C.E. 19246 Date
Replaced S-02		J. Tomasulo	03/05		
Edited		T. Stanton	05/08		
					DRAWING NUMBER SM-05



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) MANHOLES FOR SEWER MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED
- 3) MANHOLE SHAFT AND CONE SECTIONS, AND GRADE RINGS SHALL HAVE A PVC LINER PLACED WITH T-SHAPED SUPPORTS INTEGRALLY CAST INTO THE CONCRETE
- 4) ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE BASES
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

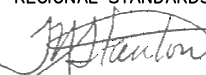
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		MANHOLE COATING AND LINING SYSTEM	 03/24/2005
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Replaced S-02		J. Tomasulo	03/05	DRAWING NUMBER		SM-07

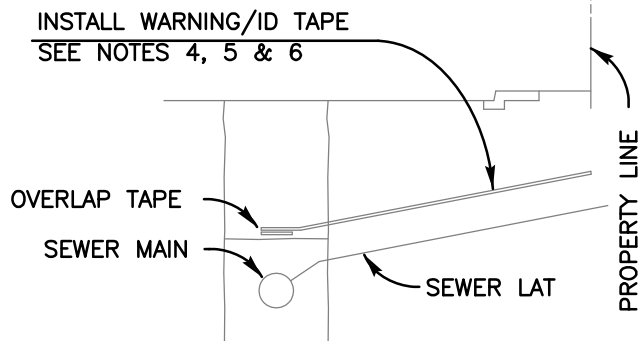


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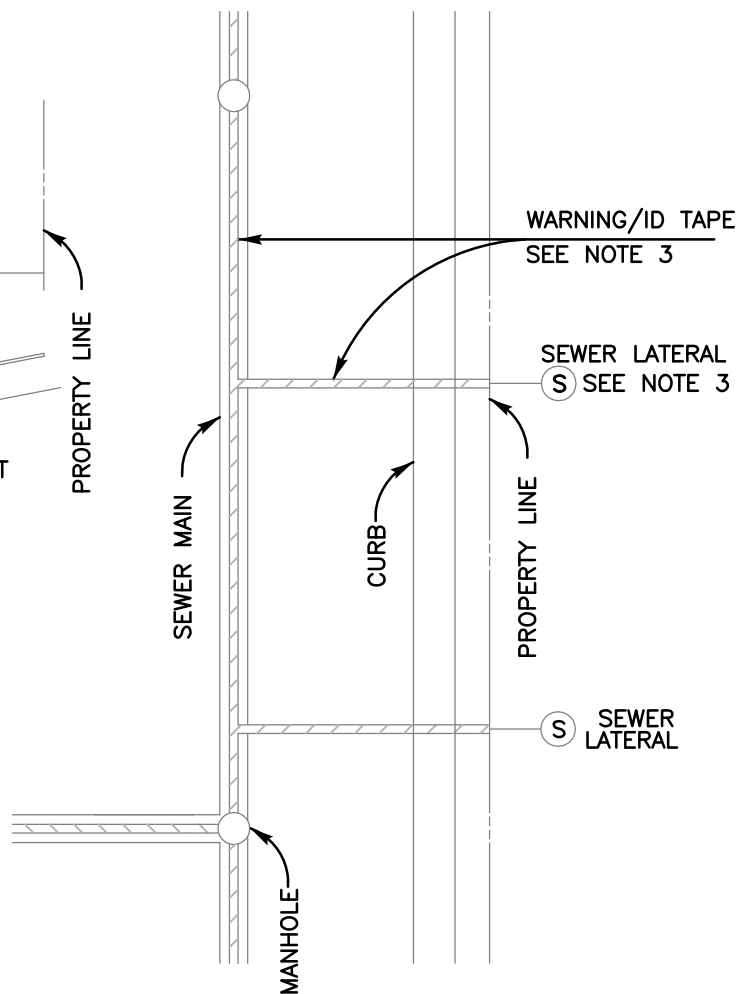
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) ALL SALVAGED MATERIAL BECOMES PROPERTY OF AGENCY OF JURISDICTION
- 3) BACKFILL PER AGENCY'S REQUIREMENT
- 4) FOR CUTTING & PLUGGING ABANDONED SEWER MAINS SEE WP-03

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		EXISTING MANHOLE ABANDONMENT	 03/24/2005
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246		Date
Replaced S-02		J. Tomasulo	03/05	DRAWING NUMBER		SM-08



SECTION AT SEWER LATERALS

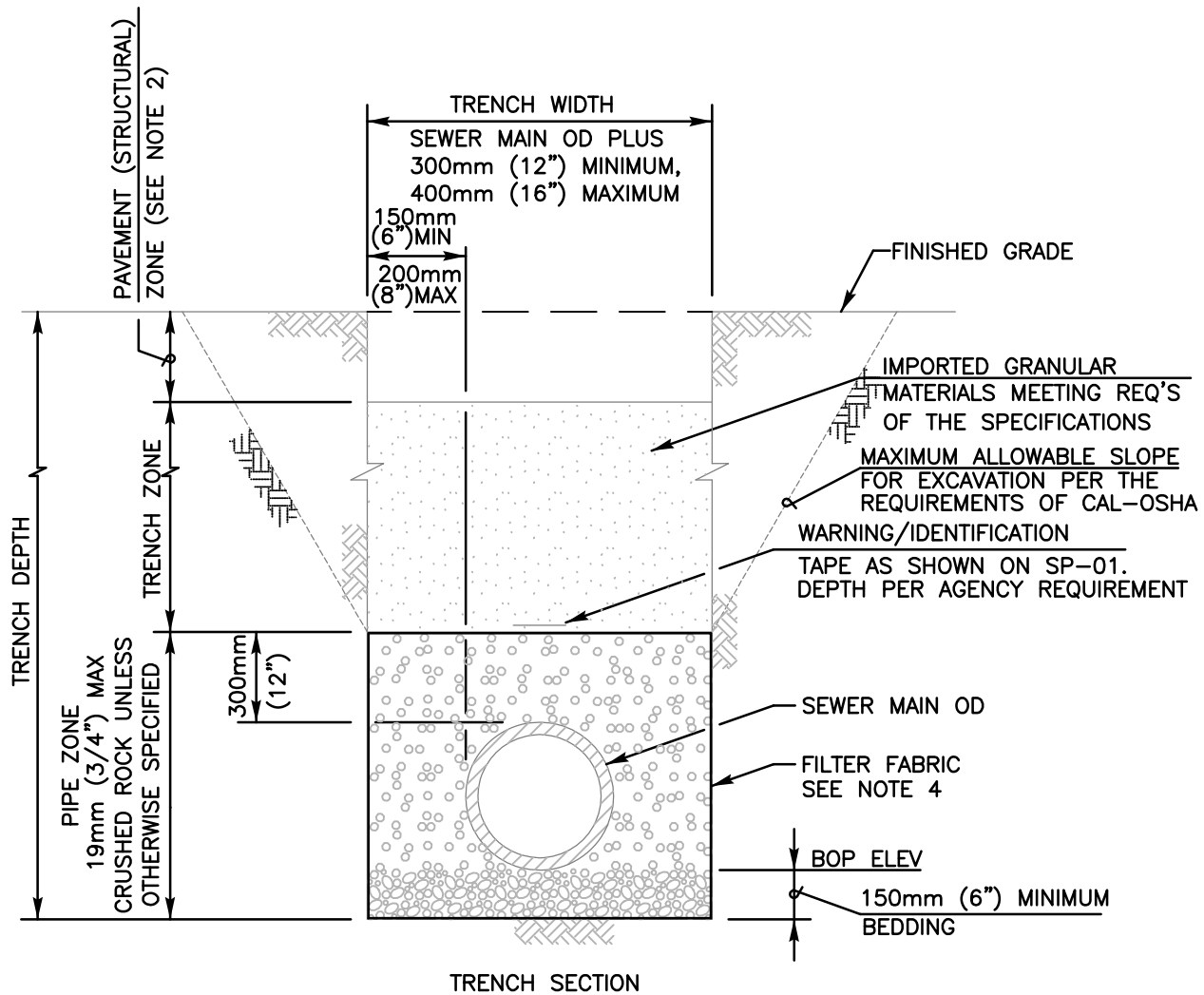


PLAN

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED AS SPECIFIED BY AGENCY
- 3) STAMP OR CHISEL A 50mm (2") HIGH 'S' IN CURB FACE TO IDENTIFY SEWER LATERAL LOCATION
- 4) FOR SEWER LATERALS EXTEND TAPE TO PROPERTY LINE
- 5) DEPTH OF WARNING/IDENTIFICATION TAPE AS SPECIFIED BY AGENCY
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

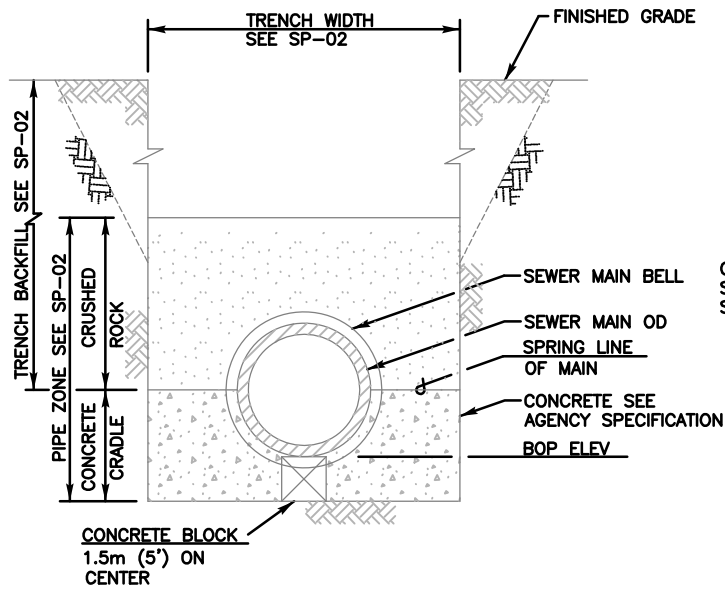
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	WARNING/IDENTIFICATION TAPE INSTALLATION	 03/24/2005 Chairperson R.C.E. 19246 Date
Replaced S-19		J. Tomasulo	03/05		
					DRAWING NUMBER SP-01



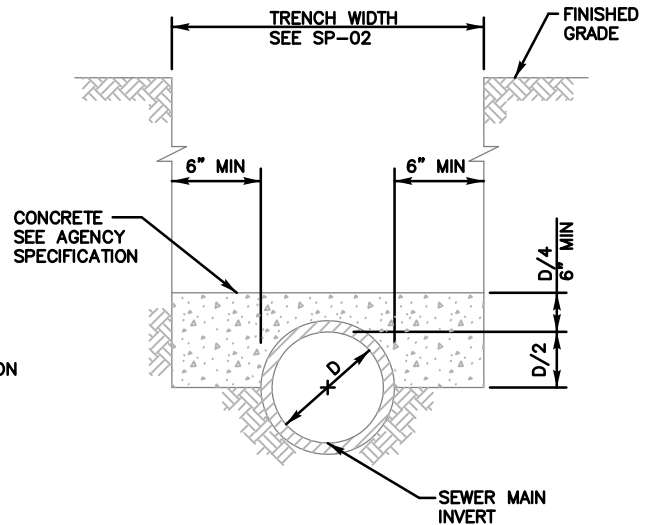
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) PAVING OR PAVEMENT REPAIR TO BE DONE IN ACCORDANCE WITH AGENCY OF JURISDICTION
- 3) EXCAVATE BELL HOLES AT EACH JOINT TO PERMIT PROPER ASSEMBLY AND INSPECTION OF THE ENTIRE JOINT
- 4) FILTER FABRIC AS REQUIRED BY AGENCY OF JURISDICTION (WITH A MINIMUM 12" OVERLAP).

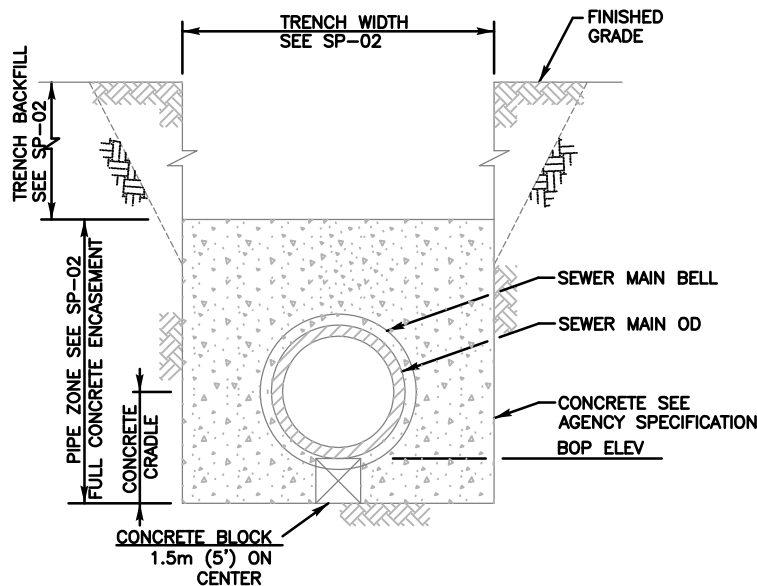
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	PIPE BEDDING AND TRENCH BACKFILL FOR SEWER FACILITIES	<i>T. Stanton</i> 03/24/2005
Replaced S-04		J. Tomasulo	03/05		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER SP-02



TRENCH SECTION
CONCRETE PIPE CRADLE



TRENCH SECTION
CONCRETE PROTECTION



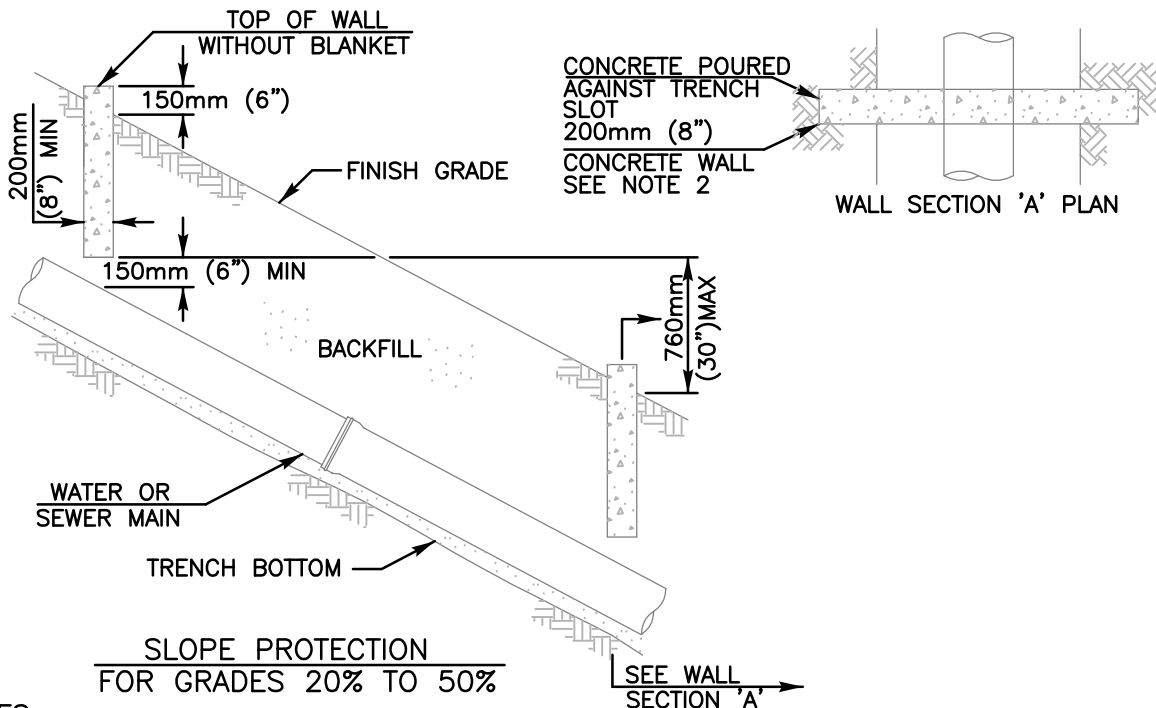
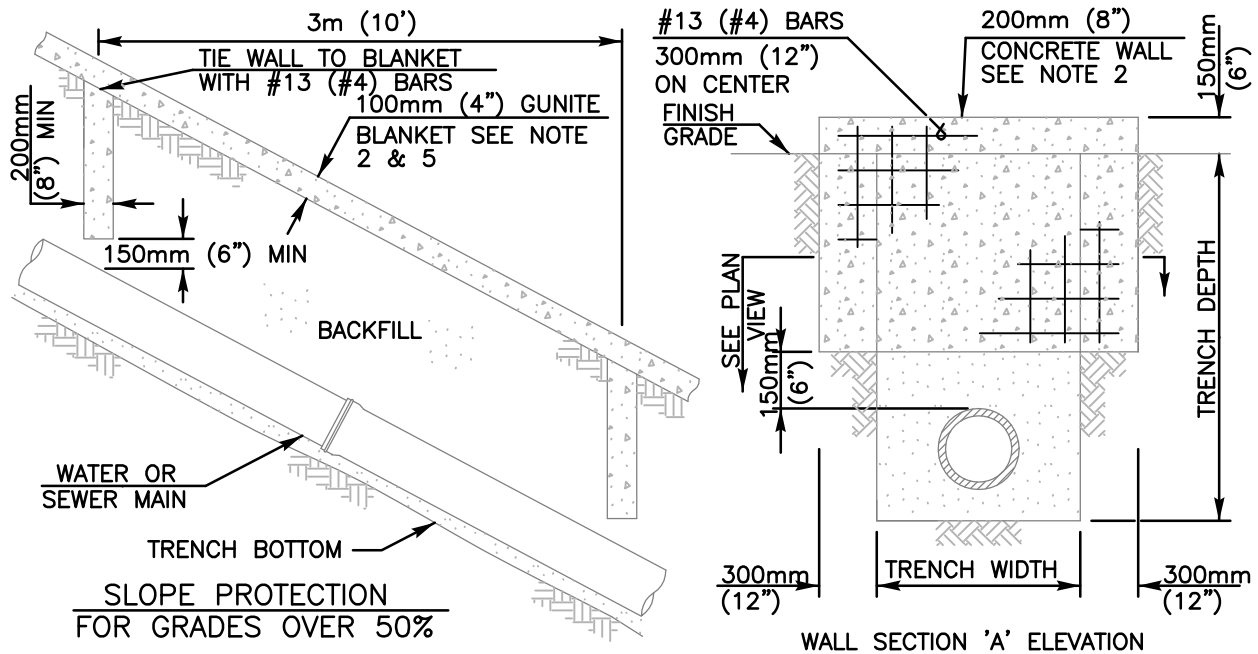
TRENCH SECTION
CONCRETE PIPE ENCASEMENT

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) CONCRETE CRADLE SHALL BE USED WHEN THE TRENCH WIDTH AT THE UPPER LIMIT OF THE PIPE ZONE EXCEEDS THE MAX WIDTH SPECIFIED ON SP-02 AND OR DIRECTED BY AGENCY'S ENGINEER
- 3) FOR PIPE BEDDING AND TRENCH BACKFILL SEE SP-02

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE PROTECTION FOR SEWER PIPE	 03/24/2005 Chairperson R.C.E. 19246 Date
Replaced S-06		J. Tomasulo	03/05		
					DRAWING NUMBER SP-03

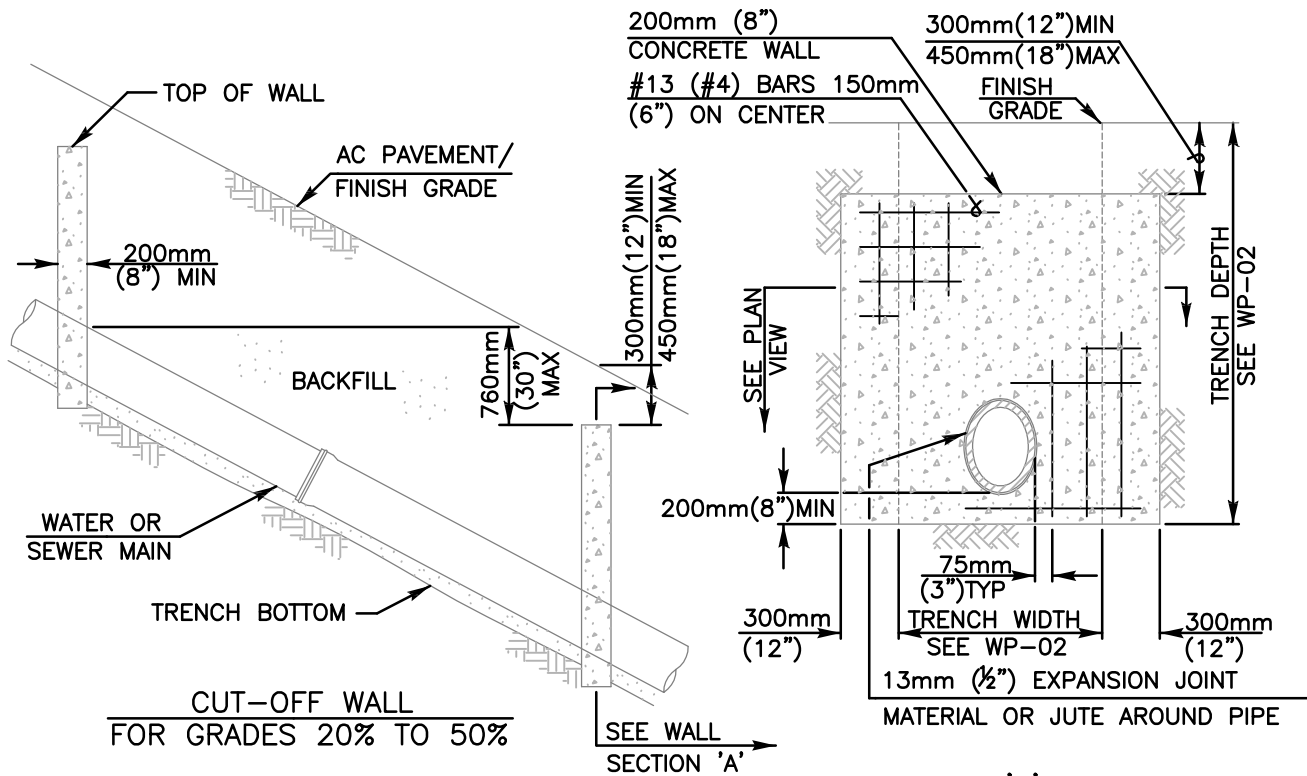


NOTES:

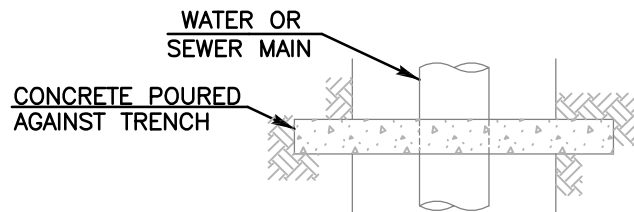
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITE BLANKET PLACED OVER THE PIPELINE ALIGNMENT
- 5) 100mm (4") GUNITE BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	03/05		
				SLOPE PROTECTION INSTALLATIONS	Chairperson R.C.E. 19246 Date
					DRAWING NUMBER
					SP-05



WALL SECTION 'A' ELEVATION



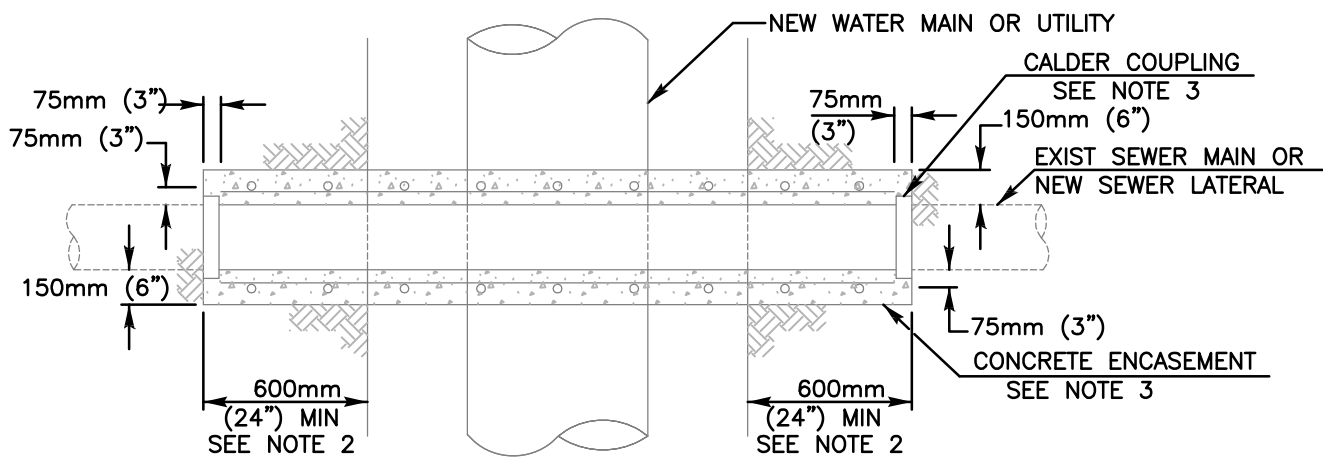
WALL SECTION 'A' PLAN

NOTES:

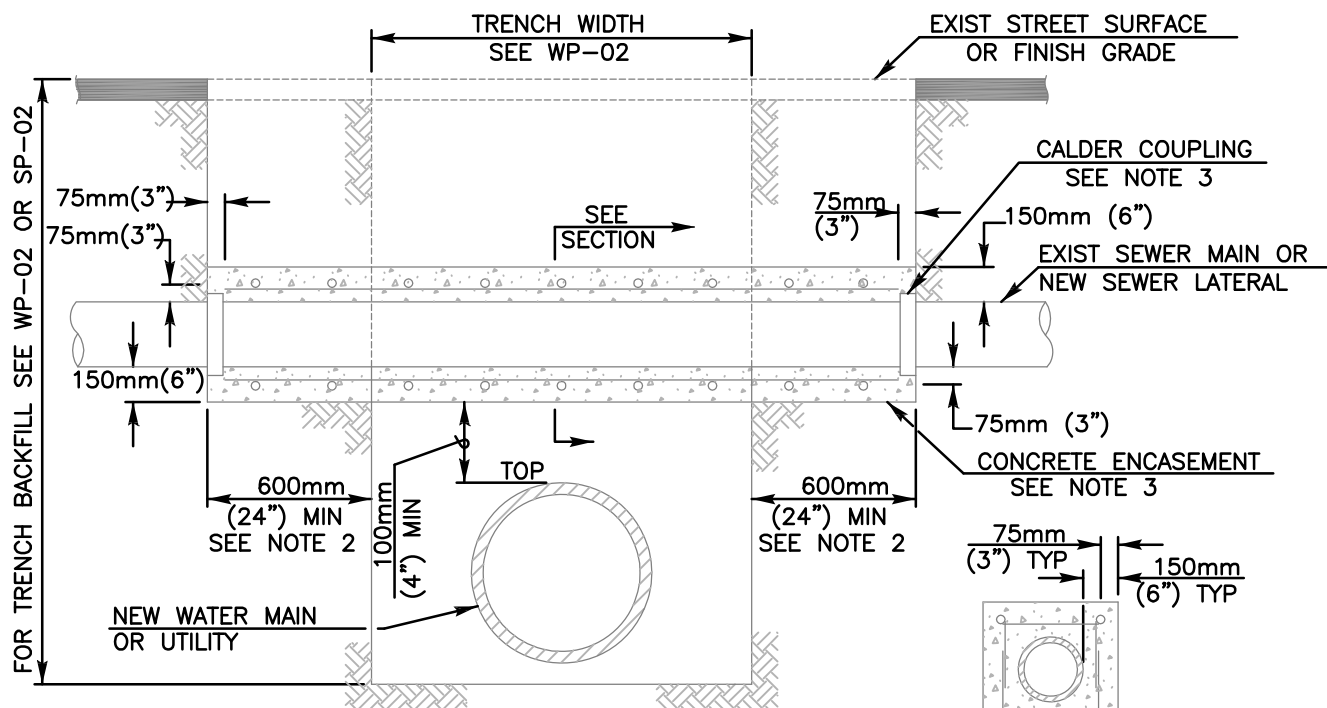
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR USE AS TRENCH BACKFILL STABILIZATION IN TRAVELED AREAS
- 3) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 4) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 5) FOR GRADES OVER 50% SEE WP-05/SP-05

LEGEND ON PLANS

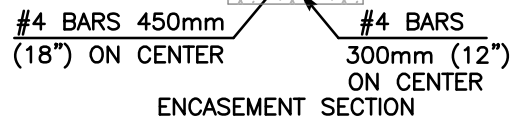
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	03/05		
				CUT-OFF WALL INSTALLATION IN TRAVELED AREAS	 03/24/2005 Chairperson R.C.E. 19246 Date
				DRAWING NUMBER	SP-07



PLAN



ELEVATION



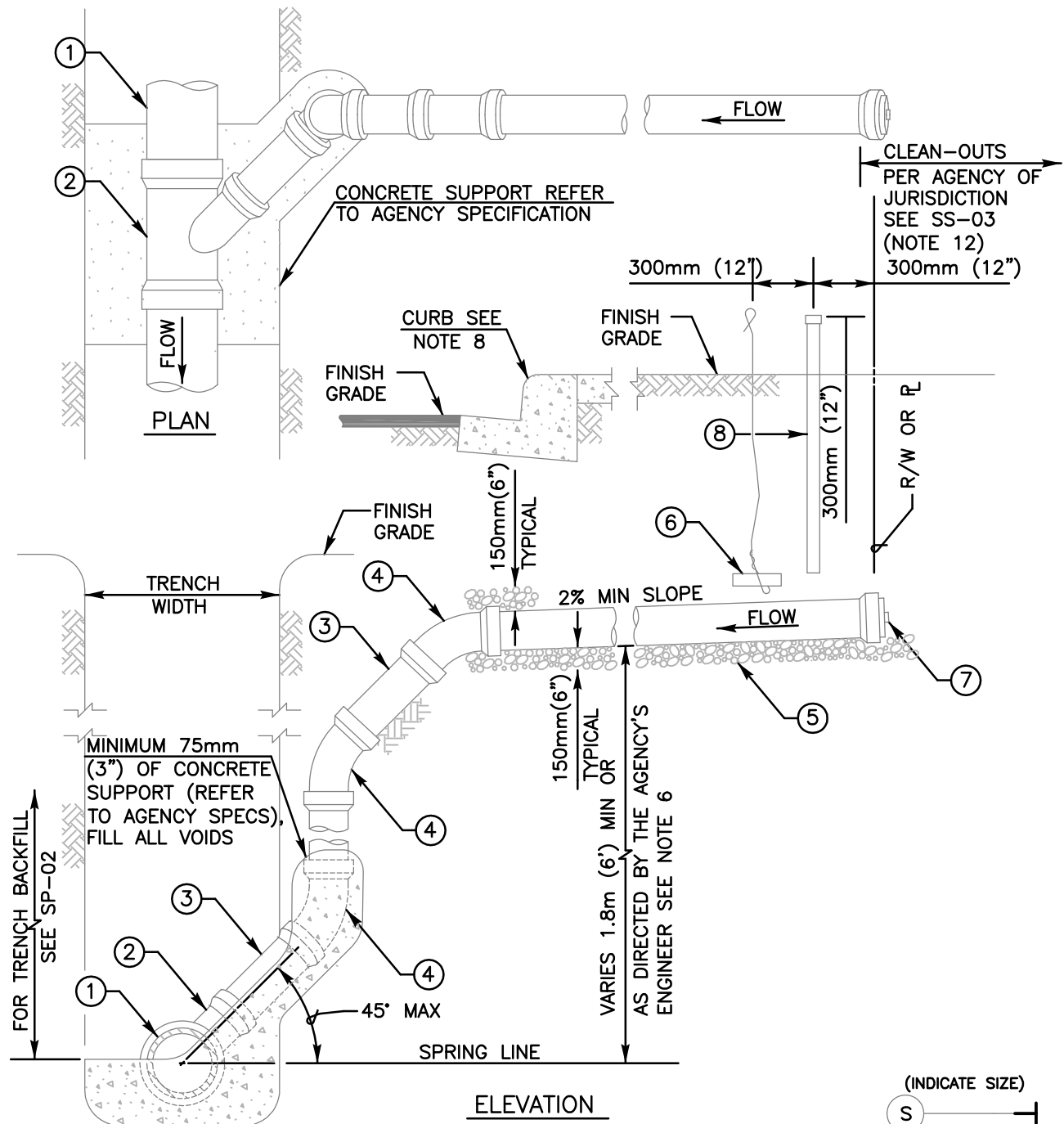
ENCASEMENT SECTION

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
- 2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH [600mm (24") MIN 1200mm (48") MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH].
- 3) CONCRETE ENCASEMENT REQUIRED FOR SEWER MAINS ONLY. CALDER COUPLINGS REQUIRED FOR SEWER LATERALS ONLY. SEWER LATERALS TO BE REPLACED WITH SCH. 80 PVC WITH NO INTERMEDIATE JOINTS.
- 4) FOR PIPE BEDDING AND TRENCH BACKFILL SEE WP-02 OR SP-02.

LEGEND ON PLANS

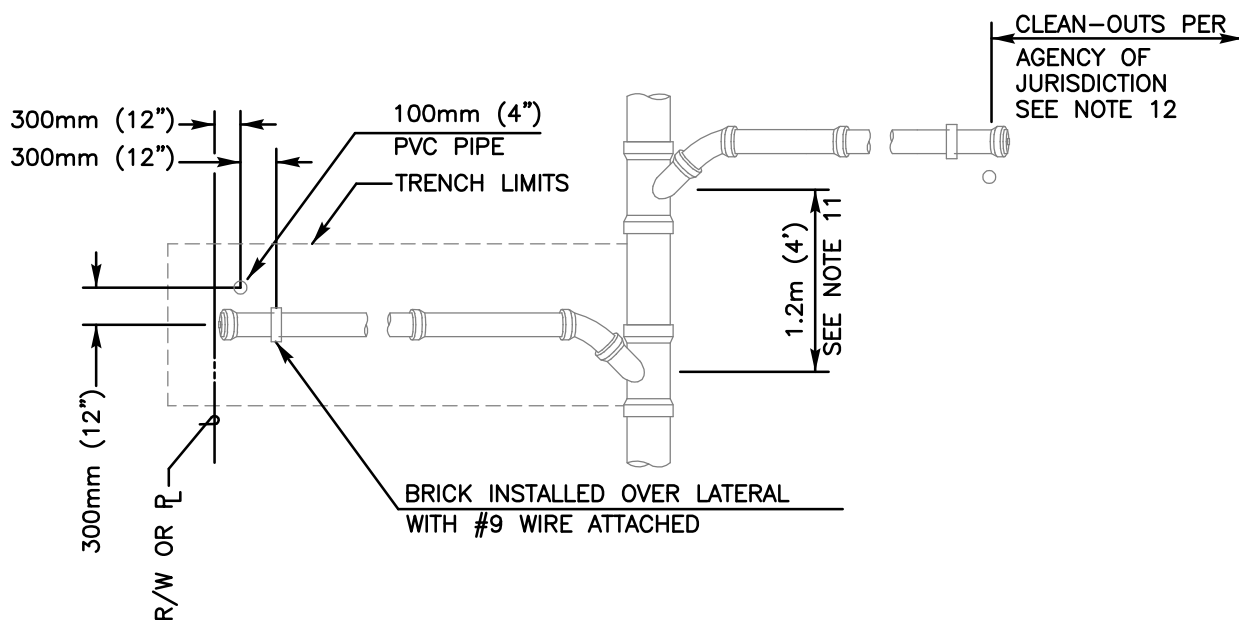
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	03/05		
				PIPE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS	 03/24/2005 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER SP-09



FOR SEWER LATERAL NOTES SEE DETAIL SS-03

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SEWER MAIN	⑤	19mm (3/4") MAXIMUM CRUSHED ROCK
②	45° WYE	⑥	#9 WIRE ATTACHED TO A BRICK
③	PIPE	⑦	PLUG OR CAP
④	45° ELBOW	⑧	100mm (4") PVC PIPE WITH GLUED CAP

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 100mm (4") AND 150mm (6") DEEP-CUT SEWER LATERAL INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 03/24/2005 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced S-13		J. Tomasulo	03/05		
					DRAWING NUMBER SS-02

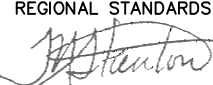


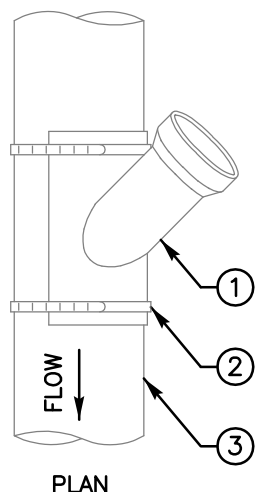
SEWER LATERAL DETAIL
SEE NOTE 10 BELOW

NOTES:

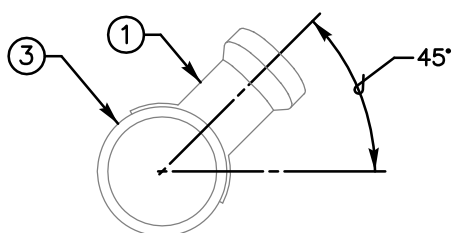
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) IN NO CASE SHALL LATERAL CONNECT DIRECTLY ON TOP OF SEWER MAIN
- 3) LATERAL SHALL BE INSTALLED TO PROPERTY LINE UNLESS SPECIFIED ON PLANS
- 4) MINIMUM 1.2m (4') COVER ABOVE LATERAL AT PROPERTY LINE
- 5) LATERAL TO HAVE A MINIMUM SLOPE OF 2%
- 6) VERTICAL PIPE SHALL BE BRACED WHILE BACKFILLING TRENCH
- 7) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON SP-01
- 8) STAMP OR CHISEL A 50mm (2") HIGH "S" IN CURB FACE OVER LATERAL TO IDENTIFY SEWER LATERAL LOCATION
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
- 10) FOR SEWER LATERAL INSTALLATIONS SEE SS-01 AND SS-02
- 11) FOR SEWERS SPECIFIED AS PVC PIPE, A MINIMUM 0.9m (3') SECTION OF PIPE IS REQUIRED BETWEEN FITTINGS
- 12) SEWER CLEAN-OUT SEE SC-01 TYPE B AS REQUIRED BY AGENCY OF JURISDICTION

(INDICATE SIZE)
S ————
LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	SEWER LATERAL NOTES AND DETAIL	 03/24/2005 Chairperson R.C.E. 19246 Date
Replaced S-13		J. Tomasulo	03/05		
					DRAWING NUMBER SS-03

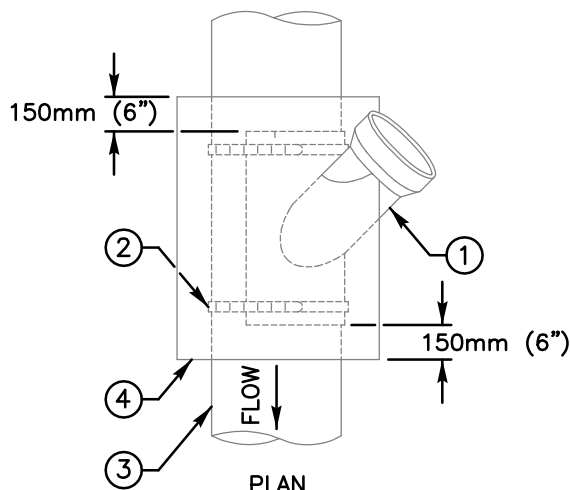


PLAN

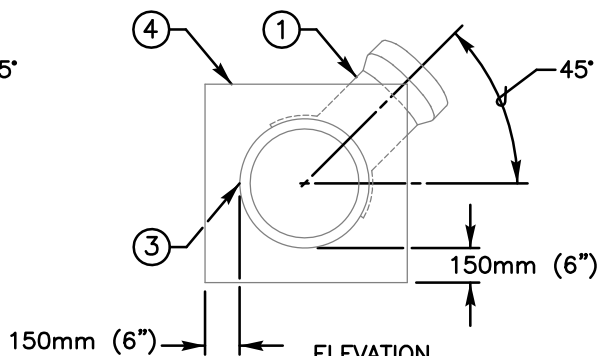


ELEVATION

CUT IN WYE CONNECTION
TYPE A



PLAN



ELEVATION

CUT IN WYE CONNECTION
TYPE B

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CONNECTIONS TO EXISTING SEWER MAINS TO BE MADE BY AGENCY PERSONNEL IN ACCORDANCE WITH SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS
- 3) IN NO CASE SHALL CONNECTION BE MADE DIRECTLY ON TOP OF SEWER MAIN
- 4) NO MORE THAN ONE CUT IN WYE WILL BE ALLOWED FOR EACH LENGTH OF EXISTING VCP SEWER MAIN
- 5) FOR SEWER LATERAL INSTALLATION SEE SS-01 AND SS-02
- 6) FOR TRENCH BACKFILL SEE SP-02
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

(INDICATE SIZE)
S ————>
LEGEND ON PLANS

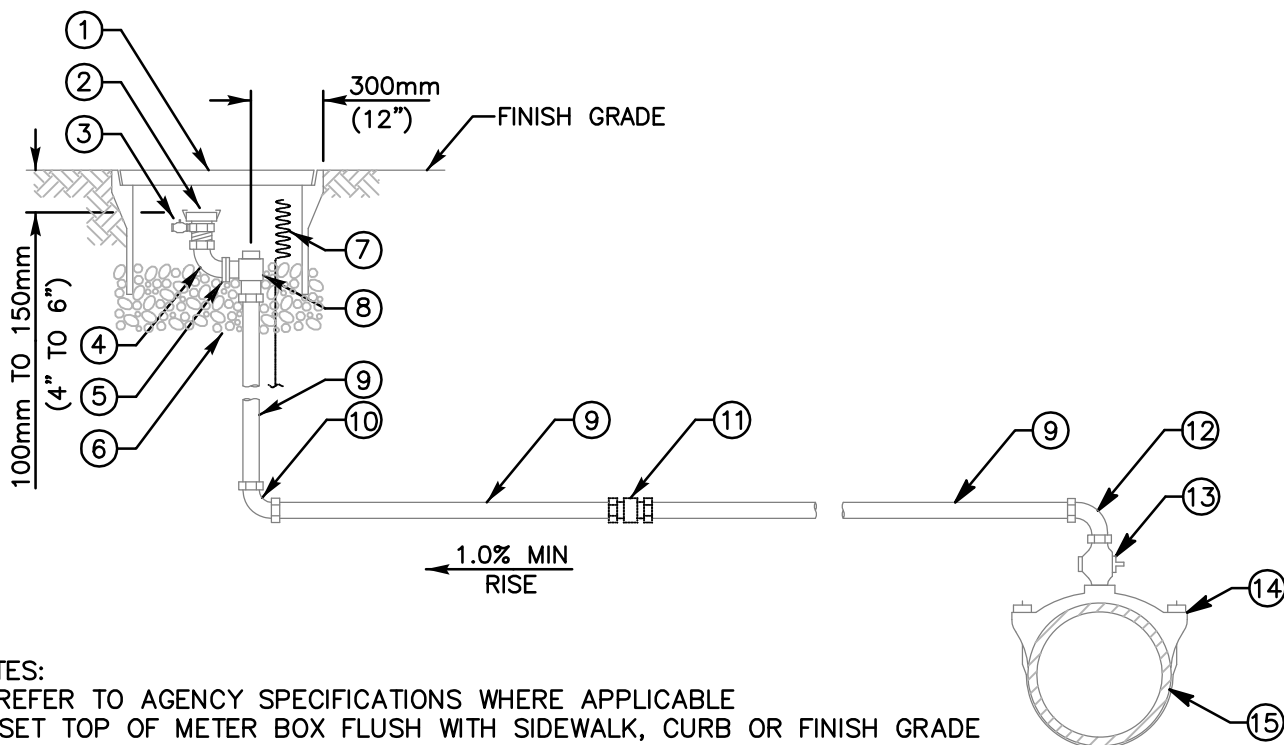
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	45° SADDLE WYE WITH GASKET	③	EXISTING SEWER MAIN
②	STAINLESS STEEL HOSE CLAMPS (2-EACH)	④	CONCRETE ENCASEMENT

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 100mm (4") AND 150mm (6") SEWER CUT-IN WYE CONNECTIONS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>[Signature]</i> 03/24/2005 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced S-13		J. Tomasulo	03/05		
					DRAWING NUMBER SS-04

WATER SYSTEMS

WATER SYSTEMS

W



NOTES:

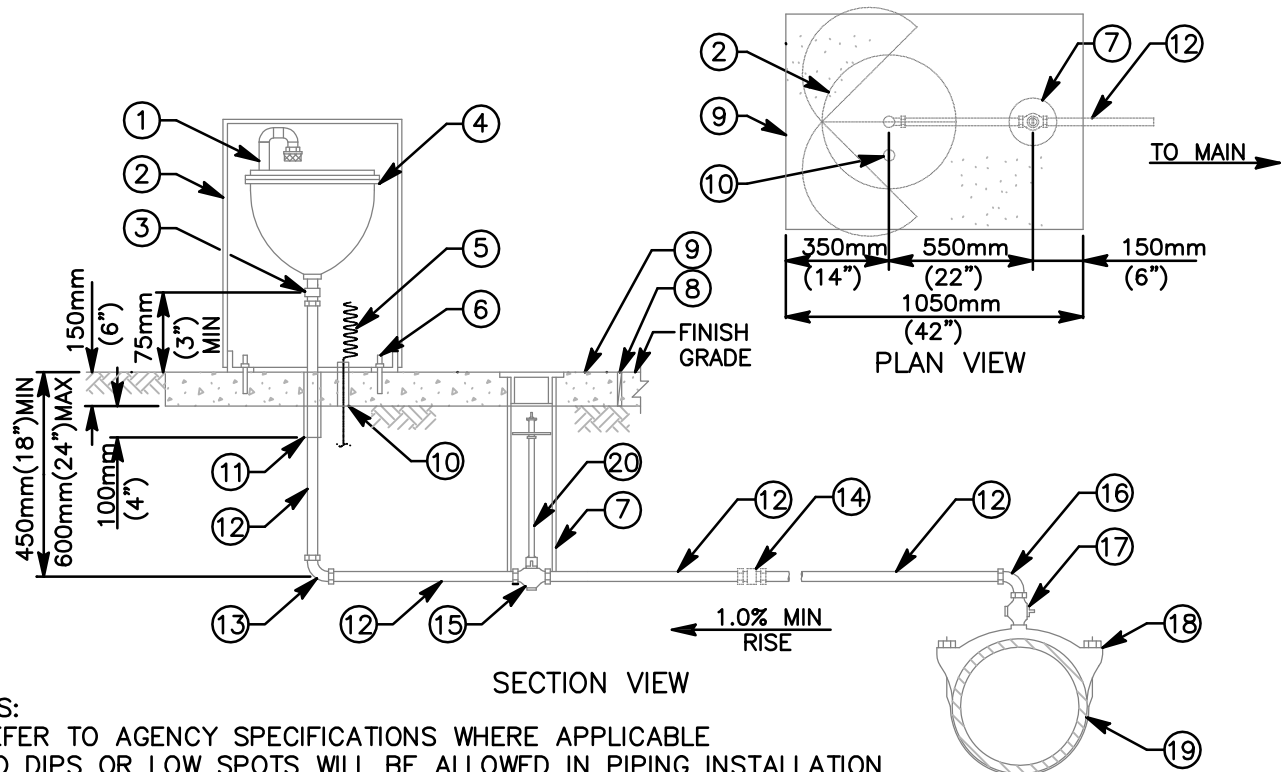
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
- 3) LOCATE METER BOX AS SHOWN ON WS-03
- 4) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 5) MANUAL AIR VALVE INSTALLATION AT END OF MAIN TO BE SADDLED 24" FROM END CAP
- 6) MANUAL AIR VALVE ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 7) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 8) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE RELEASE PET COCK
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

50mm (2")

 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	POLYMER METER BOX WITH LID 430mm x 760mm (17" x 30"), SEE NOTE 3	⑧	50mm (2") BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
②	50mm (2") CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 8	⑨	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
③	6mm (1/4") PRESSURE PET COCK	⑩	50mm (2") 90° BRONZE COMPRESSION ELL
④	50mm (2") 90° BRONZE MIPT x FIPT ELL	⑪	50mm (2") BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
⑤	50mm (2") OVAL METER FLANGE FLG x FIPT, WITH GASKET	⑫	50mm (2") 90° BRONZE FIPT x COMP ELL
⑥	10mm (3/8") ROCK 100mm TO 150mm (4" TO 6") DEEP	⑬	50mm (2") BRONZE MIPT x MIPT CORPORATION STOP
⑦	TRACER WIRE (AS REQUIRED), SEE WP-01	⑭	SIZE x 50mm (2") SERVICE SADDLE
		⑮	WATER MAIN

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	50mm (2") MANUAL AIR VALVE	10/28/2004
Replaced W-03		J. Tomasulo	10/04		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WA-01



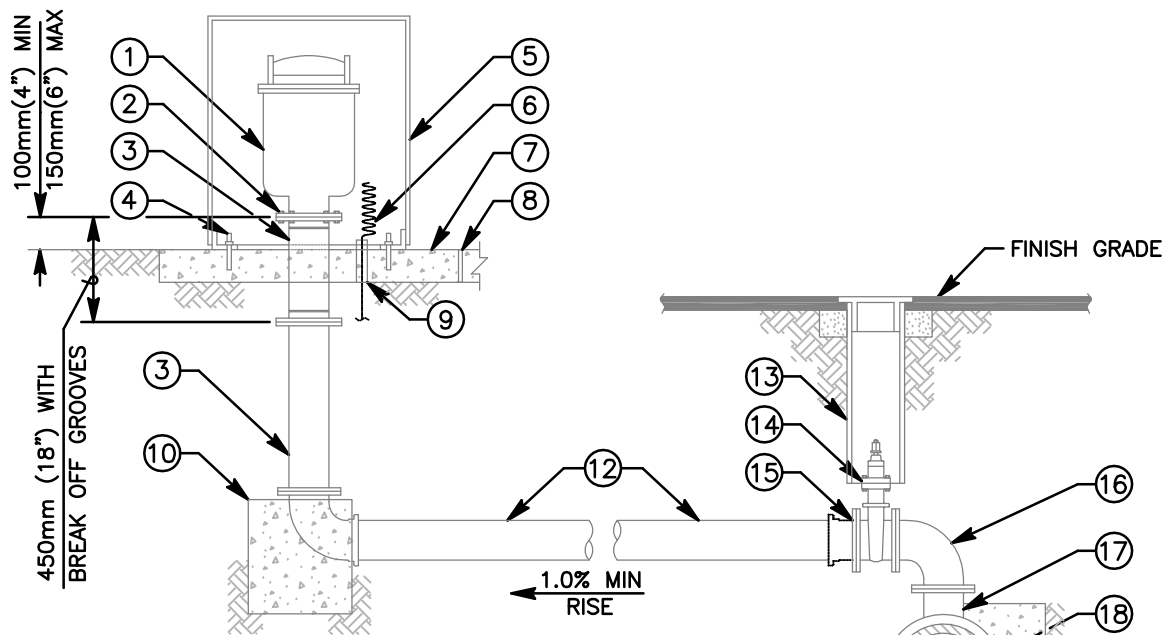
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
- 3) LOCATE ENCLOSURE AS SHOWN ON WA-06
- 4) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 5) AIR & VACUUM VALVES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 6) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	50mm (2") PVC SCH 80 CLOSE NIPPLE & 2-SCH 80 STREET ELLS & INSECT SCREEN	⑪	50mm (2") x 13mm (1/2") BLACK FOAM SLEEVE
②	VALVE ENCLOSURE	⑫	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
③	50mm (2") MIPT x COMPRESSION ADAPTER	⑬	50mm (2") 90° BRONZE COMPRESSION ELL
④	50mm (2") AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE	⑭	50mm (2") BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
⑤	TRACER WIRE (AS REQUIRED), SEE WP-01	⑮	50mm (2") COMP BALL VALVE W/ TEE HEAD
⑥	13mm x 75mm (1/2" x 3") STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)	⑯	50mm (2") 90° BRONZE FIPT x COMP ELL
⑦	100mm (4") SDR 35 SEWER PIPE GATE WELL WITH CAP	⑰	50mm (2") BRONZE MIPT x MIPT CORPORATION STOP
⑧	COLD JOINT STRIP	⑱	SIZE x 50mm (2") SERVICE SADDLE
⑨	1050mm x 750mm x 150mm THICK (3'-6" x 2'-6" x 6" THICK) CONCRETE SLAB	⑲	WATER MAIN
⑩	25mm (1") PVC CONDUIT FOR TRACER WIRE INSTALLED 50mm (2") ABOVE SLAB	⑳	VALVE STEM EXTENSION, SEE WV-05

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 50mm (2") AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>[Signature]</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-04		J. Tomasulo	10/04		
					DRAWING NUMBER WA-02



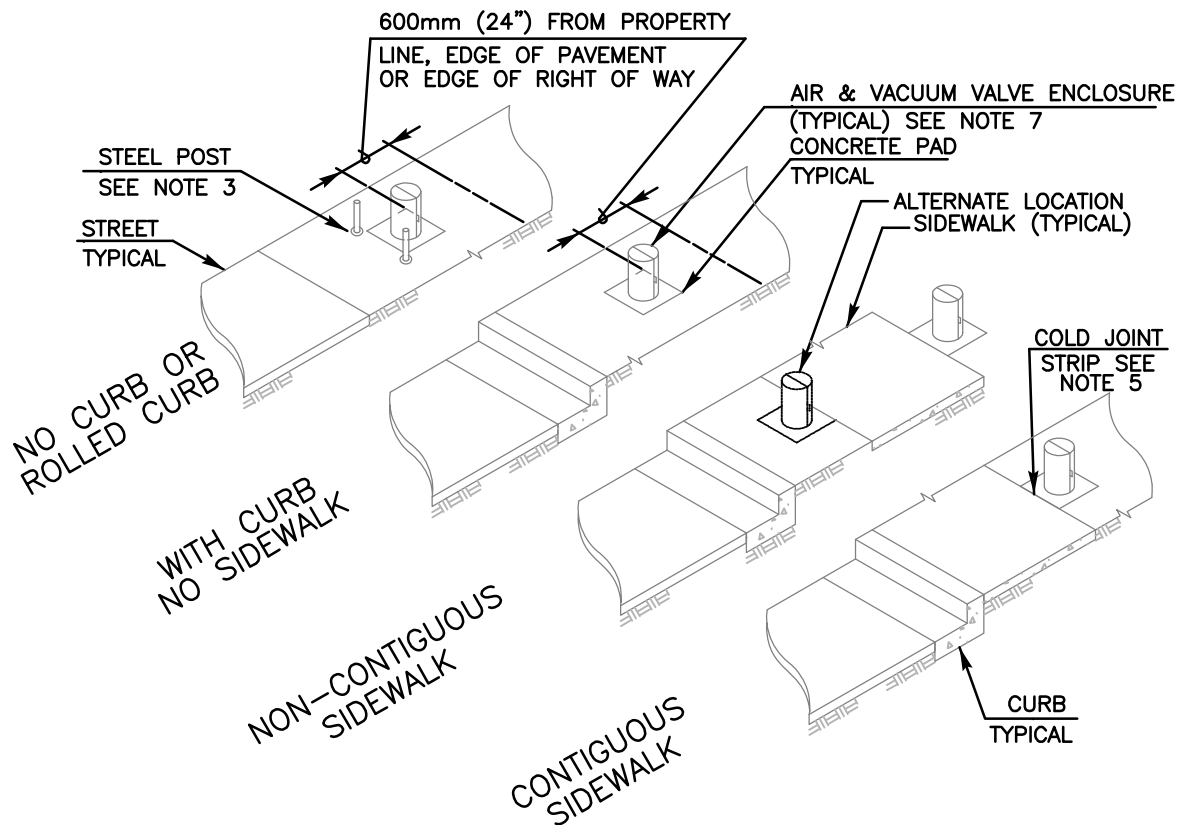
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
- 3) LOCATE ENCLOSURE AS SHOWN ON WA-06
- 4) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 5) BREAK-AWAY BOLTS SHALL BE 15.6mm x 75mm (5/8" x 3") WITH 9.4mm (3/8") HOLE DRILLED IN THE SHAFT OF THE BOLT. INSTALL WITH NUTS ON TOP OF THE FLANGE. BOLT SHAFT SHALL BE FILLED WITH SILICONE SEALANT
- 6) AIR & VACUUM VALVES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

LEGEND ON PLANS

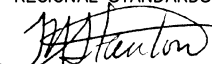
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①	100mm (4") OR 150mm (6") AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE ASSEMBLY	⑩	CONCRETE THRUST/ANCHOR BLOCK SEE WT-01
②	BREAK-AWAY BOLTS, SEE NOTE 5	⑪	100mm (4") OR 150mm (6") FLG x MJ/PO 90° BEND
③	100mm (4") OR 150mm (6") FLANGED 8-BOLT DUCTILE IRON PIPE x REQ'D LENGTH (MAX OF 2 SPOOLS)	⑫	100mm (4") OR 150mm (6") C-900 PVC PIPE
④	13mm x 75mm (5/8" x 3") STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)	⑬	GATE WELL WITH CAP SEE WV-01 OR WV-02
⑤	VALVE ENCLOSURE	⑭	100mm (4") OR 150mm (6") FLG x MJ/PO/FLG RWGV
⑥	TRACER WIRE (AS REQUIRED), SEE WP-01	⑮	100mm (4") OR 150mm (6") FLG x MJ/PO ADAPTER (IF REQUIRED)
⑦	1050mm x 1050mm x 150mm THICK (42" x 42" x 6" THICK) CONCRETE SLAB	⑯	100mm (4") OR 150mm (6") FLANGE 90° BEND
⑧	COLD JOINT STRIP	⑰	SIZE x 100mm (4") OR 150mm (6") MJ/PO/FLG x FLG TEE
⑨	25mm (1") PVC CONDUIT FOR TRACER WIRE INSTALLED 50mm (2") ABOVE SLAB	⑱	WATER MAIN

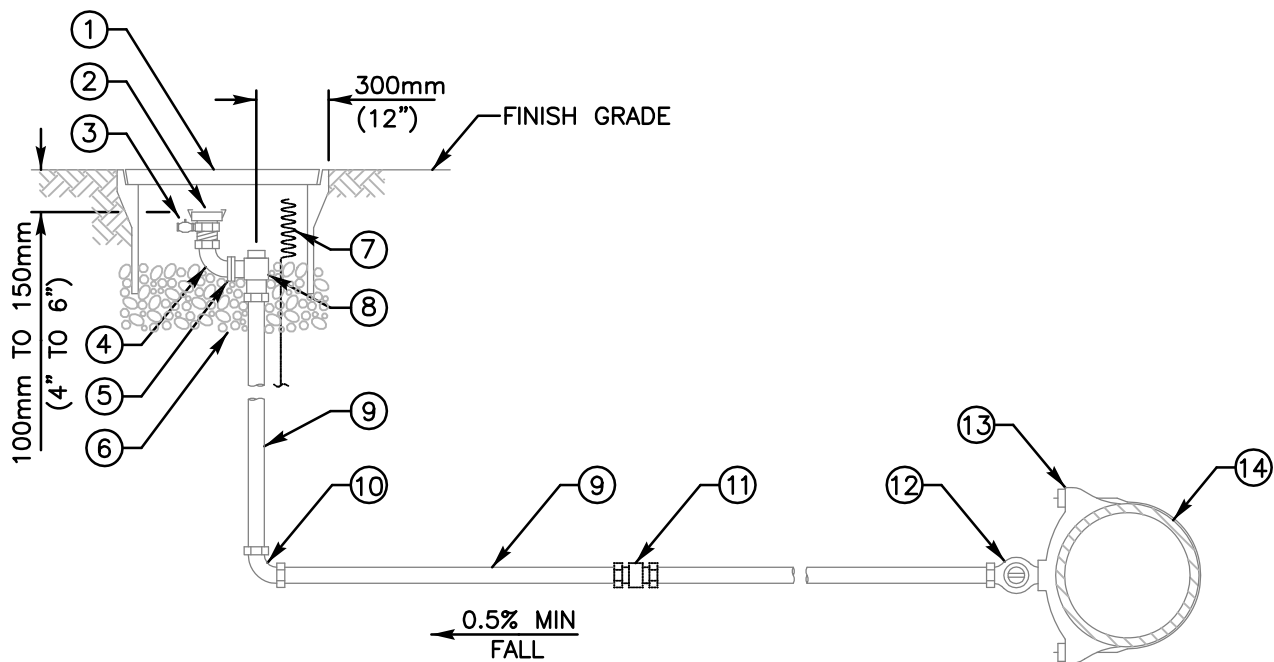
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	100mm (4") & 150mm (6") AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-05		J. Tomasulo	10/04		
					DRAWING NUMBER WA-04



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) REFER TO WA-02 AND WA-04
- 3) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER PER WM-04
- 4) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF ENCLOSURE
- 5) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE CURB OR SIDEWALK A COLD JOINT STRIP SHALL BE INSTALLED
- 6) AIR & VACUUM VALVES & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN THE AGENCY'S SPECIFICATIONS
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	AIR & VACUUM VALVE ENCLOSURE LOCATIONS	 10/28/2004
Replaced W-14		J. Tomasulo	10/04		
				Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER WA-06	



NOTES:

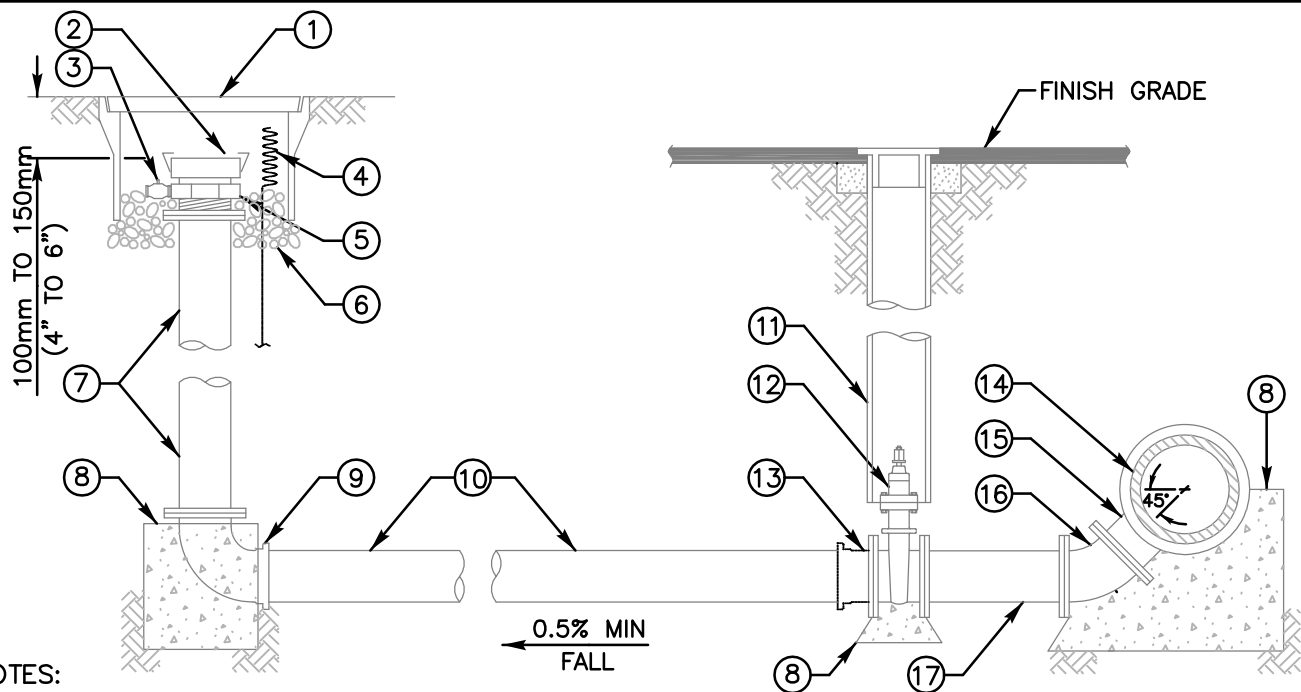
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
- 3) LOCATE METER BOX AS SHOWN ON WS-03
- 4) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 5) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE WB-04
- 6) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 7) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 8) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

50mm (2")

 LEGEND ON PLANS

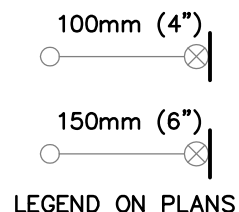
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	POLYMER METER BOX WITH LID 430mm x 760mm (17" x 30"), SEE NOTE 3	⑧	50mm (2") BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
②	50mm (2") CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 8	⑨	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
③	6mm (1/4") PRESSURE PET COCK	⑩	50mm (2") 90° BRONZE COMPRESSION ELL
④	50mm (2") 90° BRONZE MIPT x FIPT ELL	⑪	50mm (2") BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
⑤	50mm (2") OVAL METER FLANGE FLG x FIPT, WITH GASKET	⑫	50mm (2") BRONZE MIPT x COMP CORPORATION STOP
⑥	10mm (3/8") ROCK 100mm TO 150mm (4" TO 6") DEEP	⑬	SIZE x 50mm (2") SERVICE SADDLE
⑦	TRACER WIRE (AS REQUIRED), SEE WP-01	⑭	WATER MAIN

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 50mm (2") BLOW-OFF INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-06		J. Tomasulo	10/04		
					DRAWING NUMBER WB-01



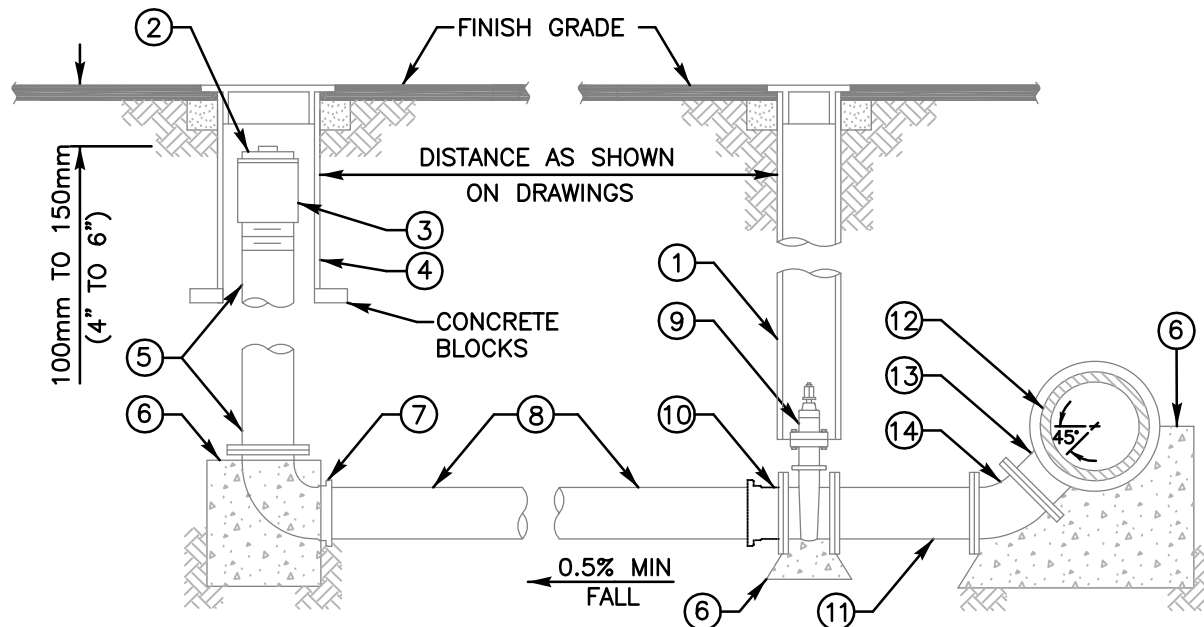
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
- 3) LOCATE METER BOX AS SHOWN ON WS-03
- 4) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 5) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE WB-04
- 6) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 7) 45° BEND SHALL BE USED FOR MAINS UP TO 750mm (30"). 90° BEND SHALL BE USED FOR MAINS IN EXCESS OF 750mm (30") AS DIRECTED BY THE ENGINEER
- 8) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



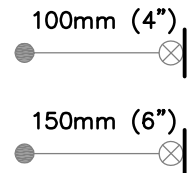
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	POLYMER METER BOX WITH LID 430mm x 760mm (17" x 30"), SEE NOTE 3	⑨	100mm (4") OR 150mm (6") FLG x MJ/PO 90° BEND
②	100mm (4") OR 150mm (6") CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 8	⑩	100mm (4") OR 150mm (6") C-900 PVC PIPE
③	6mm (1/4") PRESSURE PET COCK	⑪	GATE WELL WITH CAP SEE WV-01 OR WV-02
④	TRACER WIRE (AS REQUIRED), SEE WP-01	⑫	100mm (4") OR 150mm (6") FLG x MJ/PO/FLG RWGV
⑤	100mm (4") OR 150mm (6") FLANGED COMPANION x FIPT	⑬	100mm (4") OR 150mm (6") FLG x MJ/PO ADAPTER (IF REQUIRED)
⑥	10mm (3/8") ROCK 100mm TO 150mm (4" TO 6") DEEP	⑭	WATER MAIN
⑦	100mm (4") OR 150mm (6") FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)	⑮	SIZE x 100mm (4") OR 150mm (6") MJ/PO/FLG x FLG TEE
⑧	CONCRETE THRUST BLOCK SEE WT-01	⑯	100mm (4") OR 150mm (6") FLANGED 45° BEND
		⑰	100mm (4") OR 150mm (6") x 600mm (24") FLG DI SPOOL

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	100mm (4") & 150mm (6") BLOW-OFF INSTALLATION TYPE A	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-08		J. Tomasulo	10/04		
					DRAWING NUMBER WB-02



NOTES:

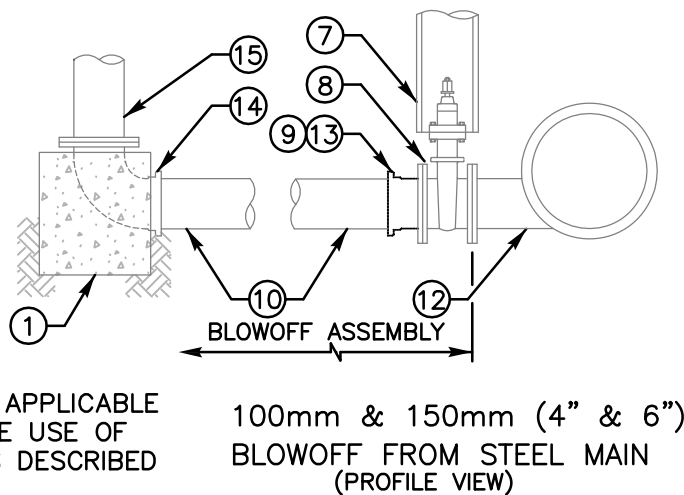
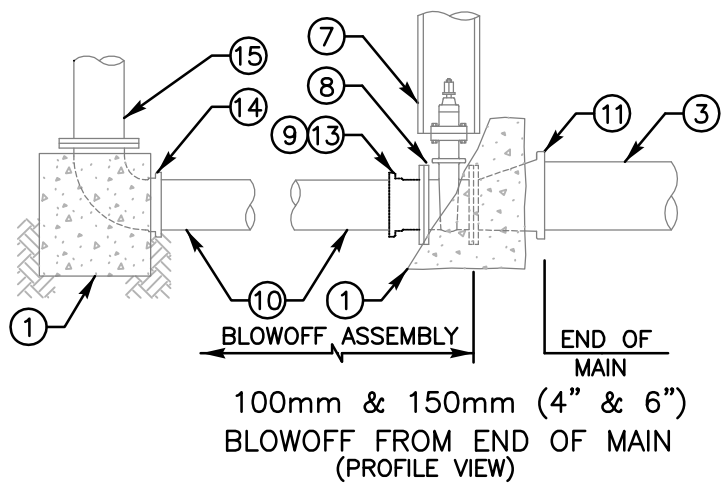
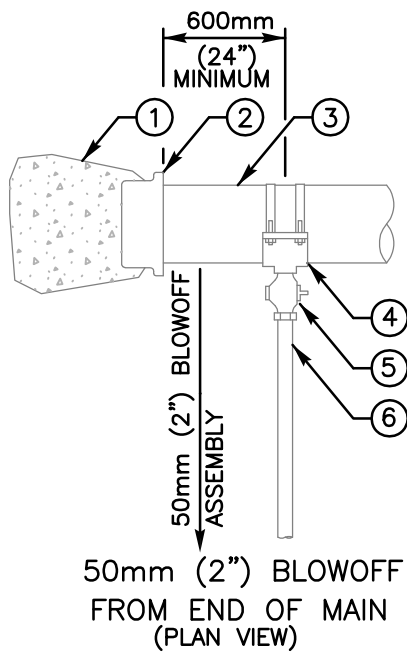
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE WB-04
- 3) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 4) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 5) 45° BEND SHALL BE USED FOR MAINS UP TO 750mm (30"). 90° BEND SHALL BE USED FOR MAINS IN EXCESS OF 750mm (30") AS DIRECTED BY THE ENGINEER
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	GATE WELL WITH CAP SEE WV-01 OR WV-02	⑧	100mm (4") OR 150mm (6") C-900 PVC PIPE
②	GALVANIZED IRON PLUG	⑨	100mm (4") OR 150mm (6") FLG x MJ/PO/FLG RWGV
③	GALVANIZED IRON COUPLING, THREADED	⑩	100mm (4") OR 150mm (6") FLG x MJ/PO ADAPTER (IF REQUIRED)
④	250mm (10") STEEL GATE WELL WITH CAP	⑪	100mm (4") OR 150mm (6") x 600mm (24") FLG DI SPOOL
⑤	100mm (4") OR 150mm (6") FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)	⑫	WATER MAIN
⑥	CONCRETE THRUST BLOCK SEE WT-01	⑬	SIZE x 100mm (4") OR 150mm (6") MJ/PO/FLG x FLG TEE
⑦	100mm (4") OR 150mm (6") FLG x MJ/PO 90° BEND	⑭	100mm (4") OR 150mm (6") FLANGED 45° BEND, SEE NOTE 5

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 100mm (4") & 150mm (6") BLOW-OFF ASSEMBLIES IN STREET TYPE B	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date DRAWING NUMBER WB-03
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-09		J. Tomasulo	10/04		

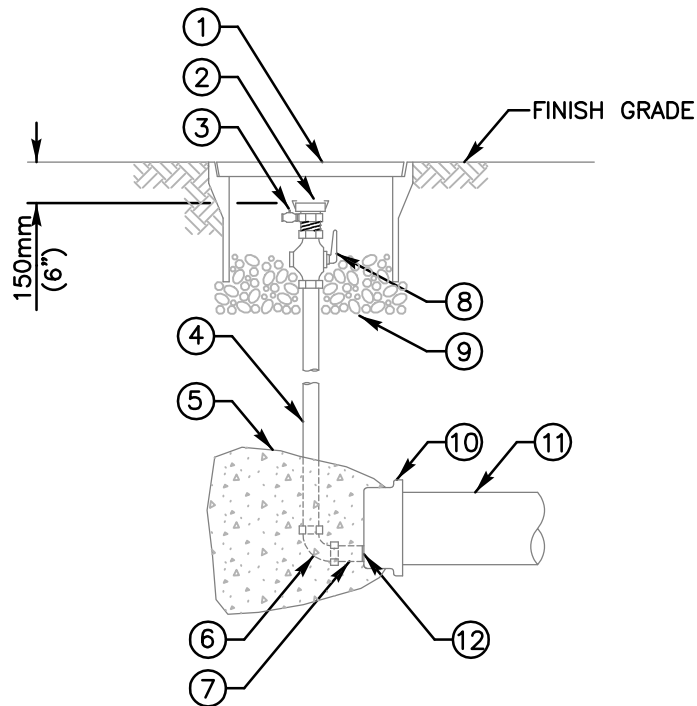


NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 3) FOR 2" BLOW-OFFS ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 4) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	CONCRETE THRUST BLOCKS SEE WT-01	⑧	FLG x MJ/PO/FLG RWGV
②	DI END CAP	⑨	FLG x MJ/PO ADAPTER (IF REQUIRED)
③	WATER MAIN	⑩	C-900 PVC PIPE
④	SIZE x 50mm (2") SERVICE SADDLE	⑪	FLG x MJ/PO ECCENTRIC DI REDUCER
⑤	50mm (2") BRONZE MIPT x COMP CORPORATION STOP	⑫	MAIN SIZE x BLOWOFF SIZE FLANGE MANUFACTURED STEEL TANGENTIAL OUTLET
⑥	50mm (2") x REQ'D LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT	⑬	FLG x MJ/PO BEND (IF REQUIRED)
⑦	GATE WELL WITH CAP SEE WV-01 & WV-02	⑭	FLG x MJ/PO 90° BEND
		⑮	FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	BLOW-OFF INSTALLATION FROM END OF MAINS AND FROM STEEL MAINS	 10/23/2004 Chairperson R.C.E. 19246 Date
Replaced W-07		J. Tomasulo	10/04		
					DRAWING NUMBER WB-04



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) SET TOP OF METER BOX 50mm (2") ABOVE FINISH GRADE
- 3) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 4) THE CONSTRUCTION OF A TEMPORARY BLOW-OFF FOR THE USE OF TESTING AND FLUSHING OF NEW MAINS ONLY
- 5) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

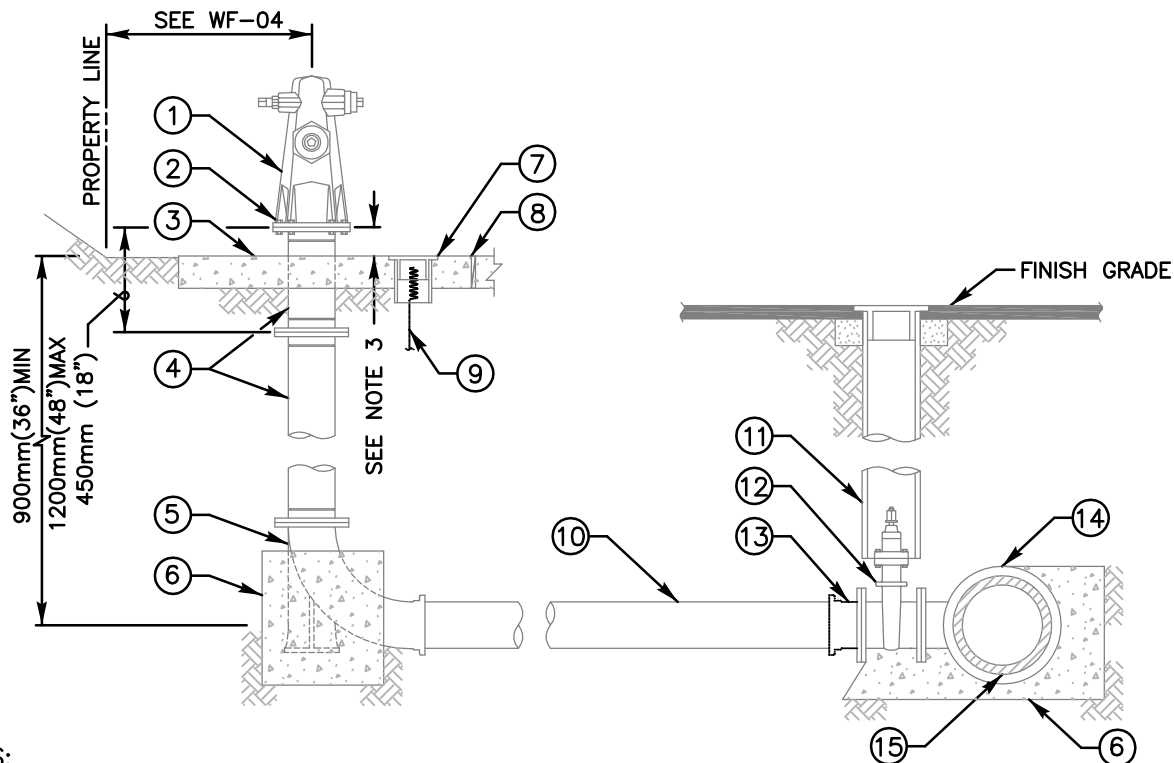
TEMP 50mm (2")



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	POLYMER METER BOX WITH LID 430mm x 760mm (17" x 30")	⑥	50mm (2") 90° BRONZE IRON PIPE THREAD BY COMPRESSION ELL
②	50mm (2") CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 5	⑦	50mm (2") CLOSE NIPPLE IPT
③	6mm (1/4") PRESSURE PET COCK	⑧	50mm (2") COMPRESSION x FIPT BALL VALVE WITH HANDLE
④	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT	⑨	10mm (3/8") ROCK 150mm (6") DEEP
⑤	CONCRETE THRUST BLOCK SEE WT-01	⑩	DI END CAP WITH 63mm (2.5") FIPT OUTLET
		⑪	WATER MAIN
		⑫	NYLON DIELECTRIC BUSHING

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING TEMPORARY 50mm (2") BLOW-OFF INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-07		J. Tomasulo	10/04		
					DRAWING NUMBER WB-05



NOTES:

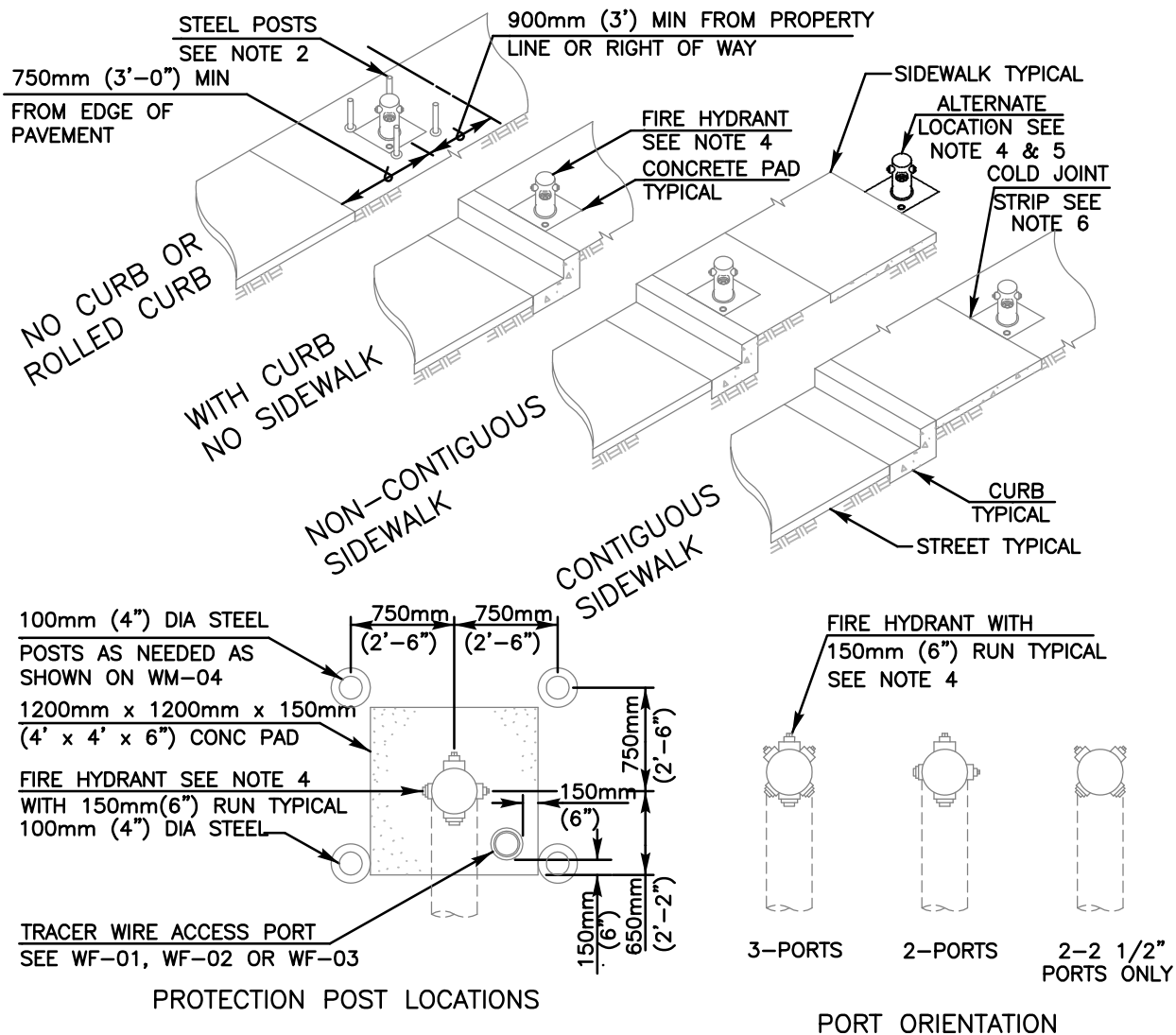
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) THE NUMBER OF OUTLETS SHALL BE AS SHOWN ON PLANS
- 3) FIRE HYDRANT FLANGE SHALL BE 150mm $\pm$ 25mm (6" $\pm$ 1") ABOVE TOP OF CURB OR SPLASH PAD SEE PLANS FOR ELEVATION
- 4) LOCATE FIRE HYDRANT AS SHOWN ON WF-04
- 5) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 6) FIRE HYDRANT FLANGE BOLTS SHALL BE BREAK AWAY BOLTS INSTALLED WITH NUTS ON TOP OF THE FLANGE. BOLT SHAFT SHALL BE FILLED WITH SILICONE SEALANT
- 7) CONNECTIONS TO STEEL MAINS WILL BE MADE IN ACCORDANCE WITH AGENCY'S SPECIFICATIONS
- 8) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	150mm (6") FIRE HYDRANT SEE NOTE 2	⑧	COLD JOINT STRIP
②	BREAK-AWAY BOLTS, SEE NOTE 6	⑨	TRACER WIRE (AS REQUIRED) PER WP-01
③	1200mm x 1200mm x 150mm THICK (4' x 4' x 6" THICK) CONCRETE SPLASH PAD	⑩	150mm (6") C-900 PVC PIPE
④	150mm (6") FLANGE DI HYDRANT EXTENSION SPOOL(S) WITH BREAK OFF GROOVES (MAXIMUM OF 2 SPOOLS)	⑪	GATE WELL WITH CAP SEE WV-01 OR WV-02
⑤	150mm x 400mm (6" x 16") LONG RADIUS FLG x MJ/PO BURY ELL	⑫	150mm (6") FLG x MJ/PO/FLG RWGV
⑥	CONCRETE THRUST BLOCK SEE WT-01	⑬	150mm (6") FLG x MJ/PO ADAPTER (IF REQUIRED)
⑦	TRACER WIRE ACCESS PORT, 100mm (4") x 200mm 8" LONG SDR 35 SEWER PIPE W/ CAP (AS-REQUIRED)	⑭	SIZE x 150mm (6") MJ/PO/FLG x FLG TEE
		⑮	WATER MAIN

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	150mm (6") FIRE HYDRANT INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75			
Add Metric		T. Stanton	03/03			
Replaced W-10		J. Tomasulo	10/04			
						DRAWING NUMBER WF-01



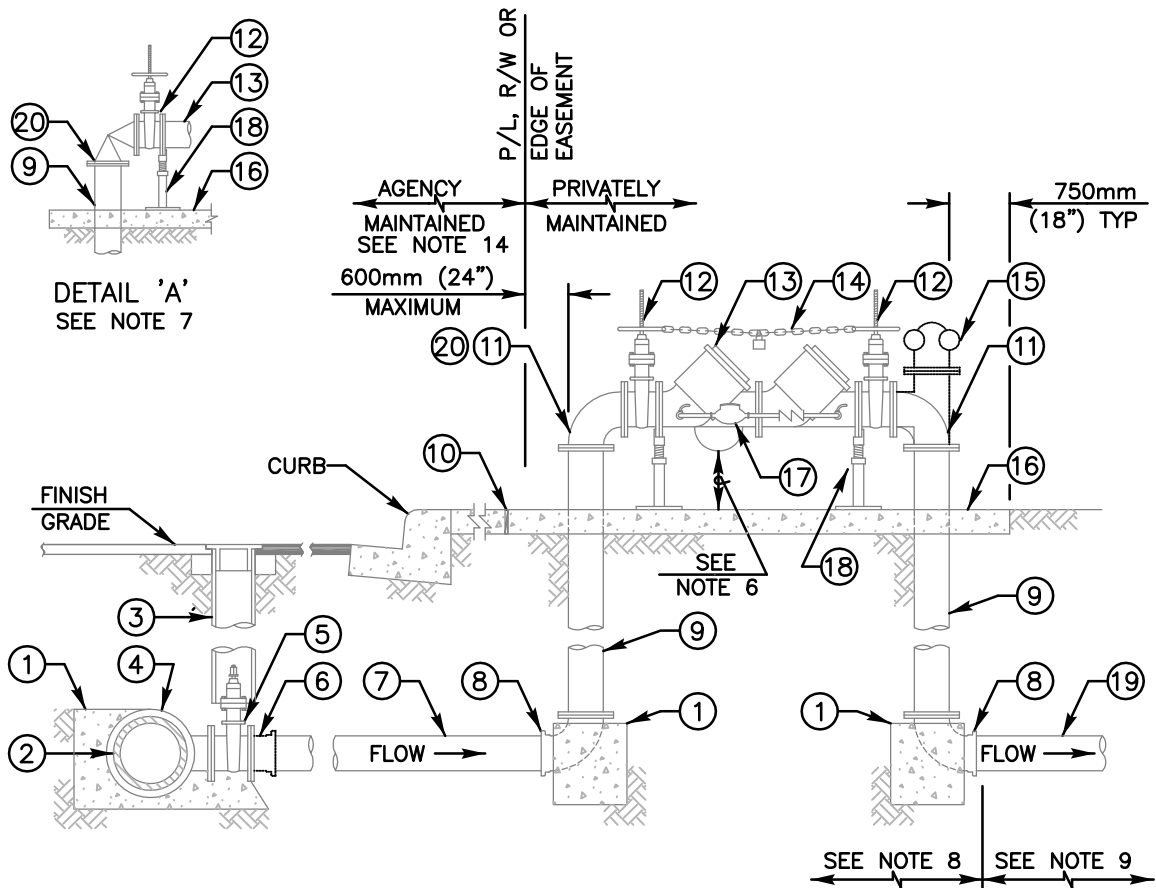
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER PER WM-04
- 3) LOCATE FIRE HYDRANT AS SHOWN ABOVE OR AS DIRECTED BY THE ENGINEER
- 4) FIRE HYDRANTS SHALL BE INSTALLED WITH THE LARGEST PORT PERPENDICULAR TO THE STREET
- 5) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF FIRE HYDRANT
- 6) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE CURB OR SIDEWALK A COLD JOINT STRIP SHALL BE INSTALLED
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	FIRE HYDRANT LOCATIONS AND PORT ORIENTATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>T. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75			
Add Metric		T. Stanton	03/03			
Replaced W-11		J. Tomasulo	10/04			
						DRAWING NUMBER WF-04



FOR NOTES REGARDING THE INSTALLATION OF
FIRE SERVICES SEE WF-05 SHEET 2 OF 2

RPFS 
LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	CONCRETE THRUST BLOCK SEE WT-01	⑬	RPDA UNLESS OTHERWISE SPECIFIED BY AGENCY OF JURISDICTION SEE NOTE 4
②	WATER MAIN	⑭	CHAIN WITH KNOX LOCK SEE NOTE 4
③	GATE WELL WITH CAP SEE WV-01 OR WV-02	⑮	FLANGED TEE WITH "FDC" SEE NOTE 4
④	SIZE x SIZE MJ/PO/FLG x FLG TEE	⑯	CONCRETE SLAB AS REQUIRED BY AGENCY OF JURISDICTION. MINIMUM 100mm (4") THICK x 900mm (36") WIDE x AS REQUIRED
⑤	FLG x MJ/PO/FLG RWGV	⑰	19mm (3/4") BYPASS, METER & RP DEVICE
⑥	FLG x MJ/PO ADAPTER (IF REQUIRED)	⑱	ADJUSTABLE VALVE SUPPORT
⑦	C-900 PVC PIPE	⑲	PVC OR DI PIPE SEE NOTE 9
⑧	MJ/PO x FLG 90° BEND	⑳	FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 7
⑨	FLANGED DUCTILE IRON PIPE		
⑩	COLD JOINT STRIP		
⑪	FLANGED 90° BEND, SEE NOTE 7		
⑫	FLANGED OS&Y RWGV WITH HAND WHEEL		

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-26		J. Tomasulo	10/04		
				100mm (4") AND LARGER FIRE SERVICE INSTALLATION	DRAWING NUMBER WF-05 (1 OF 2)

NOTES:

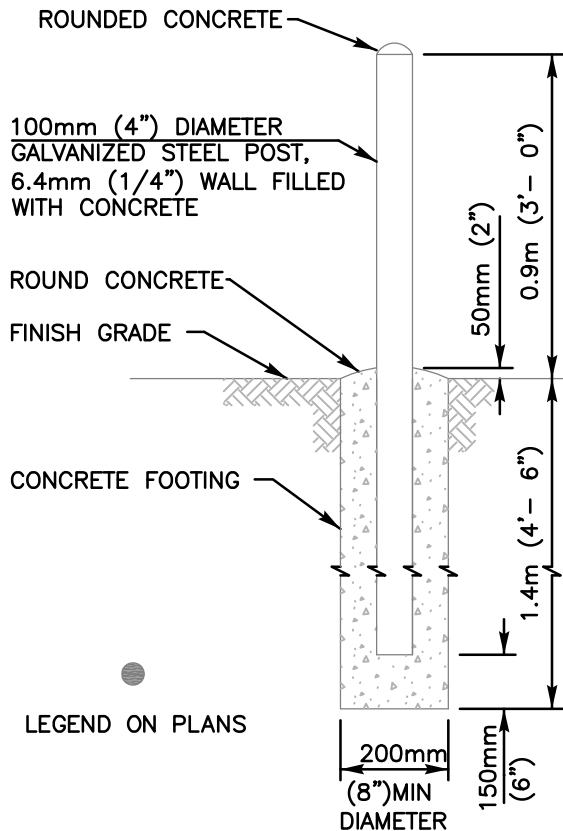
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 3) LOCATION OF FIRE SERVICES SHALL BE AS DIRECTED BY THE FIRE DEPARTMENT OF JURISDICTION. FIRE SERVICES SHOULD BE LOCATED IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION, REPAIR, AND USAGE
- 4) TAMPER SWITCH, AUTOMATIC RESET, CHAIN WITH KNOX LOCK, AND FIRE DEPARTMENT CONNECTION ("FDC") SHALL BE AS REQUIRED BY THE FIRE DEPARTMENT OF JURISDICTION
- 5) BALL VALVE TEST COCKS SHALL BE PROVIDED AND LOCATED PER THE MANUFACTURES RECOMMENDATIONS AND THE REQUIREMENTS OF THE WATER AGENCY STANDARDS
- 6) INSTALL FIRE SERVICES SO THAT THE DISTANCE BETWEEN THE BOTTOM OF THE RELIEF DIAPHRAM AND THE CONCRETE SLAB OR FINISH GRADE IS 300mm (12") MINIMUM AND 600mm (24") MAXIMUM
- 7) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° BEND WHEN SYSTEM STATIC PRESSURE EXCEEDS 1.03 MPa (150 PSI) OR WHEN RECOMMENDED BY THE BACKFLOW MANUFACTURER
- 8) INSTALL PIPE AND RELATED APPURTENANCES IN THIS AREA PER THE REQUIREMENTS OF THE WATER AGENCY STANDARDS
- 9) INSTALL PIPE AND RELATED APPURTENANCES IN THIS AREA AS REQUIRED BY THE FIRE DEPARTMENT OF JURISDICTION
- 10) ABOVE GROUND APPURTENANCES SHALL BE PAINTED AND IDENTIFIED AS CALLED FOR BY THE FIRE DEPARTMENT OF JURISDICTION
- 11) TESTING SHALL BE CONDUCTED AS CALLED FOR IN AGENCY'S SPECIFICATIONS PRIOR TO ACCEPTANCE BY THE DISTRICT
- 12) CONNECTIONS TO STEEL MAINS SHALL BE IN ACCORDANCE WITH AGENCY'S SPECIFICATIONS
- 13) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
- 14) AGENCY RESPOSIBILITY ENDS AT EDGE OF PROPERTY LINE, RIGHT OF WAY, OR EASEMENT.

FOR DETAILS REGARDING THE INSTALLATION OF
FIRE SERVICES SEE WF-05 SHEET 1 OF 2

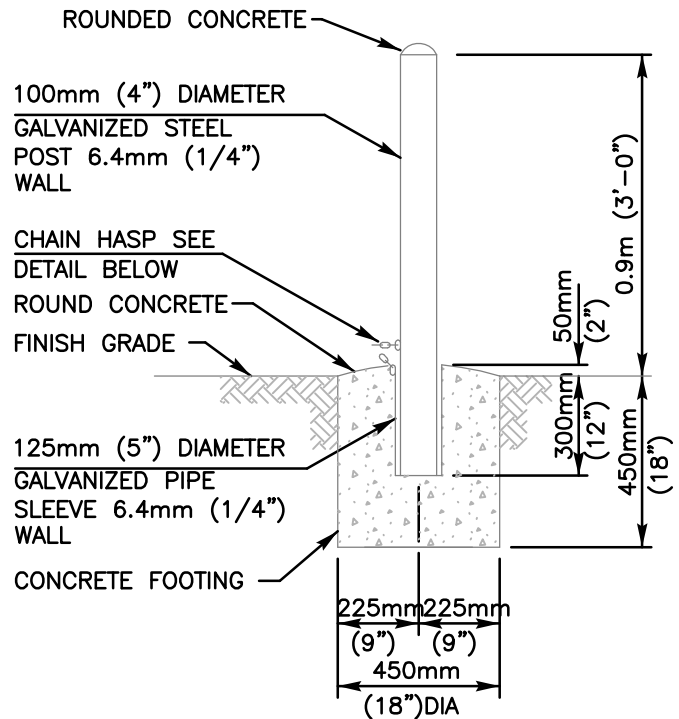


LEGEND ON PLANS

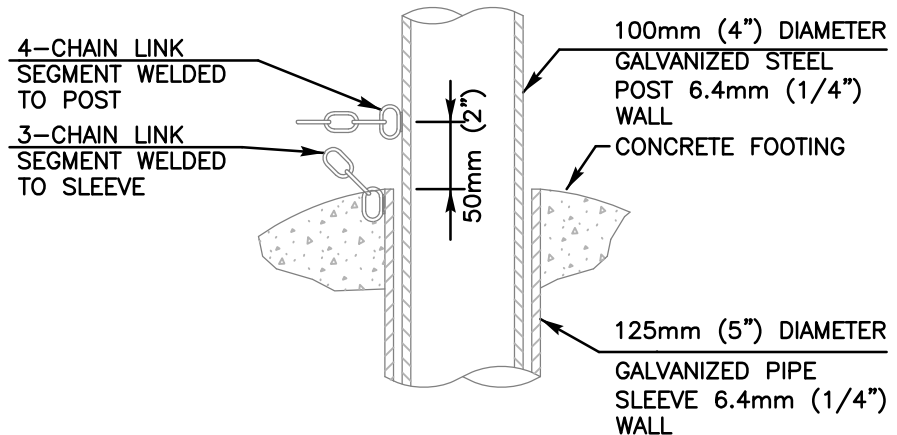
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	100mm (4") AND LARGER FIRE SERVICE INSTALLATION NOTES	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75			<i>T. Stanton</i> 10/28/2004
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Replaced W-26		J. Tomasulo	10/04			DRAWING NUMBER WF-05 (2 OF 2)



PROTECTION POST TYPE "A"



DEMOUNTABLE PROTECTION POST TYPE "B"

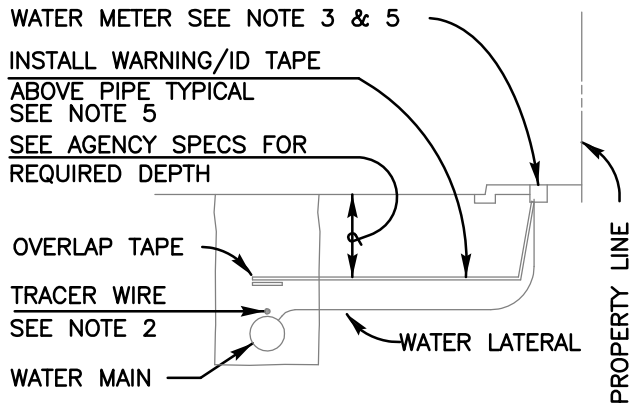


CHAIN HASP DETAIL

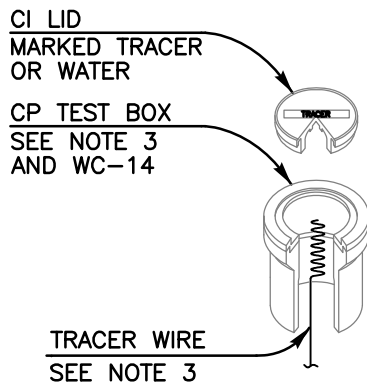
NOTES:

- 1) TYPE "A" AND TYPE "B" PROTECTION POSTS SHALL BE INSTALLED WHERE INDICATED ON THE APPROVED PLANS OR AS DIRECTED BY THE ENGINEER. SDG&E REQUIREMENTS DICTATE IN AREAS OF SDG&E EQUIPMENT
- 2) CHAIN TO BE 6.4mm (1/4") PROOF COIL CHAIN GALVANIZED STEEL. WELD 4-LINK SEGMENT TO POST AND 3-LINK SEGMENT TO SLEEVE
- 3) TYPE "A" AND TYPE "B" PROTECTION POSTS SHALL BE COATED USING SAFETY YELLOW IN ACCORDANCE WITH AGENCY'S STANDARDS

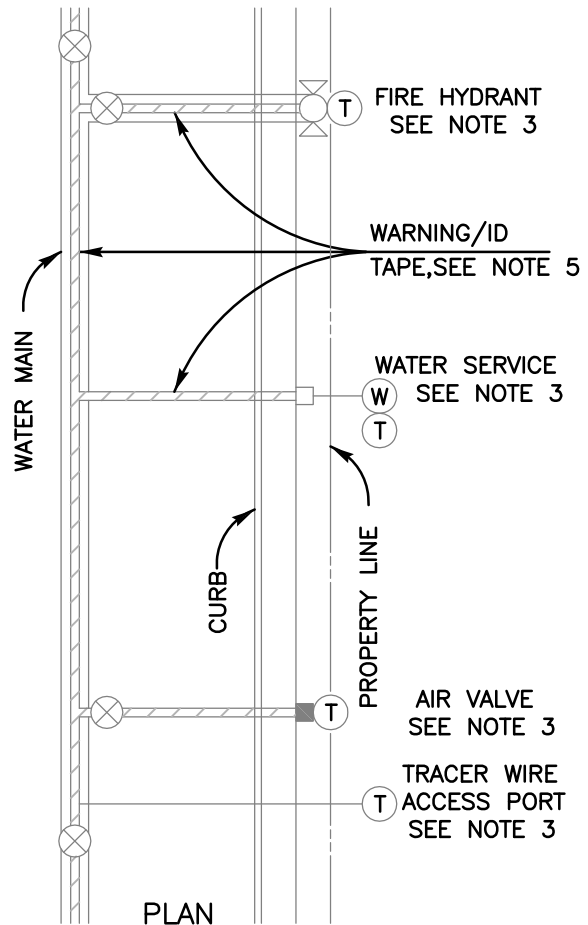
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		<i>[Signature]</i> 10/28/2004
Add Metric		T. Stanton	03/03	PROTECTION POST INSTALLATION	Chairperson R.C.E. 19246 Date
Replaced W-16		J. Tomasulo	10/04		DRAWING NUMBER WM-04



SECTION AT WATER LATERALS



TRACER WIRE ACCESS PORT (CP BOX)
DETAIL



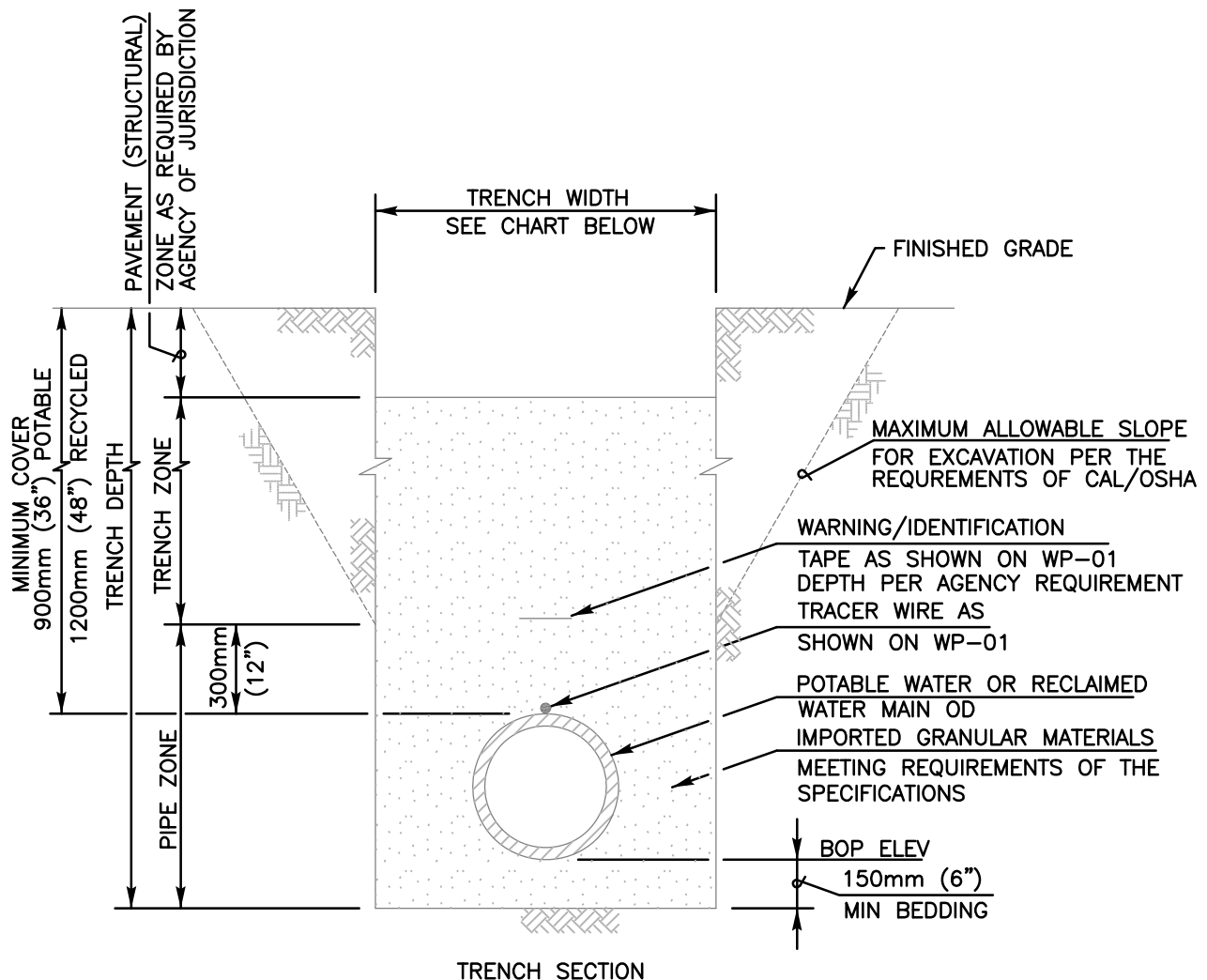
PLAN

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) WHERE SPECIFIED, TRACER WIRE AND OR WARNING ID TAPE, TO RUN CONTINUOUSLY ALONG THE ENTIRE LENGTH OF WATER MAINS. WIRE SHALL BE SECURED TO THE PIPE AND MAINTAINED ON PIPE CENTERLINE DURING TRENCH BACKFILL
- 3) TRACER WIRE ACCESS PORTS SHALL BE INSTALLED WITHIN THE CONCRETE SPLASH PAD OF ALL FIRE HYDRANTS IN ACCORDANCE WITH THE STANDARD DRAWINGS. TRACER WIRE MAY TERMINATE WITHIN METER BOX, BLOWOFF BOX OR AIR VALVE PER AGENCY'S SPECIFICATIONS. TRACER WIRE MAY TERMINATE IN A CP TEST BOX ONLY IF NO OTHER APPURTENANCE EXISTS WITHIN THE REQUIRED 305m (1,000') INTERVAL. ALL BURIED WIRES THAT REQUIRE TRENCHING TO A TEST BOX LOCATION SHALL BE INSTALLED, WITHOUT SPLICE, IN A CONDUIT IN THE TRENCH AT A MINIMUM DEPTH OF 600mm (24")
- 4) WIRE SPLICE CONNECTORS SHALL BE SILICONE FILLED TYPE
- 5) WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED ABOVE THE PIPE AS SPECIFIED AND RUN CONTINUOUSLY ALONG THE ENTIRE LENGTH OF THE PIPE AND ALL RELATED APPURTENANCES
- 6) FOR PIPE BEDDING AND TRENCH BACKFILL SEE WP-02
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

 ——— |
 LEGEND ON PLANS
 (TRACER WIRE)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  10/28/2004
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	WARNING/IDENTIFICATION TAPE AND TRACER WIRE INSTALLATIONS	Chairperson R.C.E. 19246 Date
Replaced W-25		J. Tomasulo	10/04		
				DRAWING NUMBER WP-01	



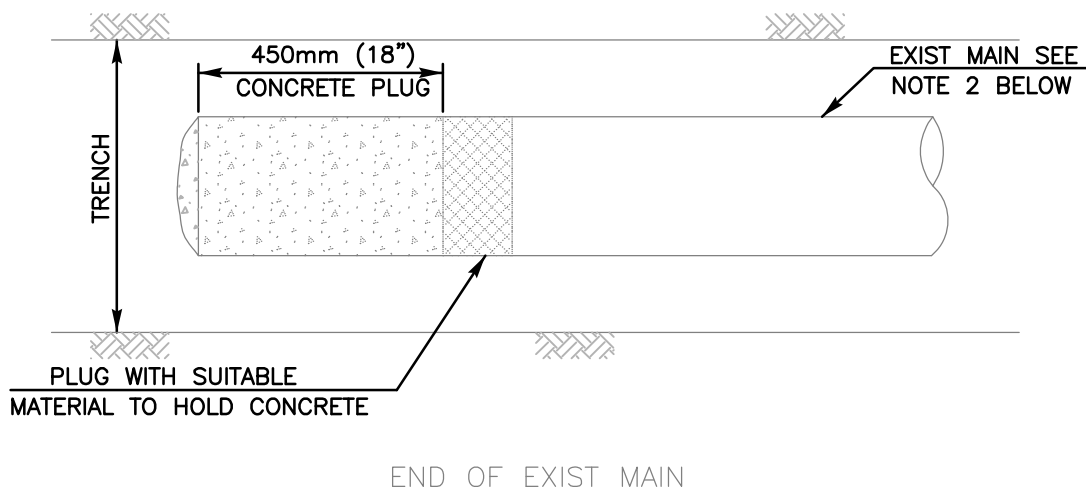
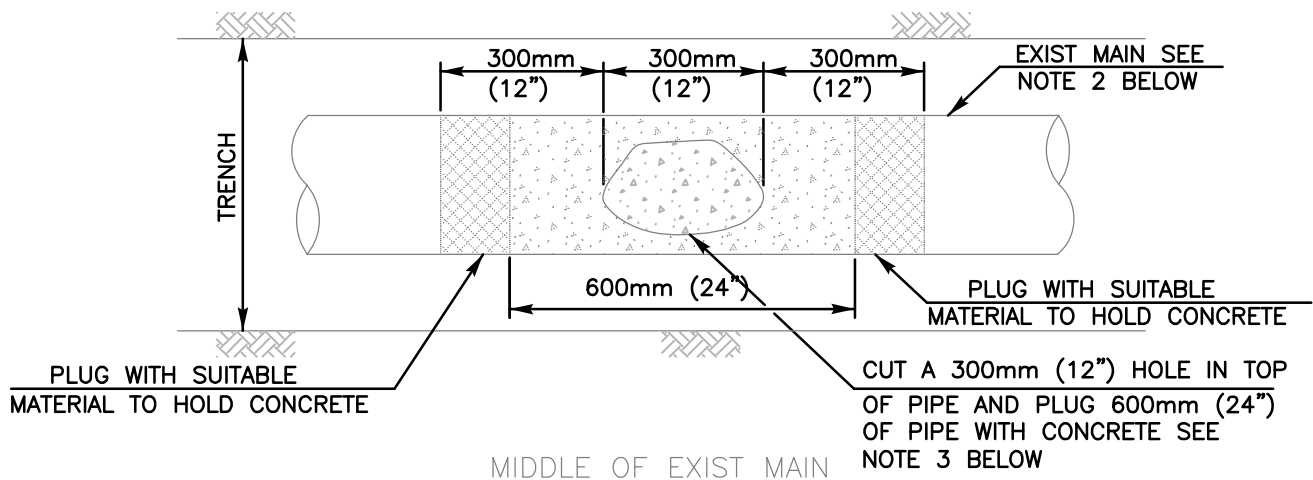
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) PAVING OR PAVEMENT REPAIR TO BE DONE IN ACCORDANCE TO CITY OR COUNTY STANDARDS
- 3) EXCAVATE BELL HOLES AT EACH PIPE JOINT TO PERMIT PROPER ASSEMBLY AND INSPECTION OF THE ENTIRE JOINT
- 4) ALL PIPELINE TRENCHES SHALL BE EXCAVATED SO THAT THE DISTANCE BETWEEN TRENCH WALLS AT THE TOP OF PIPE SHALL BE AS SHOWN BELOW:

TRENCH WIDTH

NOMINAL PIPE INSIDE DIAMETER	MINIMUM DISTANCE	MAXIMUM DISTANCE
100mm (4") & SMALLER	450mm (18")	700mm (28")
150mm & 200mm (6" & 8")	600mm (24")	800mm (32")
250mm & 300mm (10" & 12")	700mm (28")	900mm (36")
400mm THRU 900mm (16" THRU 36")	OD PLUS 600mm(24")	OD PLUS 900mm(36")

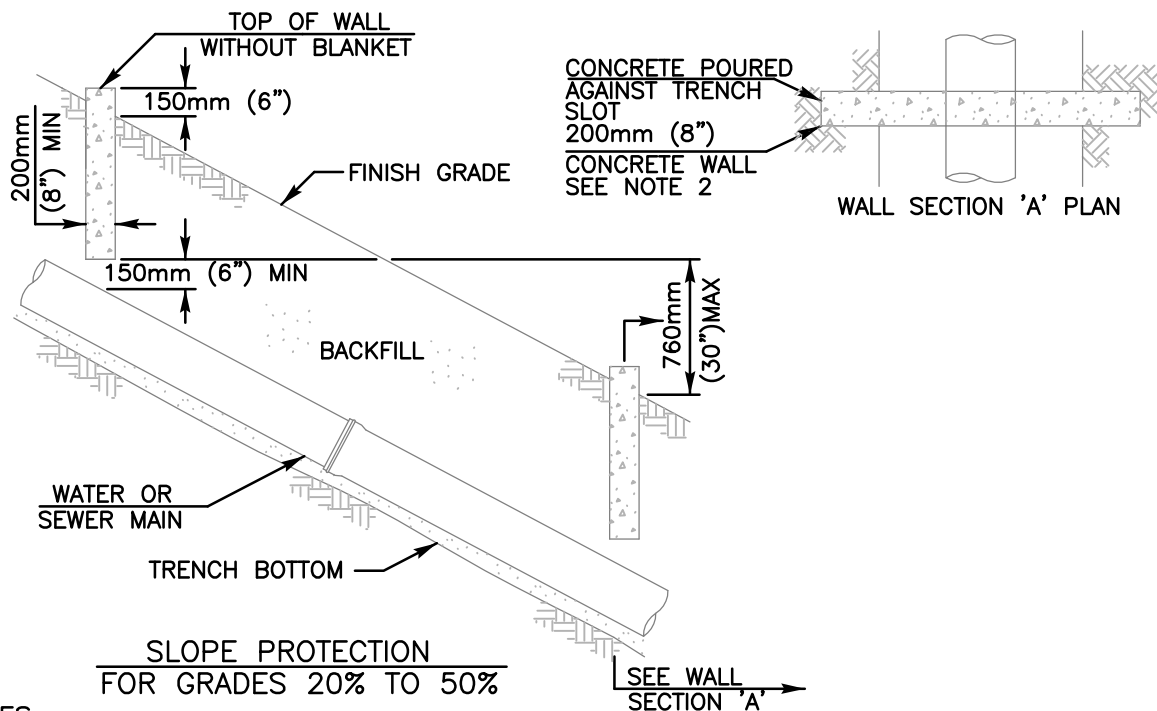
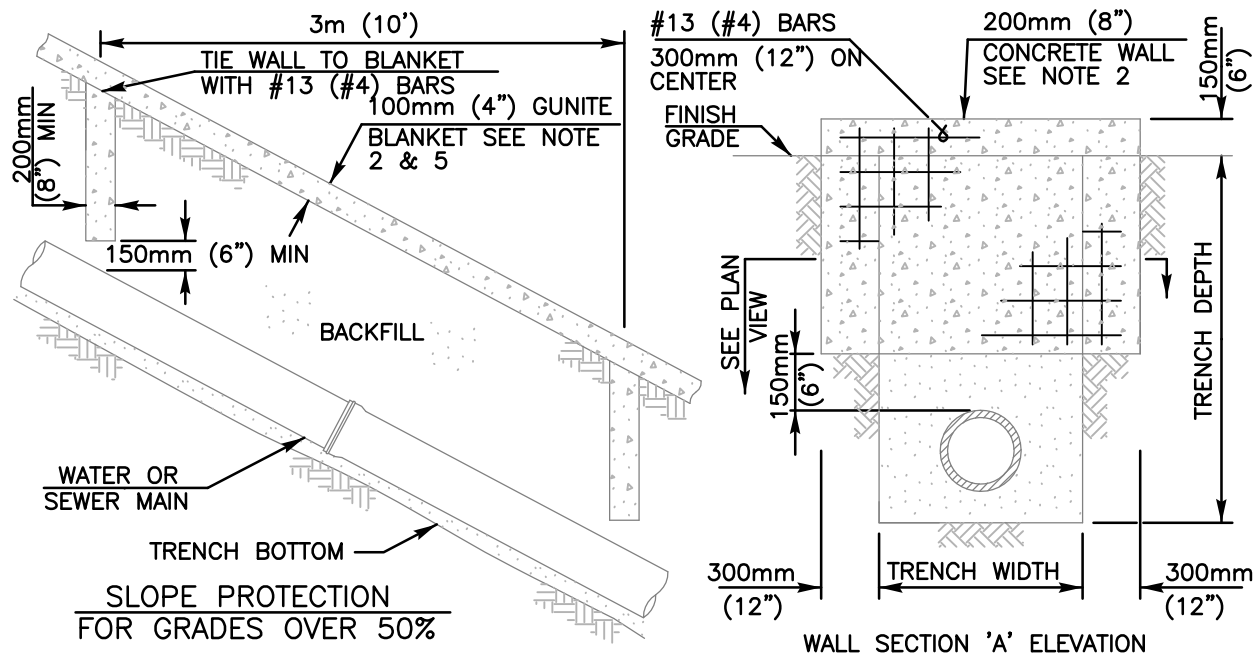
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	PIPE BEDDING AND TRENCH BACKFILL FOR POTABLE AND RECYCLED WATER MAINS	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-21		J. Tomasulo	10/04		
					DRAWING NUMBER WP-02



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) WATER AND RECYCLED WATER MAINS AND SEWER LATERALS 100mm (4") DIAMETER AND SMALLER SHALL HAVE A SHORT SECTION OF PIPE REMOVED AND PIPE ENDS ENCASED IN CONCRETE
- 3) EXISTING MAIN TO BE PLUGGED WITH CONCRETE OR PRESSURE GROUTED AT INTERVALS OF ABOUT 61m (200') OR AS DIRECTED BY THE ENGINEER
- 4) EXISTING MAINS 400mm (16") AND LARGER REQUIRE THE ENTIRE LENGTH OF THE PIPE TO BE FILLED BY PRESSURE GROUTING OR BY BLOWN SAND
- 5) EXISTING VALVES SHALL BE TURNED TO THE CLOSED POSITION. REMOVE GATE WELL AND REPLACE WITH COMPACTED BACKFILL
- 6) FOR ABANDONMENT OF MANHOLES SEE SM-08
- 7) PRIOR AGENCY APPROVAL REQUIRED FOR CUTTING AND PLUGGING

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	10/04		
				CUTTING AND PLUGGING ABANDONED WATER, RECYCLED WATER AND SEWER MAINS	<i>[Signature]</i> 10/28/2004
					Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WP-03

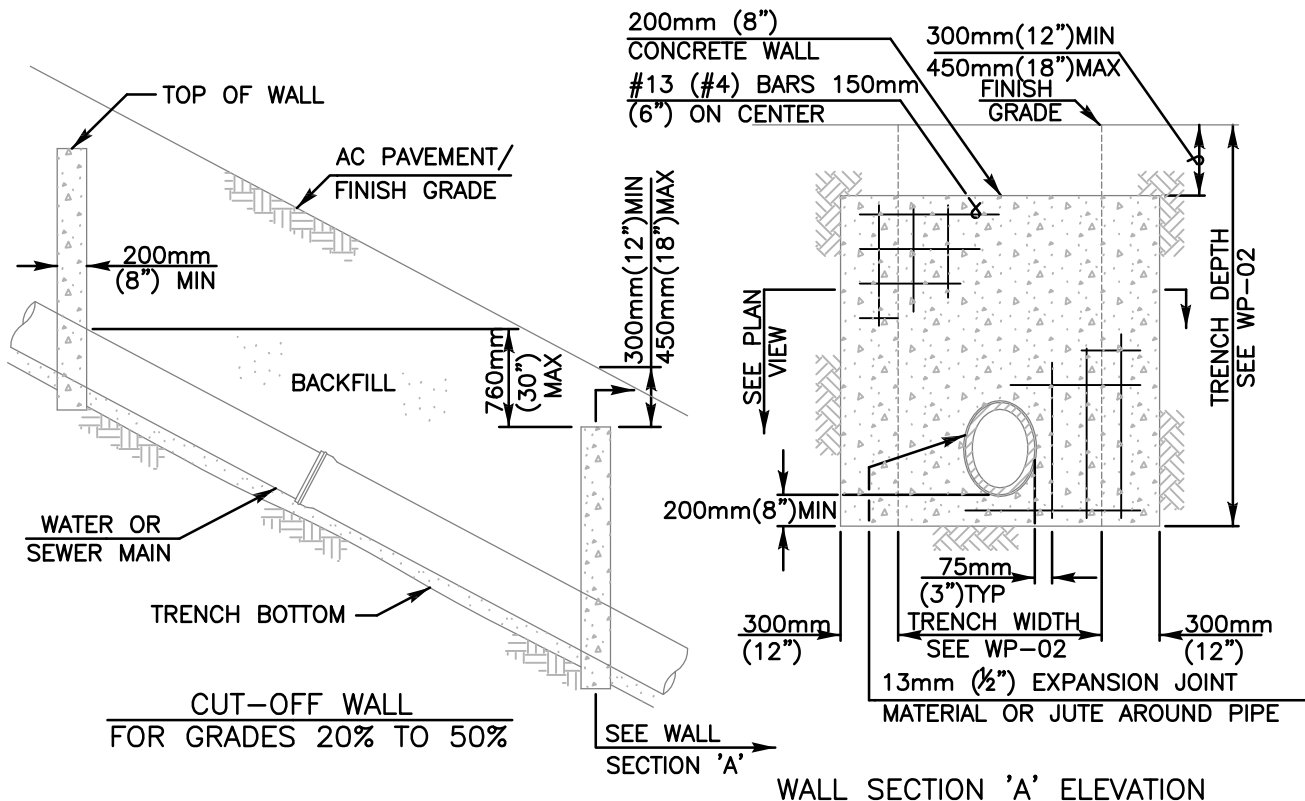


NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITING BLANKET PLACED OVER THE PIPELINE ALIGNMENT
- 5) 100mm (4") GUNITING BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION

LEGEND ON PLANS

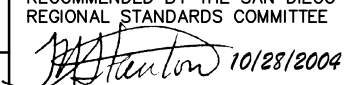
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	10/04		
				SLOPE PROTECTION INSTALLATIONS	 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WP-05

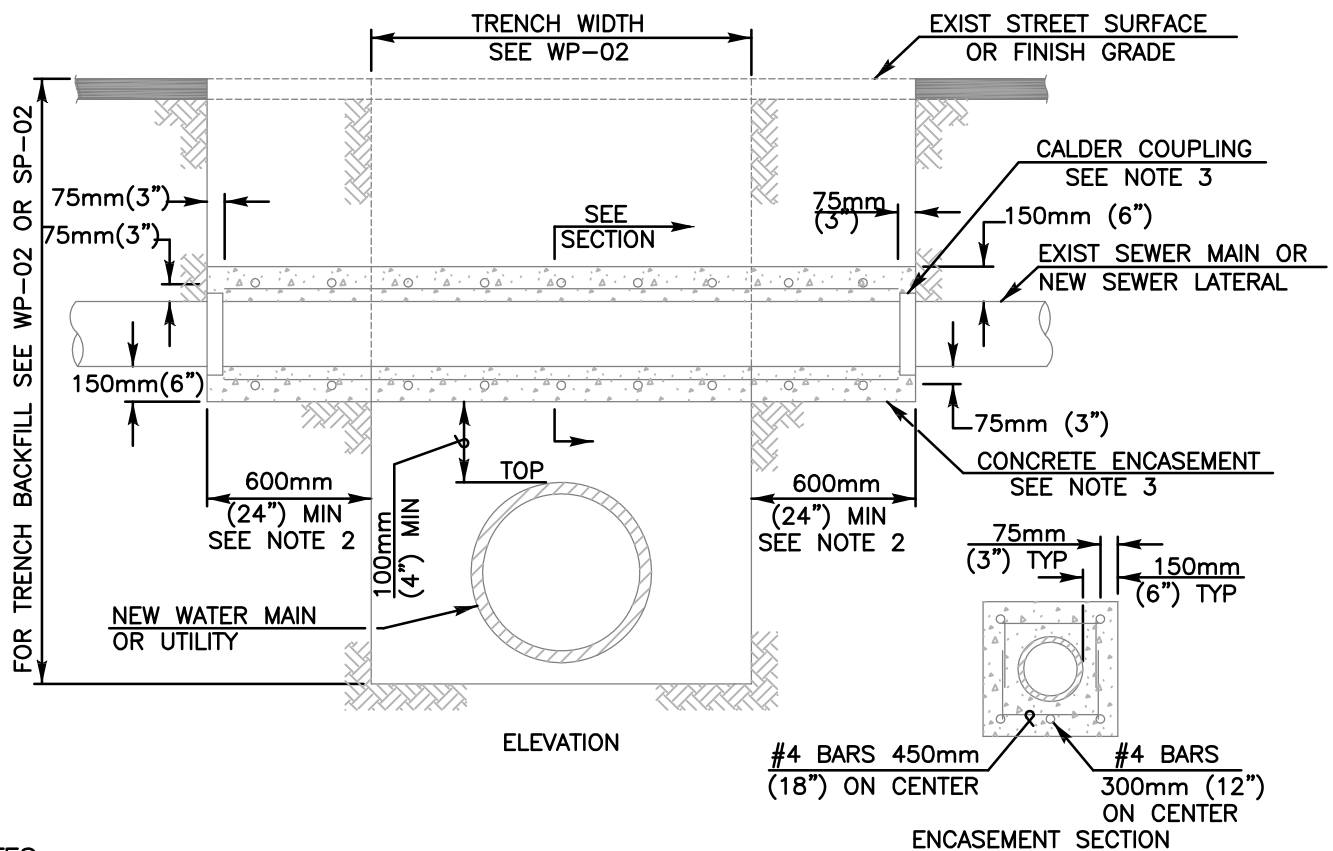
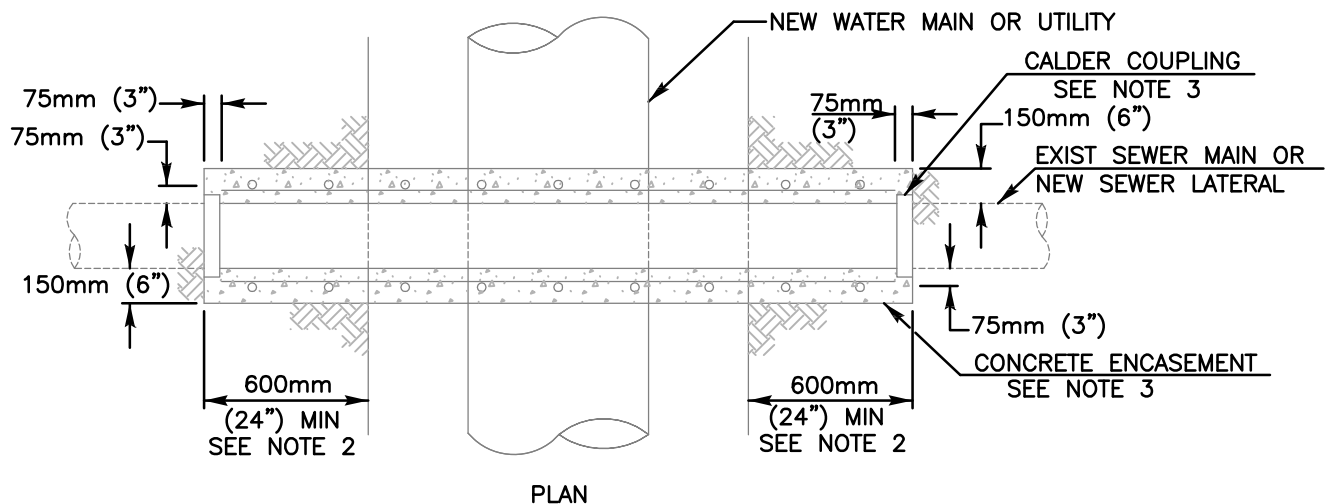


NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR USE AS TRENCH BACKFILL STABILIZATION IN TRAVELED AREAS
- 3) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 4) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 5) FOR GRADES OVER 50% SEE WP-05/SP-05

LEGEND ON PLANS

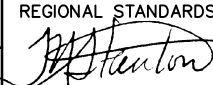
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	10/04		
				CUT-OFF WALL INSTALLATION IN TRAVELED AREAS	 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WP-07

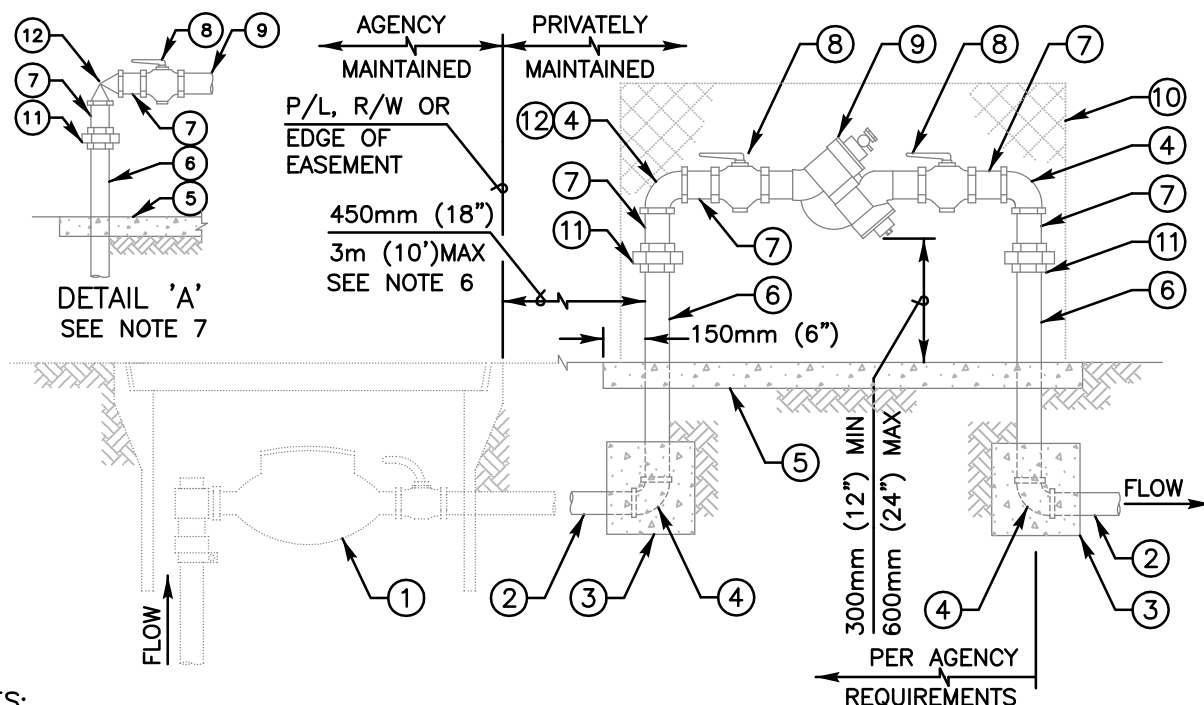


NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
- 2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH [600mm (24") MIN 1200mm (48") MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH].
- 3) CONCRETE ENCASEMENT REQUIRED FOR SEWER MAINS ONLY. CALDER COUPLINGS REQUIRED FOR SEWER LATERALS ONLY. SEWER LATERALS TO BE REPLACED WITH SCH. 80 PVC WITH NO INTERMEDIATE JOINTS.
- 4) FOR PIPE BEDDING AND TRENCH BACKFILL SEE WP-02 OR SP-02.

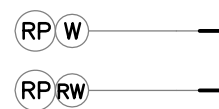
LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		J. Tomasulo	10/04		
				PIPE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS	 10/28/2004 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WP-09



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 3) LOCATE BACKFLOW PREVENTION DEVICE (BPD) IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR
- 4) STRAINERS SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE
- 5) ALL ABOVE GROUND PIPING, UNIONS, ELBOWS, & NIPPLES SHALL BE SOLDERED OR THREADED BRASS
- 6) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE BPD EXCEEDS 450mm (18")
- 7) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° ELL WHEN SYSTEM PRESSURE EXCEEDS 1.03 MPa (150 PSI) PER AGENCY SPECIFICATIONS
- 8) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH AGENCY SPECIFICATIONS PRIOR TO ACCEPTANCE
- 9) BPD & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY SPECIFICATIONS
- 10) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

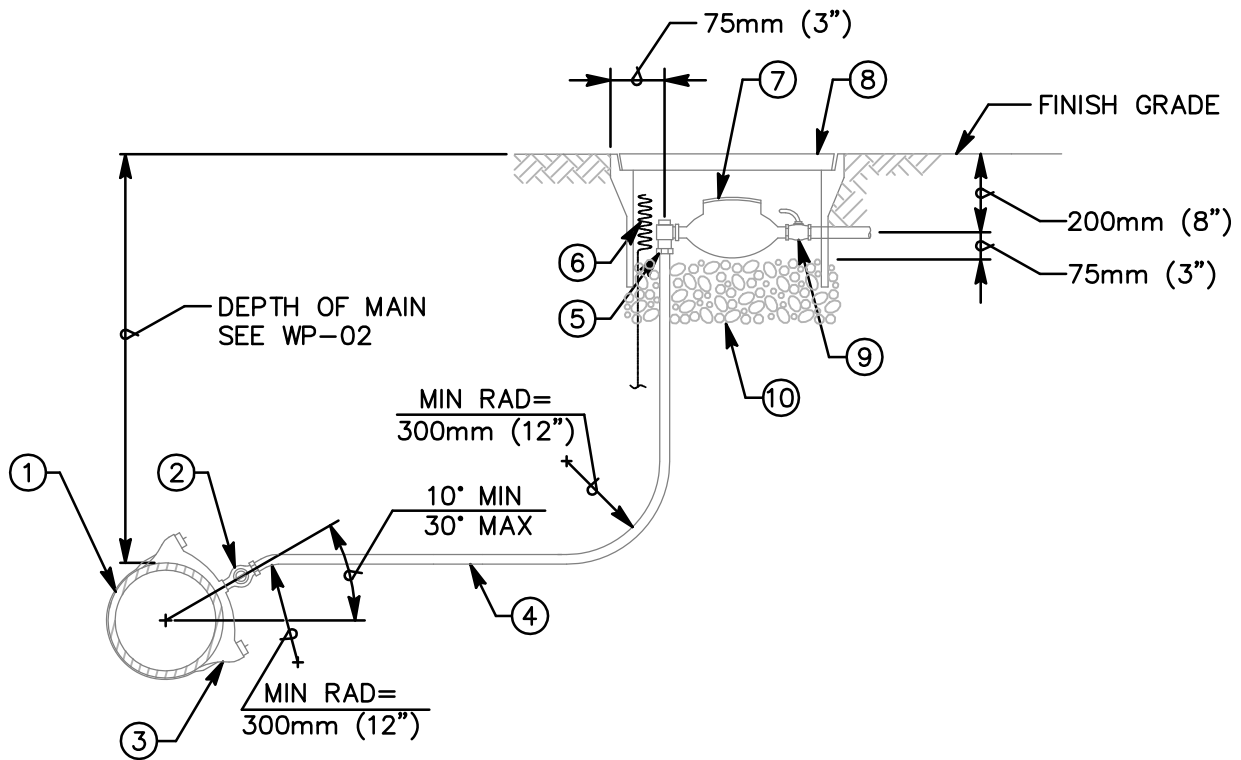


LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	METER BOX & METER ASSEMBLY SEE WS-01 & WS-02	⑥	BRASS OR COPPER PIPE SEE NOTE 5
②	SCH 80 PVC, BRASS OR COPPER PIPE	⑦	75mm (3") LONG NIPPLE SEE NOTE 5
③	CONCRETE THRUST BLOCK SEE WT-01	⑧	BALL VALVE "SHUT-OFF"
④	90° ELL SEE NOTES 5 & 7	⑨	REDUCED PRESSURE BACKFLOW DEVICE
⑤	CONCRETE SLAB, MINIMUM 100mm (4") THICK x 450mm (18") WIDE	⑩	ENCLOSURE (OPTIONAL)
		⑪	UNION SEE NOTE 5
		⑫	ANGLE PRV SEE NOTES 5 & 7

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	19mm THRU 50mm (3/4" THRU 2") REDUCED PRESSURE BACKFLOW PREVENTION DEVICE	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-27		J. Tomasulo	10/04		

DRAWING NUMBER	WR-01
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NOTES:

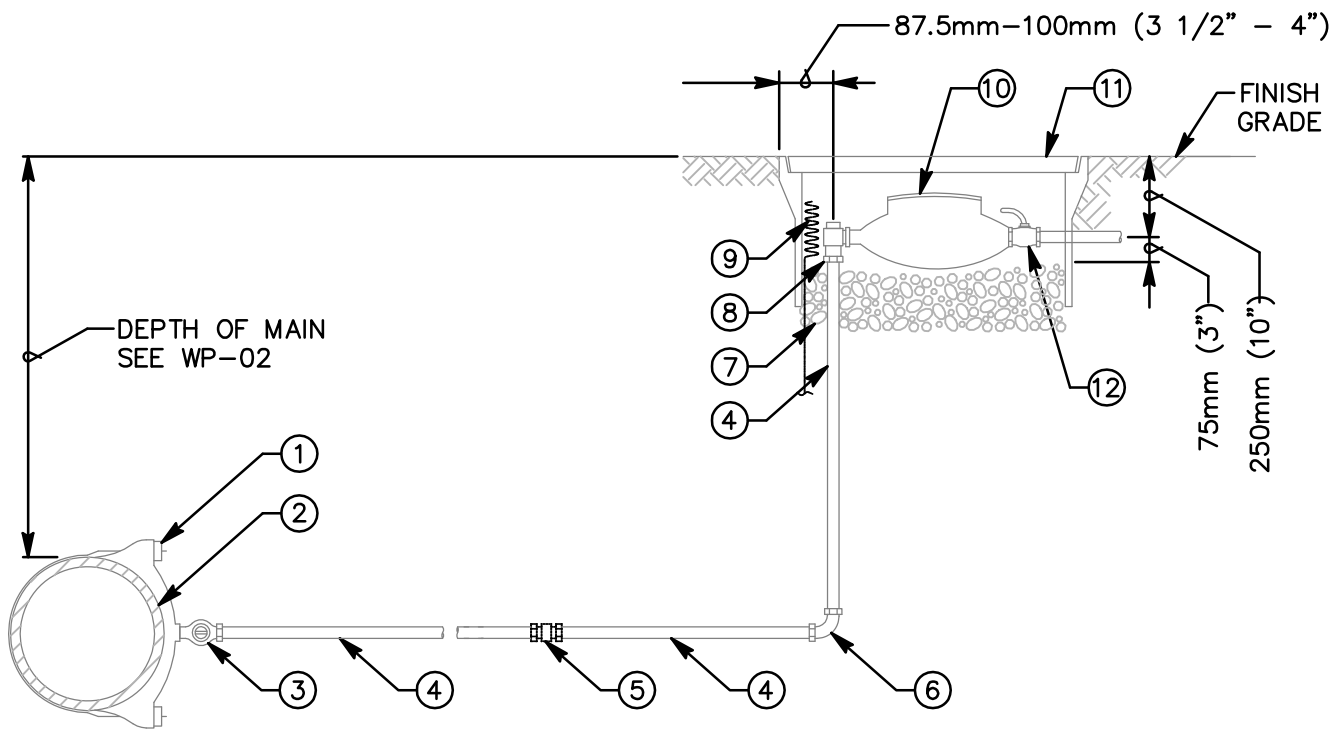
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION
- 3) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE
- 4) LOCATE METER BOX AS SHOWN ON WS-03
- 5) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 6) WATER LATERALS INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY SPECIFICATIONS
- 7) SILVER SOLDER JOINTS SHALL NOT BE USED
- 8) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

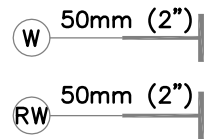
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	WATER MAIN	⑦	WATER METER FURNISHED & INSTALLED BY THE WATER AGENCY OF JURISDICTION
②	25mm (1") BRONZE CORPORATION STOP	⑧	METER BOX WITH LID, 250mm x 500mm (10" x 20")
③	SIZE x 25mm (1") SERVICE SADDLE	⑨	CUSTOMER SHUT-OFF VALVE (LOCKABLE) FURNISHED AND INSTALLED BY THE WATER AGENCY OF JURISDICTION
④	25mm (1") x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT	⑩	10mm (3/8") ROCK, 100mm TO 150mm (4" TO 6") DEEP
⑤	25mm (1") BRONZE ANGLE METER STOP WITH LOCKWING		
⑥	TRACER WIRE (AS REQUIRED), SEE WP-01		

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-01		J. Tomasulo	10/04		
25mm (1") WATER SERVICE INSTALLATION					Chairperson R.C.E. 19246 Date DRAWING NUMBER WS-01



NOTES:

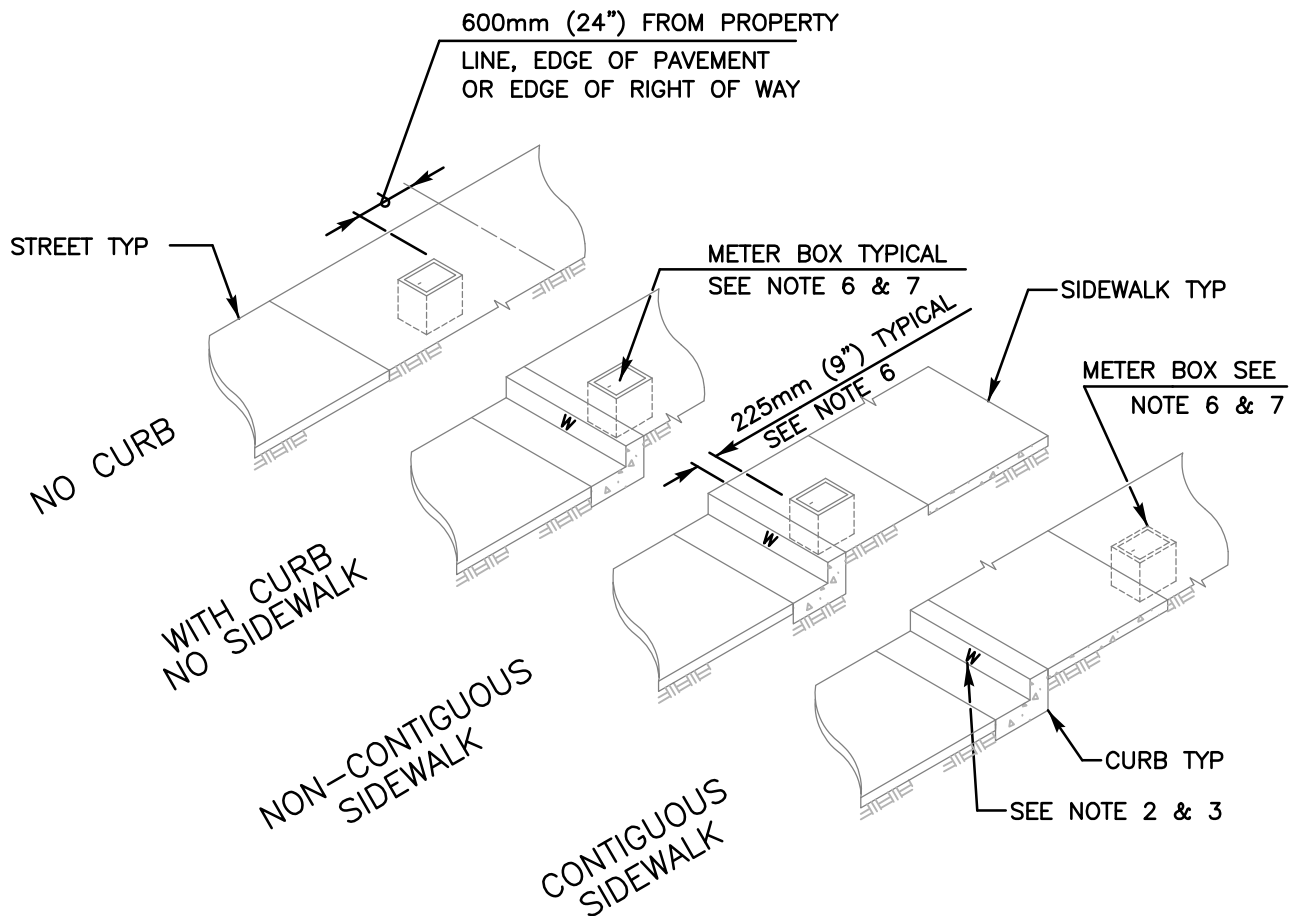
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION
- 3) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE
- 4) LOCATE METER BOX AS SHOWN ON WS-03
- 5) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 6) WATER LATERALS INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY SPECIFICATIONS
- 7) SILVER SOLDER JOINTS SHALL NOT BE USED
- 8) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SIZE x 50mm (2") SERVICE SADDLE	⑦	10mm (3/8") ROCK, 100mm x 150mm (4" TO 6") DEEP
②	WATER MAIN	⑧	50mm (2") BRONZE ANGLE METER STOP WITH LOCKWING
③	50mm (2") BRONZE CORPORATION STOP	⑨	TRACER WIRE (AS REQUIRED), SEE WP-01
④	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT/RIGID OR UNLESS OTHERWISE SPECIFIED BY AGENCY OF JURISDICTION	⑩	WATER METER FURNISHED AND INSTALLED BY THE WATER AGENCY OF JURISDICTION
⑤	50mm (2") BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)	⑪	METER BOX WITH LID, 425mm x 750mm (17"x 30")
⑥	50mm (2") BRONZE COMPRESSION ELL	⑫	CUSTOMER SHUT-OFF VALVE (LOCKABLE)

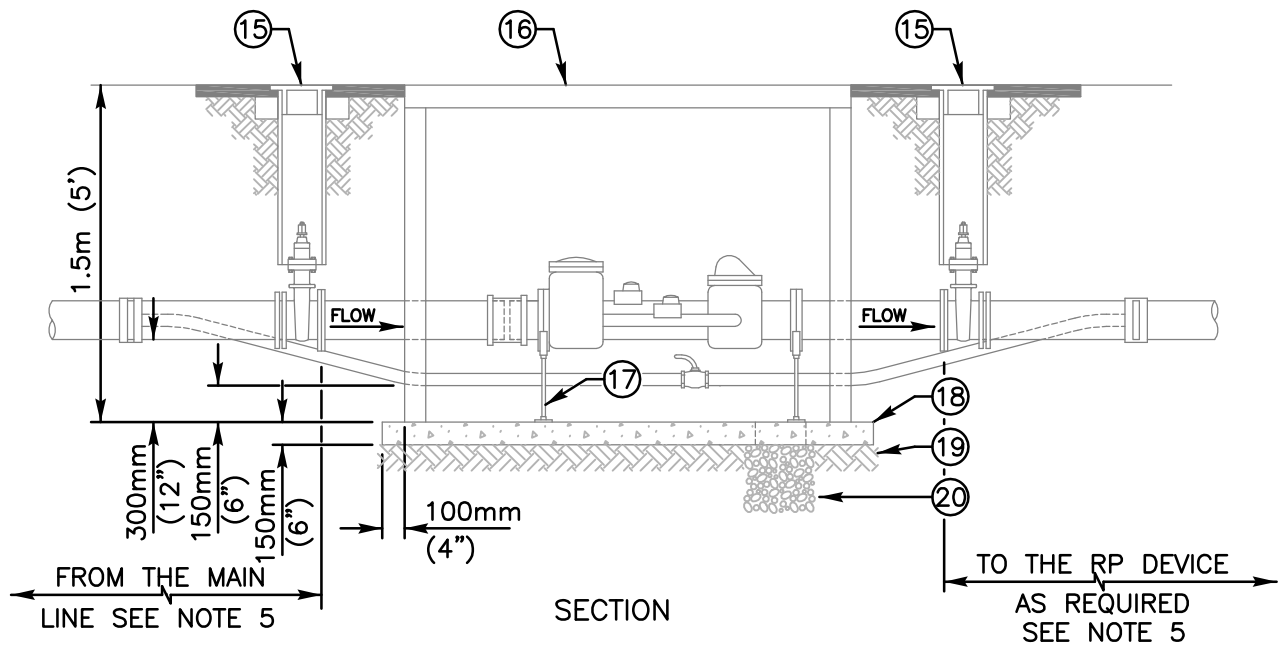
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 50mm (2") WATER SERVICE INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>J. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Replaced W-02		J. Tomasulo	10/04		
					DRAWING NUMBER WS-02



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) STAMP OR CHISEL A 50mm (2") HIGH 'W' IN CURB FACE TO IDENTIFY POTABLE WATER SERVICE LOCATION
- 3) STAMP OR CHISEL A 50mm (2") HIGH 'RW' IN CURB FACE TO IDENTIFY RECYCLED WATER SERVICE LOCATION
- 4) METER BOXES ARE NOT TO BE INSTALLED IN DRIVEWAYS, SIDEWALKS OR WITHIN PAVED ROADWAYS
- 5) MULTIPLE METER BOXES SHALL BE INSTALLED WITH A MINIMUM OF 225mm (9") BETWEEN BOXES
- 6) METER BOX SHALL BE INSTALLED 225mm (9") FROM THE BACK OF BERM, CURB, OR SIDEWALK (TYP)
- 7) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF METER BOX
- 8) METER BOXES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	METER BOX LOCATIONS FOR WATER AND RECYCLED WATER APPURTENANCES	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-15		J. Tomasulo	10/04		
					DRAWING NUMBER WS-03



FOR MATERIAL DESCRIPTIONS AND NOTES SEE WS-04 (2 OF 2)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		J. Tomasulo	10/04		
				100mm (4") OR 150mm (6") FIRELINE/MASTER METER INSTALLATION	DRAWING NUMBER WS-04 (1 OF 2)

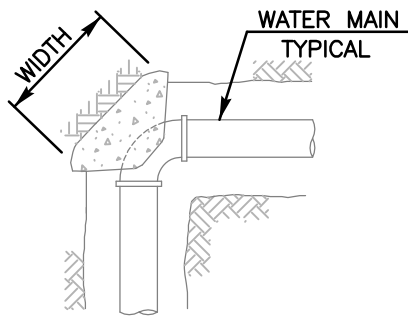
FOR DRAWING OF THE METER INSTALLATION SEE WS-04 (SHEET 1 OF 2)

NOTES:

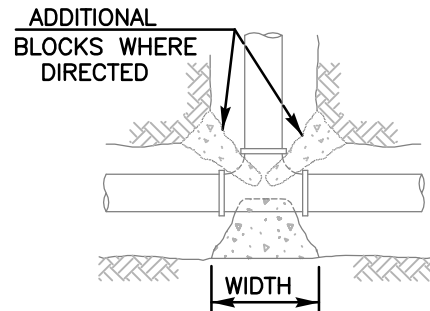
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) TO BE USED WHERE BOTH DOMESTIC SERVICE AND FIRE PROTECTION ARE INSTALLED ON THE SAME PRIVATE SYSTEM
- 3) LOCATION OF METER SHALL BE APPROVED BY THE DISTRICT ENGINEER PRIOR TO INSTALLATION IN ACCORDANCE WITH STANDARD DWG WS-06
- 4) 200mm (8") OR 250mm (10") METERS TO BE DESIGNED BY AN ENGINEER AND SUBMITTED FOR AGENCY'S APPROVAL AS NEEDED ON A CASE-BY-CASE BASIS
- 5) JOINT RESTRAINT SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
- 6) METERS SHALL BE FURNISHED AND INSTALLED BY THE AGENCY OF JURISDICTION
- 7) 100mm (4") METER REQUIRES A 1200mm x 1500mm (48" x 60") VAULT
150mm (6") METER REQUIRES A 1200mm x 1800mm (48" x 72") VAULT
- 8) IN AREAS WHERE GROUND WATER IS PRESENT THE AGENCY'S ENGINEER MAY REQUIRE A SEALED SUMP TO BE CONSTRUCTED
- 9) CONNECTIONS TO STEEL WATER MAINS SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
- 10) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	50mm (2") x REQUIRED LENGTH TYPE "K" COPPER PIPE	⑪	FRP VAULT WITH HINGED ACCESS DOOR, SEE NOTE 7
②	50mm (2") BRONZE CORPORATION STOP	⑫	300mm (12") DIAMETER x 150mm (6") LONG PVC PIPE
③	LINE SIZE x 50mm (2") SERVICE SADDLE	⑬	50mm (2") 90° COMPRESSION ELL (TYPICAL)
④	100mm (4") OR 150mm (6") PVC PIPE	⑭	LINE SIZE x 600mm (24") LONG FLANGED DUCTILE-IRON SPOOL
⑤	100mm (4") OR 150mm (6") FLG x MJ RWGV MECHANICALLY RESTRAINED, SEE NOTE 5	⑮	200mm (8") GATE WELL. SEE WV-01 & WV-02
⑥	LINE SIZE x 150mm (6") LONG FLG x PE DUCTILE-IRON SPOOL	⑯	HINGED VAULT ACCESS DOOR
⑦	50mm (2") COMPRESSION, LOCKABLE BALL VALVE	⑰	ADJUSTABLE PIPE SUPPORT (TYPICAL)
⑧	100mm (4") OR 150mm (6") FLEXIBLE COUPLING	⑱	150mm (6") CLASS "B" CONCRETE FLOOR WITH #3 BARS @ 300mm (12") C.C.
⑨	LINE SIZE x 750mm (30") LONG FLG x PE DUCTILE-IRON SPOOL	⑲	150mm (6") DG BASE COMPACTED TO 90%
⑩	100mm (4") OR 150mm (6") FIRELINE METER SEE NOTE 6	⑳	300mm (12") DIAMETER x 300mm (12") DEEP, 19mm (3/4") GRAVEL SUMP, SEE NOTE 8

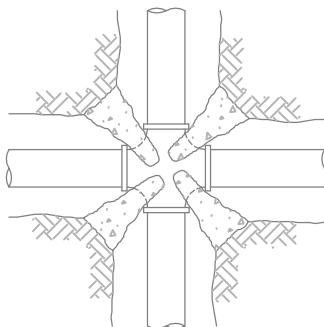
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING 100mm (4") OR 150mm (6") FIRELINE/MASTER METER INSTALLATION	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>[Signature]</i> 10/28/2004 Chairperson R.C.E. 19246 Date DRAWING NUMBER WS-04 (2 OF 2)
ORIGINAL		J. Tomasulo	10/04		



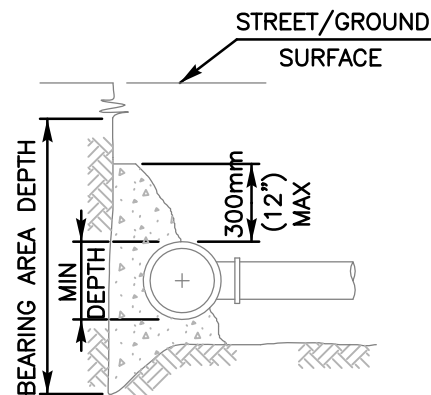
BEND



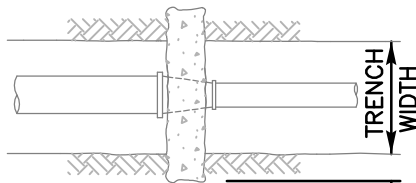
TEE PLAN



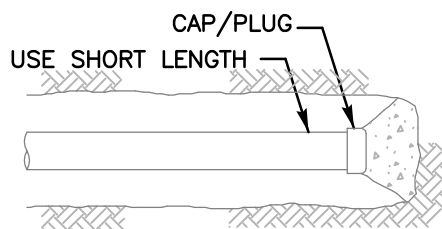
CROSS



TEE ELEVATION

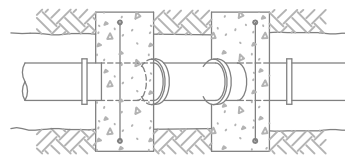


450mm (18") MINIMUM
INTO NATIVE MATERIAL
REDUCER

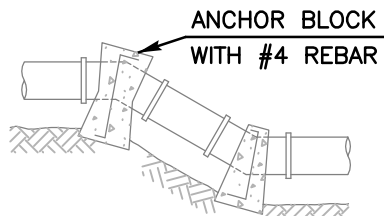


END CAP

SEE NOTE
2 BELOW



VERT BENDS PLAN



VERT BENDS ELEVATION

NOTES:

- 1) FOR ADDITIONAL THRUST BLOCKS, ANCHOR BLOCKS AND NOTES SEE WT-01 (2 OF 3) & (3 OF 3)
- 2) THE ANCHOR BLOCKS ON VERTICAL BENDS REQUIRE AGENCY APPROVAL

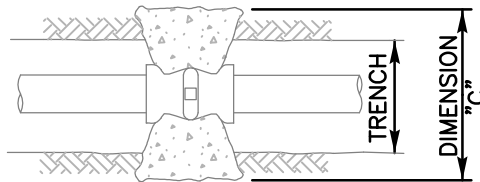
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS	 10/28/2004 Chairperson R.C.E. 19246 Date
Repl. W-17 through W-22		J. Tomasulo	10/04		
					DRAWING NUMBER WT-01 (1 OF 3)

VALVE SUPPORT BLOCK

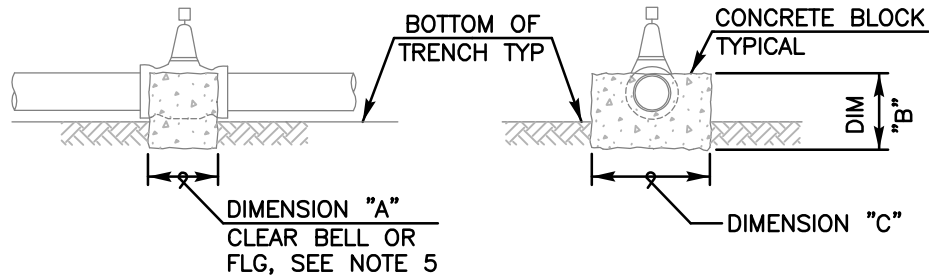
VALVE SIZE	DIMENSION "A"	DIMENSION "B"
100mm(4")	300mm(12")	300mm(12")
150mm(6")	300mm(12")	300mm(12")
200mm(8")	325mm(13")	350mm(14")
250mm(10")	350mm(14")	400mm(16")
300mm(12")	375mm(15")	450mm(18")
DIMENSION "C" = TRENCH WIDTH PLUS TWO TIMES THE PIPE DIAMETER		

THRUST AND ANCHOR BLOCKS

MINIMUM BEARING AREA IN SQUARE METERS (SQUARE FOOT) SEE NOTE 2				
MAIN SIZE	TEES	90° BEND	45° BEND	22½° BEND
100mm(4")	0.4(4)	0.5(5)	0.3(3)	0.1(1.5)
150mm(6")	0.7(8)	0.9(10)	0.5(5)	0.2(2.5)
200mm(8")	1.1(12)	1.5(16)	0.8(9)	0.4(4.5)
250mm(10")	1.6(17)	2.2(24)	1.2(13)	0.6(6.5)
300mm(12")	2.2(24)	3.1(33)	1.8(19)	0.9(9.5)



VALVE SUPPORT PLAN

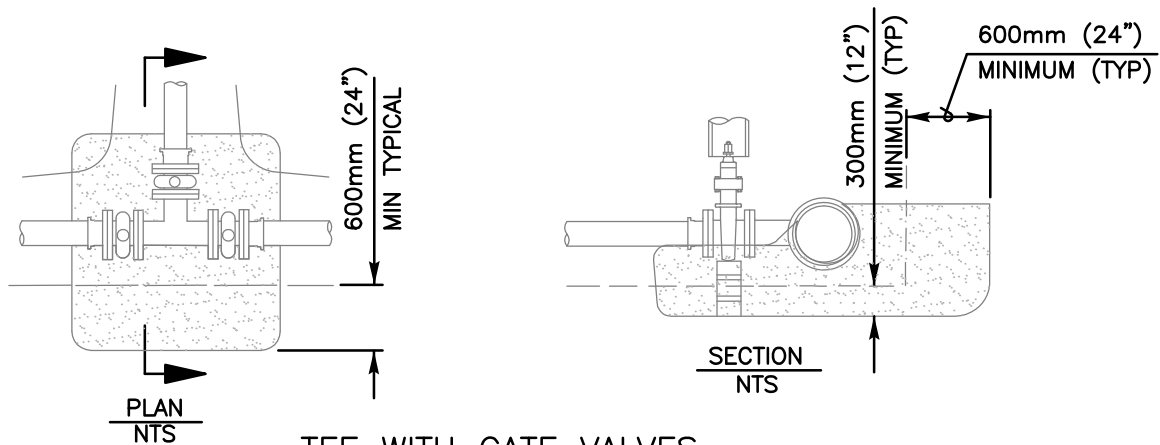


VALVE SUPPORT ELEVATION

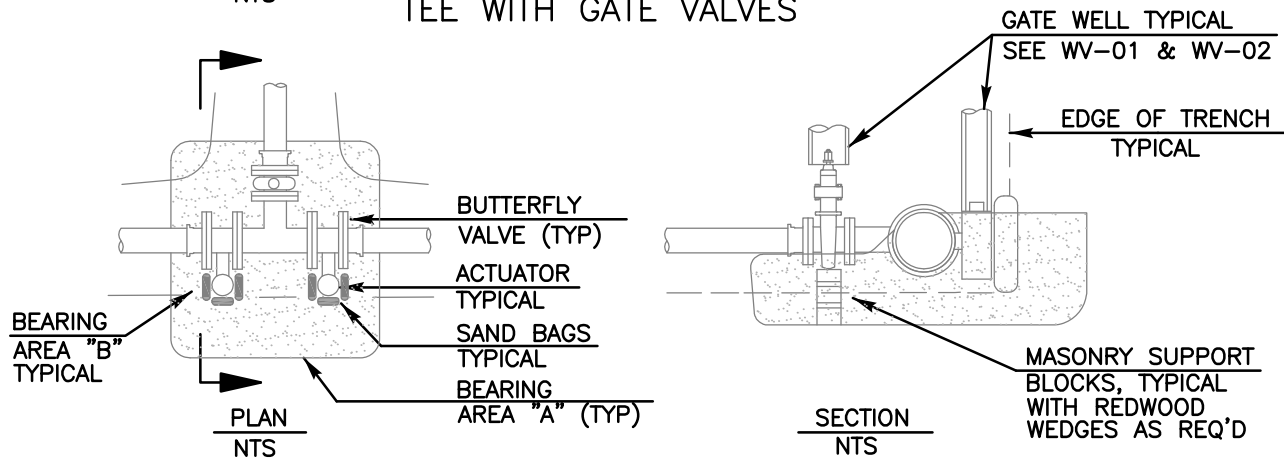
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) BEARING AREA BASED ON SOIL BEARING VALUE OF 71,821 kPa (1500 PSF) AND 1551 kPa (225 PSI) LINE PRESSURE AND A MINIMUM OF 900mm (36") COVER
FOR BEARING= 47,880 kPa (1000 PSF), 1.5 x AREA SHOWN
FOR BEARING= 23,940 kPa (500 PSF), 3.0 x AREA SHOWN
- 3) DESIGN ENGINEER SHALL DETERMINE SIZES, REFER TO AGENCY SPECIFICATIONS FOR THRUST AND ANCHOR BLOCK SIZING
- 4) THRUST BLOCKS SHALL BE CENTERED ON THE FITTING SO THAT THE BEARING AREA IS EXACTLY OPPOSITE THE RESULTANT DIRECTION OF THRUST
- 5) CONCRETE SHALL BE PLACED SO THAT FITTINGS AND VALVES WILL BE ACCESSABLE FOR REPAIR OR REPLACEMENT
- 6) ALL THRUST AND ANCHOR BLOCKS SHALL BE POURED AGAINST WETTED UNDISTURBED SOIL
- 7) FOR MINIMUM CONCRETE CURING TIME REFER TO AGENCY SPECIFICATIONS
- 8) FOR ADDITIONAL THRUST BLOCKS SEE WT-01 (1 OF 3) & (3 OF 3)

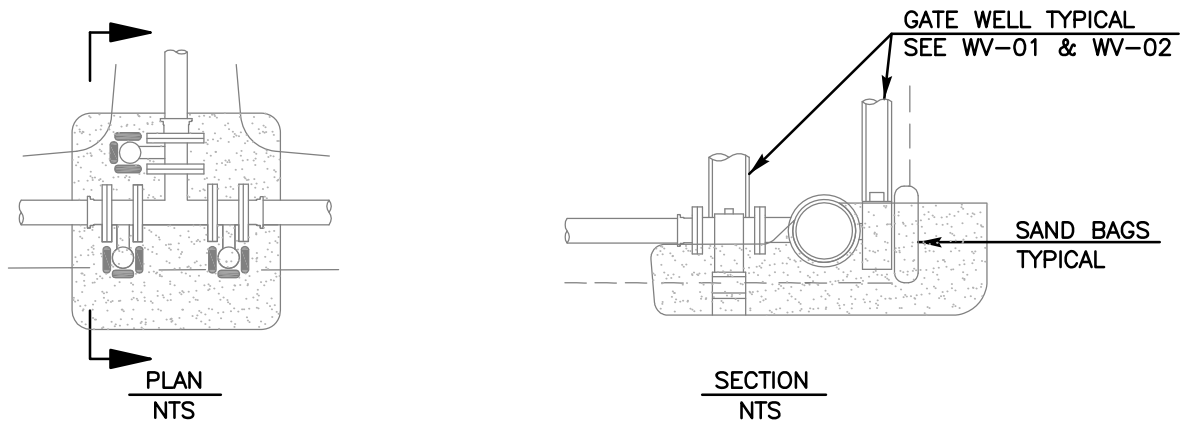
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS	 10/28/2004 Chairperson R.C.E. 19246 Date
Repl. W-17 through W-22		J. Tomasulo	10/04		
					DRAWING NUMBER WT-01 (2 OF 3)



TEE WITH GATE VALVES



TEE WITH BUTTERFLY VALVES ON MAIN

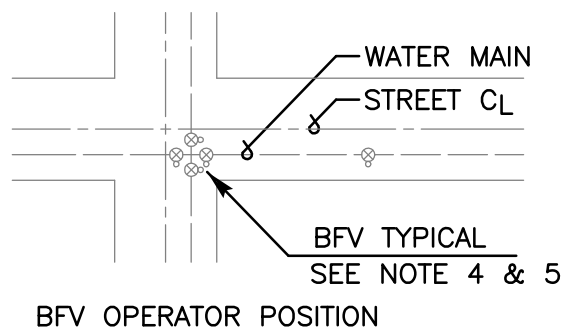
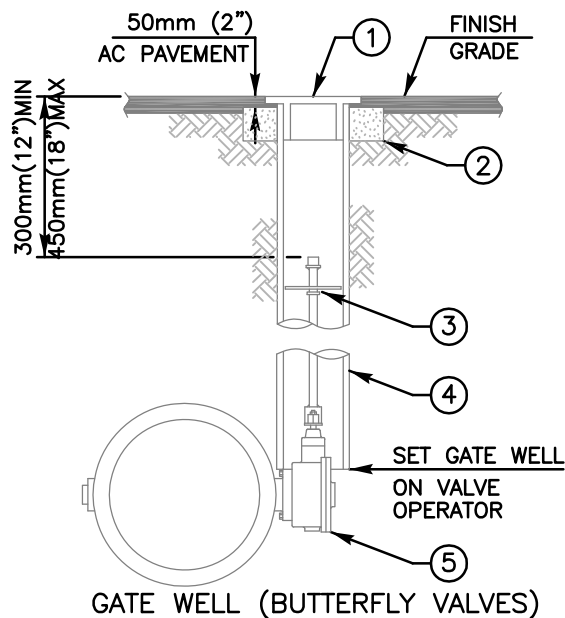
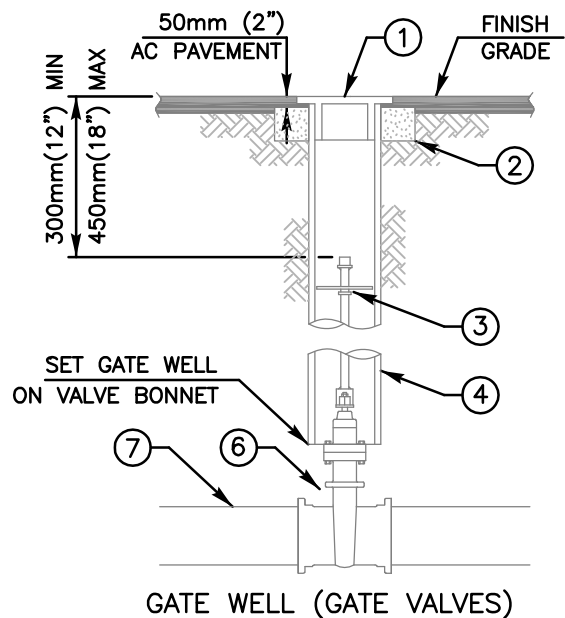


TEE WITH BUTTERFLY VALVES

NOTES:

- 1) BEARING AREA "B" MUST BE EQUAL TO OR GREATER THAN THE AREA REQUIRED FOR A 90° ELBOW INSTALLATION
- 2) INSTALL SAND BAGS AROUND BUTTERFLY VALVE ACTUATOR TO ISOLATE IT FROM CONCRETE
- 3) BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE AGENCY SPECIFICATIONS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS	 10/28/2004
Repl. W-17 through W-22		J. Tomasulo	10/04		
				Chairperson R.C.E. 19246 Date	
				DRAWING NUMBER WT-01 (3 OF 3)	



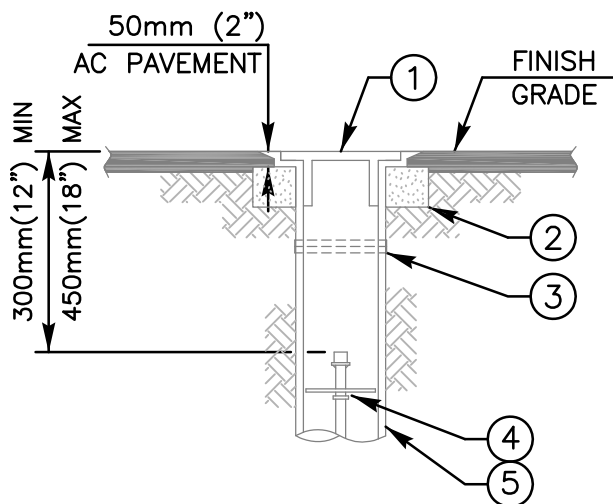
NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VALVES DEEPER THAN 1.5m (5') REQUIRE A VALVE STEM EXTENSION
- 3) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT
- 4) GATE WELL AND CAP SHALL BE SET SO THAT NO MORE THAN TWO 25mm (1") ADJUSTMENT RINGS ARE USED
- 5) BFV OPERATORS TO BE LOCATED TO THE CURBLINE SIDE OF WATER MAIN
- 6) BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE AGENCY'S SPECIFICATIONS
- 7) GATE WELLS AND CAPS SHALL BE IDENTIFIED AS DESCRIBED ON WV-03
- 8) FOR INLINE VALVE ANCHOR BLOCK INSTALLATION SEE WT-02
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

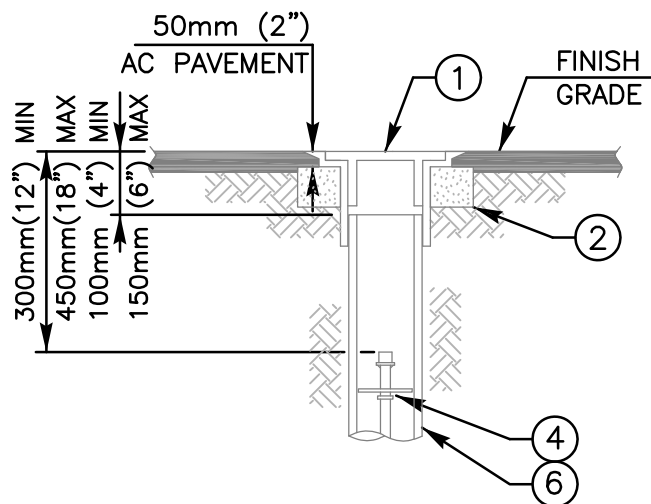
LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	GATE WELL WITH CAP SEE NOTE 7	④	200mm (8") PVC CL 200, C-900 PIPE x REQUIRED LENGTH GATE WELL SEE NOTE 7
②	150mm (6") HIGH x 150mm (6") WIDE COMPACTED ASPHALT-CONCRETE RING	⑤	BUTTERFLY VALVE
③	VALVE STEM EXTENSION SEE NOTES 2 & 3	⑥	RESILIENT WEDGE GATE VALVE
		⑦	WATER MAIN

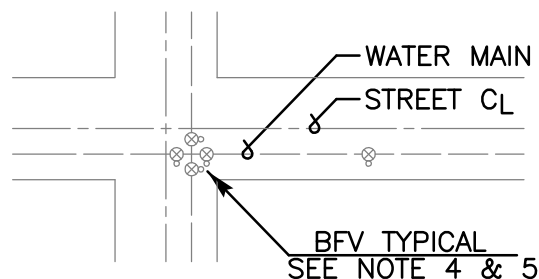
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>J. Stanton</i> 10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Repl. W-12A and W-12B		J. Tomasulo	10/04		
GATE WELL CAP INSTALLATION, FOR VALVES 100mm (4") AND LARGER				DRAWING NUMBER	WV-01



8" GATE WELL TYPE A



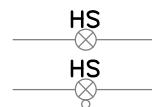
6" GATE WELL TYPE B



BFV OPERATOR POSITION

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VALVES DEEPER THAN 1.5m (5') REQUIRE A VALVE STEM EXTENSION
- 3) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT
- 4) GATE WELL AND CAP SHALL BE SET SO THAT NO MORE THAN TWO 25mm (1") ADJUSTMENT RINGS ARE USED
- 5) BFV OPERATORS TO BE LOCATED TO THE CURBLIN SIDE OF WATER MAIN
- 6) BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE AGENCY'S SPECIFICATIONS
- 7) GATE WELLS AND CAPS SHALL BE IDENTIFIED AS DESCRIBED ON WV-03
- 8) FOR INLINE VALVE ANCHOR BLOCK INSTALLATION SEE WT-02
- 9) GATE WELL TYPE AS APPROVED BY AGENCY
- 10) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	GATE WELL WITH CAP SEE NOTE 7	④	VALVE STEM EXTENSION SEE NOTES 2 & 3
②	150mm (6") HIGH x 150mm (6") WIDE COMPACTED ASPHALT-CONCRETE RING	⑤	200mm (8") PVC CL 200, C-900 PIPE x REQUIRED LENGTH GATE WELL SEE NOTE 7
③	CAULDER COUPLING	⑥	150mm (6") PVC CL 200, C-900 PIPE x REQUIRED LENGTH GATE WELL SEE NOTE 7

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  10/28/2004 Chairperson R.C.E. 19246 Date
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03		
Repl. W-12A and W-12B		J. Tomasulo	10/04		
				GATE WELL CAP & CAN INSTALLATION, FOR VALVES 100mm (4") AND LARGER	DRAWING NUMBER WV-02



RECYCLED
WATER



POTABLE
WATER

GATE WELL LIDS

SEE NOTE 2 BELOW

COLOR	GATE WELL LIDS USED FOR:
RED	NORMALLY CLOSED SYSTEM VALVES (NCV)
PURPLE	RECYCLED WATER VALVES: LINE VALVES & AIR VALVES
YELLOW	POTABLE WATER VALVES: LINE VALVES, FIRE SERVICES, & AIR VALVES
WHITE	FIRE HYDRANTS

GATE WELL LID COLORS

SEE NOTE 5 BELOW

COLOR	GATE WELL AND LIDS USED FOR:
RED	NORMALLY CLOSED SYSTEM VALVES (NCV)
WHITE	RESILIENT WEDGE GATE VALVES
GREEN	BUTTERFLY VALVES

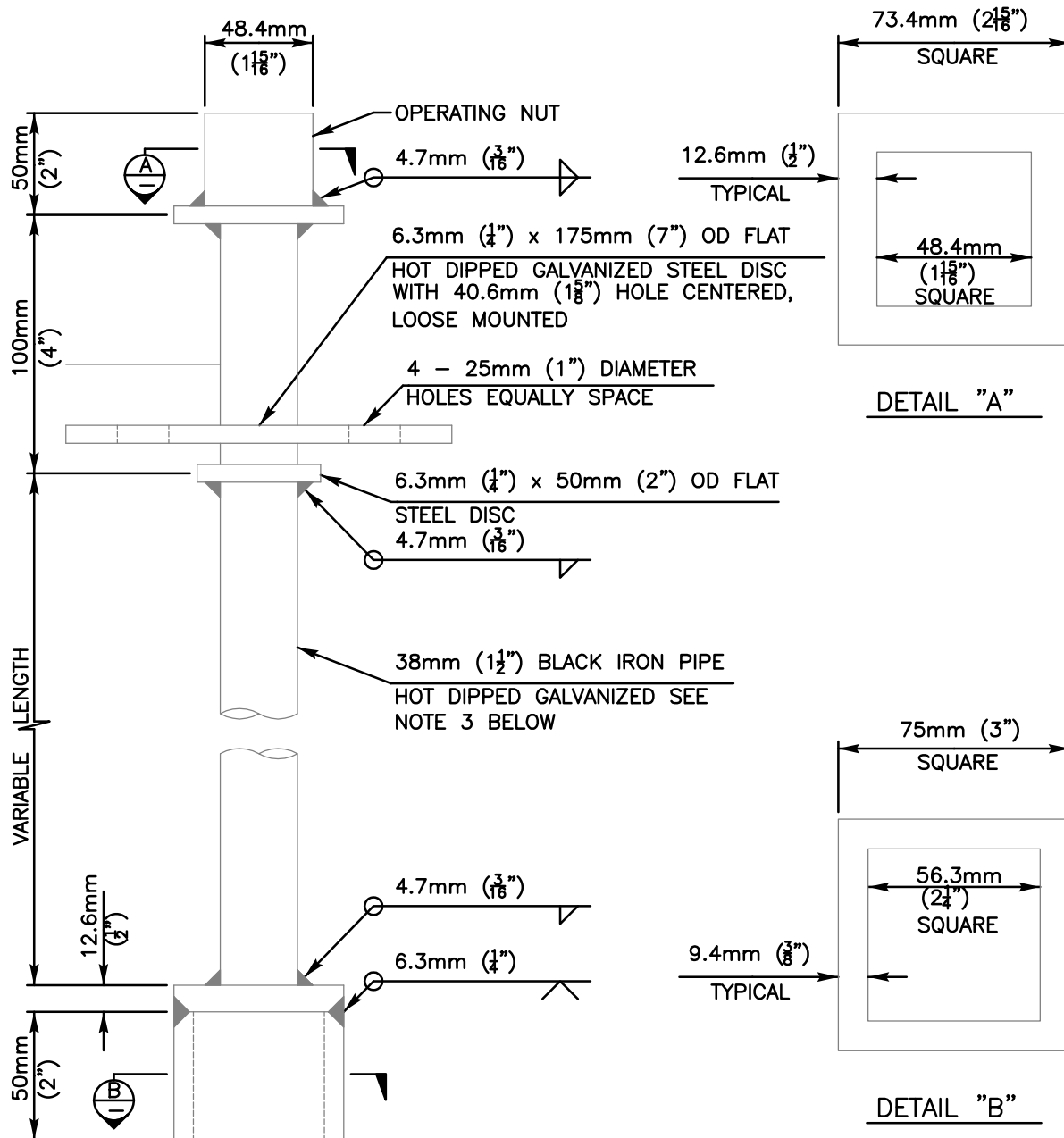
PAINTED IDENTIFICATION MARKING

SEE NOTE 4 BELOW

NOTES:

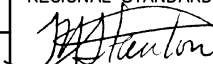
- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) GATE WELL LIDS SHALL BE CAST WITH THE "AGENCY NAME" AND THE WORD "WATER" FOR USE WITH POTABLE WATER SYSTEMS AND "RECYCLED" FOR USE WITH RECYCLED WATER SYSTEMS. LIDS SHALL INCLUDE A 25mm (1") LIFTING SLOT
- 3) PVC GATE WELLS SHALL BE MANUFACTURED IN WHITE OR BLUE FOR USE WITH POTABLE WATER, AND PURPLE FOR USE WITH RECYCLED WATER
- 4) THE INSIDE PORTIONS OF THE GATE WELL LID AND PVC GATE WELL SHALL BE IDENTIFIED WITH A PAINTED IDENTIFICATION MARKING.
- 5) THE TOP EXTERIOR PORTION OF GATE WELL LIDS SHALL BE PAINTED WITH COLORS TO IDENTIFY THE USE OF THE VALVE INSTALLED, AS SHOWN ABOVE
- 6) INSTALLATION FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS AND AS NOTED ABOVE
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

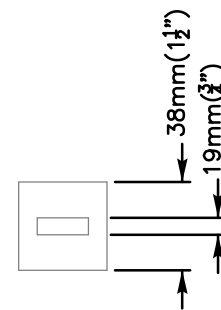
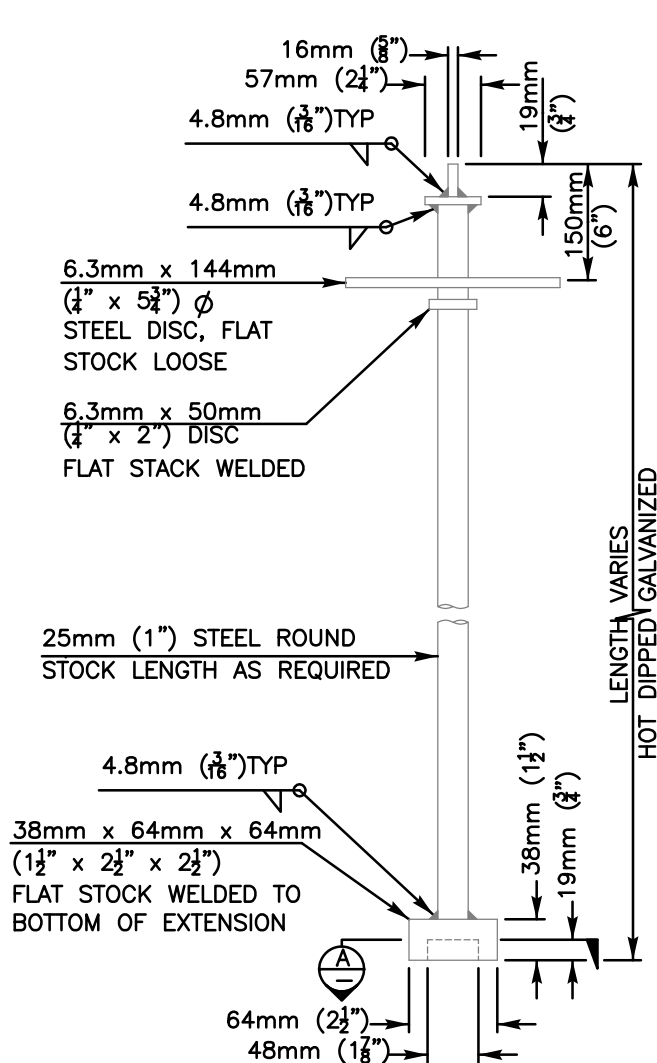
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	GATE WELL IDENTIFICATION	 10/28/2004 Chairperson R.C.E. 19246 Date
Repl. W-12A and W-12B		J. Tomasulo	10/04		
					DRAWING NUMBER WV-03



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE AND STANDARD DRAWINGS WV-01 AND WV-02
- 2) STEEL EXTENSION STEMS SHALL BE USED ONLY WHERE THE MAXIMUM LENGTHS OF THE EXTENSION EXCEEDS 2.4m (8') AND AT THE REQUEST OF THE AGENCY'S ENGINEER
- 3) EXTENSION STEMS SHALL BE ROUND OR SQUARE STEEL TUBING OF SOLID DESIGN (NO PINNED COUPLINGS PERMITTED)
- 4) VALVES DEEPER THAN 1.5m (5') REQUIRE A VALVE STEM EXTENSION
- 5) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT OF THE VALVE
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G. Parkinson	5/92		
Add Metric		T. Stanton	03/03	STEEL VALVE STEM EXTENSION FOR VALVES 100mm (4") AND LARGER	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-13		J. Tomasulo	10/04		
					DRAWING NUMBER WV-04



DETAIL "A"

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) EXTENSION STEMS SHALL BE ROUND STEEL TUBING OF SOLID DESIGN (NO PINNED COUPLINGS PERMITTED)
- 3) VALVES DEEPER THAN 1.5m (5') AND 2" AIR VALVES REQUIRE A VALVE STEM EXTENSION OR AS REQUIRED BY THE AGENCY OF JURISDICTION
- 4) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT OF THE VALVE
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	5/92		
Add Metric		T. Stanton	03/03	STEEL VALVE STEM EXTENSION FOR VALVES 50mm (2") AND SMALLER	 10/28/2004 Chairperson R.C.E. 19246 Date
Replaced W-13		J. Tomasulo	10/04		
					DRAWING NUMBER WV-05

APPENDIX "A"

TRAFFIC CONTROL PLANS

TRAFFIC CONTROL PLANS

APPENDIX "A"

TRAFFIC CONTROL PLANS

GENERAL INFORMATION

The Traffic Control Plans depicted in this Appendix are intended to supplement Part 6 "Temporary Traffic Control" of the 2003 Manual on Uniform Traffic Control Devices (MUTCD) and 2003 MUTCD California Supplement in providing guidance and information on preparing traffic control plans. Other references may also provide useful information on traffic control procedures. It should be understood that implementation of traffic control plans must conform with the latest revisions of Part 6 of the 2003 MUTCD and 2003 MUTCD California Supplement.

Part 6 of the MUTCD Manual "Temporary Traffic Control" are published by the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans). These manuals in combination are issued to provide the basic standards for uniform types of warning signs, lights, and other devices to be placed upon any public roadway or street by a person engaged in performing work which interferes with or endangers the safe movement of traffic flow upon such highway or street, in accordance with sections 21367 and 21400 of the California Vehicle Code.

It is the responsibility of the Contractor or Organization performing work on, or adjacent to, a roadway to install and maintain such devices which are necessary to provide safe passage for the traveling public through the work area and for the safety of the workers. Before work begins, traffic control plans for handling traffic through a construction or maintenance project shall be approved by the engineer of the public agency or authority having jurisdiction over the roadway.

Typical plans for intersections that are controlled by a traffic signal or a multi-way stop are not identified in this Appendix. These instructions require special attention in the preparation of traffic control plans. The approving agency should be notified prior to the preparation of traffic control plans when the work is in or near these intersections.

Special attention is also needed on the traffic control plans when the work areas affect bike lanes, sidewalks, pedestrian access, and curved or narrow roadways. Notification of the approving agency is desirable prior to the preparation of the plan when bicycles and pedestrian routes are affected by the work.

Nothing contained in this Appendix shall prevent local jurisdictions from modifying, changing, or adopting new specifications deemed necessary. The text and typical drawings in this Appendix are not a legal standard. Criteria for position, location, and use of traffic control devices is furnished solely for the purpose of guidance and information to assist in the preparation of traffic control plans.

Revision	By	Approved	Date	APPENDIX "A" SAN DIEGO REGIONAL STANDARD	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  04/27/2006 Chairperson R.C.E. 19246 Date
DRAWING	CRH		4/06		
ORIGINAL			4/27/06	TRAFFIC CONTROL PLANS GENERAL INFORMATION	DRAWING NUMBER TC-1

TRAFFIC CONTROL PLANS

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TC-32	Side of Road - Left Turn Intersection TC
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Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

TRAFFIC CONTROL PLANS

GENERAL INFORMATION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-2**



W20-1



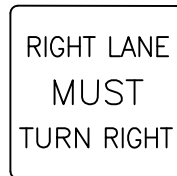
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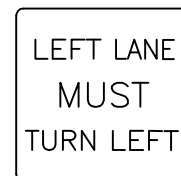
W21-5b



W3-4



R3-7R



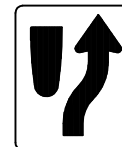
R3-7L



R3-5R



R3-5L



R4-7



R1-1



R3-1



R3-2



R3-4



R3-18

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

APPENDIX "A" SAN DIEGO REGIONAL STANDARD

TYPICAL CONSTRUCTION SIGNS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER TC-3A



W20-3



W20-5R



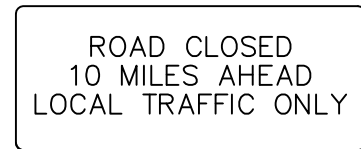
W20-5L



W20-2



R11-2



R11-3a



G20-2



M4-8a



R11-4



M4-10R



M4-10L



M4-8

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

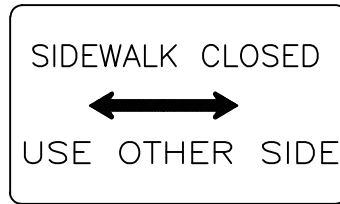
APPENDIX "A"
SAN DIEGO REGIONAL STANDARD

TYPICAL CONSTRUCTION SIGNS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
<i>[Signature]</i>	04/27/2006
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-3B



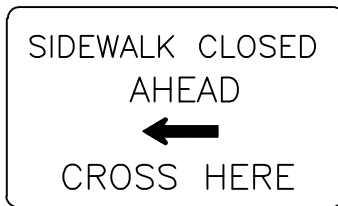
R9-9



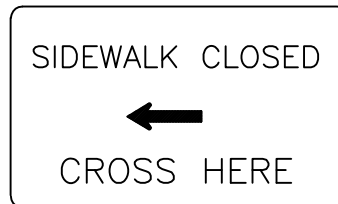
R9-10



R9-3a



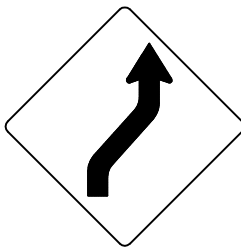
R9-11



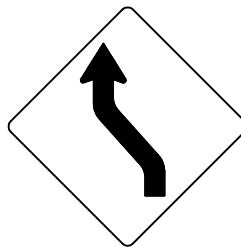
R9-11a



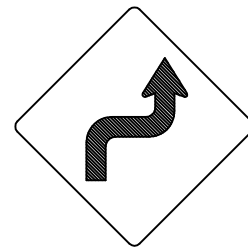
R4-7a



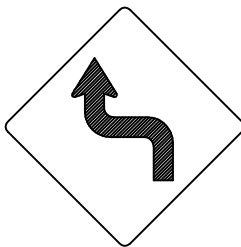
W1-4R



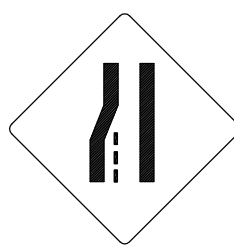
W1-4L



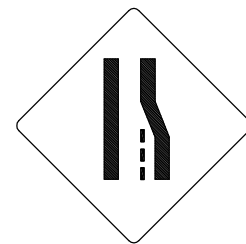
W1-3R



W1-3L



W4-2L



W4-2R

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

APPENDIX "A"	
SAN DIEGO REGIONAL STANDARD	
TYPICAL CONSTRUCTION SIGNS	

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
<i>[Signature]</i>	04/27/2006
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-3C



C12 (CA)



C27 (CA)



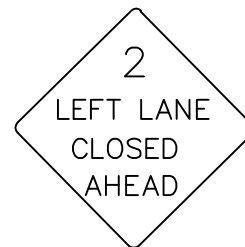
C30 (CA)



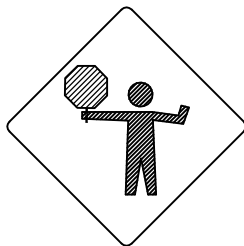
C30A (CA)



C20R (CA)



C20L (CA)



C9A (CA)



R26 (CA)



C28A (CA)



C28B (CA)

(FLAGGER PADDLES)

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

APPENDIX "A"
SAN DIEGO REGIONAL STANDARD

TYPICAL CONSTRUCTION SIGNS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
<i>[Signature]</i>	04/27/2006
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-3D

TABLE 1

RECOMMENDED SIGN SPACING FOR ADVANCE WARNING SIGN SERIES AND
MINIMUM TAPER LENGTH

APPROACH SPEED (S) (MPH)	MINIMUM DISTANCE (FEET) BETWEEN SIGNS AND FROM LAST SIGN TO TAPER	MINIMUM TAPER LENGTHS (L) (FEET) FOR 12-FOOT LANE		
		L	1/2L	1/3L
25	150-200	125	65	45
30	200-300	180	90	60
35	250-400	245	125	85
40	350-500	320	160	110
45	500-750	540	270	180
50	500-1000	600	300	200
55+	500-1500	660	330	220

L for Merge Taper
1/2L for Shift Taper
1/3L for Shoulder Taper

TABLE 2

RECOMMENDED TAPER LENGTH AND MAXIMUM CHANNELIZER/CONE SPACING

APPROACH SPEED (S) (MPH)	BUFFER LENGTH (FEET)	MAX CONE SPACING		
		TAPER	TANGENT	CONFLICT(*)
25	55	25	50	10
30	85	30	60	15
35	120	35	70	15
40	170	40	80	20
45	220	45	90	20
50	280	50	100	25
55+	335+	55	100	25

(*) Facing Opposing Traffic, Adjacent to Work Area
or Conflicting with Existing Striping

NOTES:

Taper Formula

$L = S \times W$ for speeds greater than 40 mph

$L = \frac{W \times S^2}{60}$ for speeds of 40 mph or less

Where:

L = Minimum length of taper (feet)

S = Approach Speed (mph) =
Posted Speed Limit or
off-peak 85th % speed
prior to work starting
or anticipated operating
speed

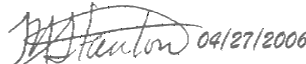
W = Width of offset (feet)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  Chairperson R.C.E. 19246 Date	APPENDIX "A" SAN DIEGO REGIONAL STANDARD DEVICE SPACING TABLES SIGN SPACING TABLE TAPER LENGTH AND CONE SPACING TABLE	Revision	By	Approved	Date
		DRAWING	CRH		4/06
DRAWING NUMBER TC-4		ORIGINAL			4/27/06

TRAFFIC CONTROL PLAN/PERMIT & PERMIT EXTENSION			
Public Utility or Company: _____		Project Contact: _____	
Address: _____		24 Hour Local Phone: _____	
City: _____ State: _____ Zip Code: _____		Cellular: _____	
		Pager: _____	
		Fax: _____	
Contractor/Subcontractor: _____		Project Contact: _____	
Address: _____		24 Hour Local Phone: _____	
City: _____ State: _____ Zip Code: _____		Cellular: _____	
		Pager: _____	
		Fax: _____	
JOB LOCATION		BEGIN CROSS STREET	END CROSS STREET
PERMIT NO.			
WORK HOURS	continuous	SPEED LIMIT	WORK TO BE DONE
FROM	A.M. TO P.M.	A.M. P.M.	
START DATE	END DATE	1st WORK DATE EXTENSION FROM	TO NEW END DATE
PERMIT WORK EXTENSIONS MUST BE OBTAINED BY THE END OF PERMIT DATE			
REQUIREMENTS: *			
1. The contractor shall post tow-away/no parking signs twenty-four (24) hours in advance, with the day of week, date and work hours noted, and shall bag parking meters (where applicable).			
2. The contractor shall post flashing arrow boards as required by the Agency.			
3. All travel lanes will typically be a minimum of 12 feet wide, 14 feet if adjacent to bike lanes, unless otherwise specifically approved by the Agency.			
4. Any work that creates an undue safety risk or that creates severe congestion will be shut down by the agency.			
5. A copy of all traffic requirements and traffic control plans issued by the Agency must be kept on the job site.			
6. Approval of this plan does not constitute an official Permit. Contact the Agency for information on obtaining a permit.			
7. All travel lanes will typically be a minimum of 12 feet wide, 14 feet if adjacent to bike lanes, unless otherwise specifically approved by the Agency.			
8. Flashing arrow boards as required by the Agency.			
9. Warning (W) series signs used in work zones shall be Black on an Orange background.			
10. Cones and pylons shall have yellow reflectorized sleeves when placed along the centerline and white reflectorized sleeves along the outside shoulder.			
11. If parking is allowed in the advance warning area, advance warning signs shall be mounted on high level devices.			
12. All conflicting signs shall be covered			
13. The contractor shall post tow-away/no parking signs twenty-four (24) hours in advance, with the day of week, date and work hours noted, and shall bag parking meters (where applicable).			
THIS TRAFFIC CONTROL PLAN IS NOT VALID UNLESS AN APPLICABLE AGENCY PERMIT OR APPROVAL IS ATTACHED/AFFIXED.			
The applicant is responsible for complete representation of the actual road conditions shown on this plan including, but not limited to, existing striping and marking, signing, sidewalks, and bike lanes.			
APPLICANTS: Name (print) _____ Address _____ Phone Number _____ Signature _____ Agent of: ☐ Owner ☐ Contractor ☐ Sign/Barricade co. ☐ Other _____			
PERMIT APPROVED By: _____ DATE: _____			
* SUBJECT TO LOCAL AGENCY REQUIREMENTS			
SEE ATTACHED SHEET(S) OR REFERENCED STANDARD DRAWING(S) THAT MAY BE APPLICABLE			

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06
APPENDIX "A"			
SAN DIEGO REGIONAL STANDARD			
TRAFFIC CONTROL PLAN			
COVER SHEET			
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
Chairperson R.C.E. 19246 Date 04/27/2006			
DRAWING NUMBER TC-5			

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE


Chairperson R.C.E. 19246 Date

DRAWING
NUMBER

TC-6

APPENDIX "A"
SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

TWO LANE TRAFFIC CONTROL
WITHOUT CENTERLINE

Revision

By

Approved

Date

DRAWING
ORIGINAL

CRH



4/27/06

FOR
SIGN SPACING
SEE TC-4

END ROAD WORK
G20-2

ROAD WORK AHEAD
W20-1

NARROW LANE
C12 (CA)

NARROW LANE
C12 (CA)

TEMPORARY "NO PARKING" AREA

KEEP RIGHT
R4-7a

12' MIN. (1)

12' MIN. (1)

SHIFT TAPER (1/2L)
(2)

100' TAPER
(optional)

END ROAD WORK
G20-2

SEE GENERAL NOTES

1. 14' MINIMUM ON ROADWAY WITH BIKE LANES

2. CONES OPTIONAL WHERE NO PARKING IS ALLOWED

CONES

FLASHING ARROW SIGN

FLAGGER

SIGN

WORK AREA

TRAFFIC DIRECTION

LEGEND

AGENCY ENGINEER'S COMMENTS

AGENCY USE

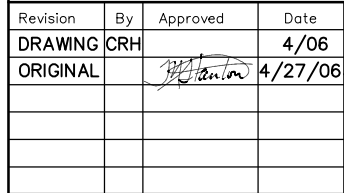
APPLICANT USE

SUBMITTED BY:
NAME
COMPANY
ADDRESS
PHONE

GENERAL NOTES

See TC-4 for sign spacing, spacing of cones, taper and buffer lengths.
For hours of darkness, change cones to vertical barricades with steady burn lights.
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TC-5 is required for all Traffic Control Plans.

August 2009



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
04/27/2006	
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-7

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

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LEGEND

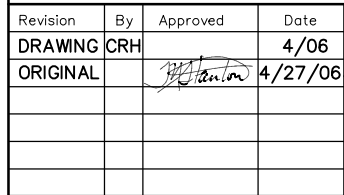
- CONE ++ BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

AGENCY USE

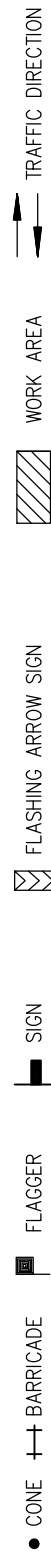
APPLICANT USE

SUBMITTED BY: _____
NAME _____
COMPANY _____
ADDRESS _____
PHONE _____



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
04/27/2006	
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-9

LEGEND



POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH
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GENERAL NOTES

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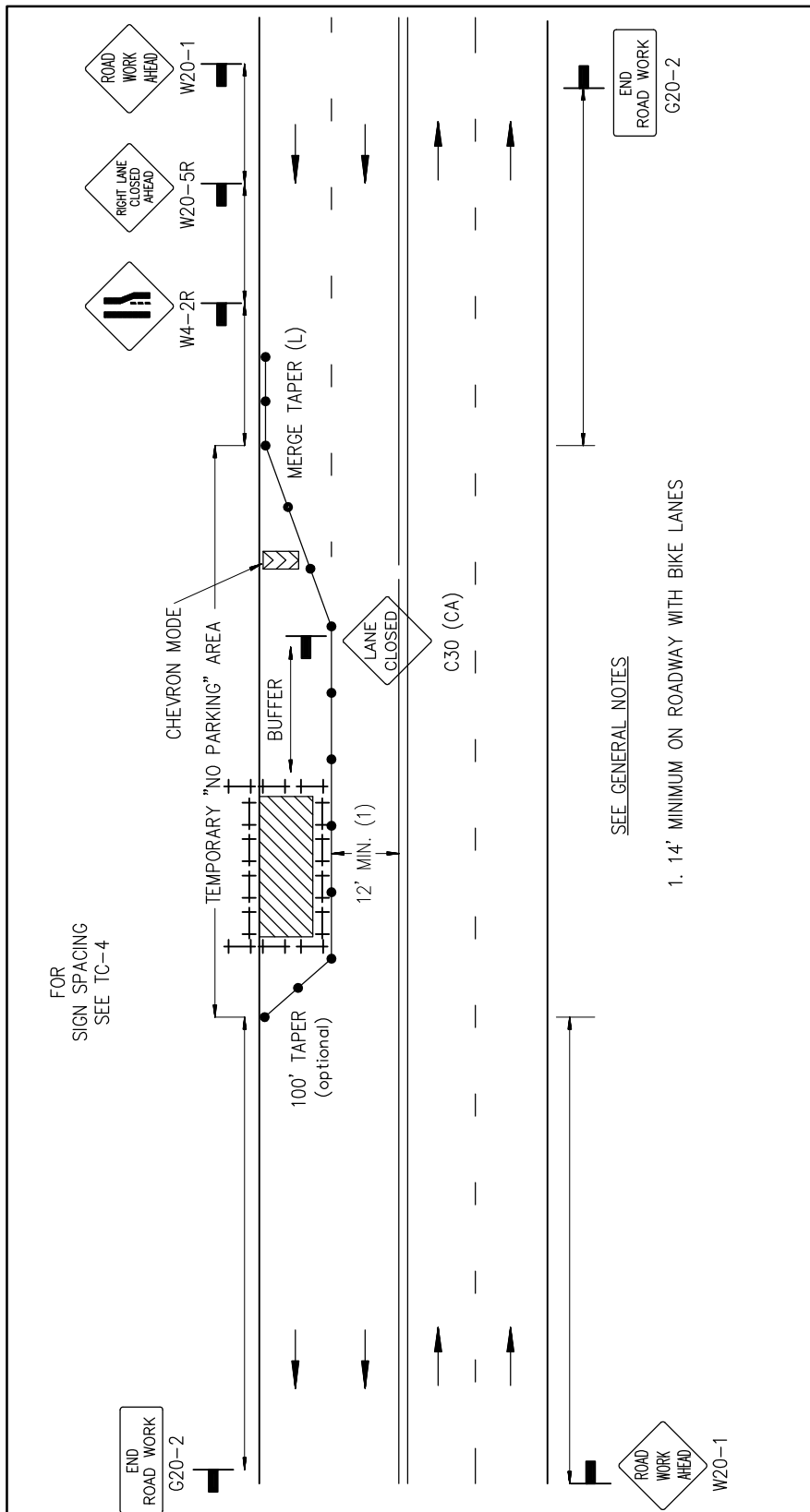
TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY: _____
NAME _____
COMPANY _____
ADDRESS _____
PHONE _____



• CONE	++ BARRICADE	FLAGGER	SIGN	FLASHING ARROW SIGN	WORK AREA	TRAFFIC DIRECTION
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POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

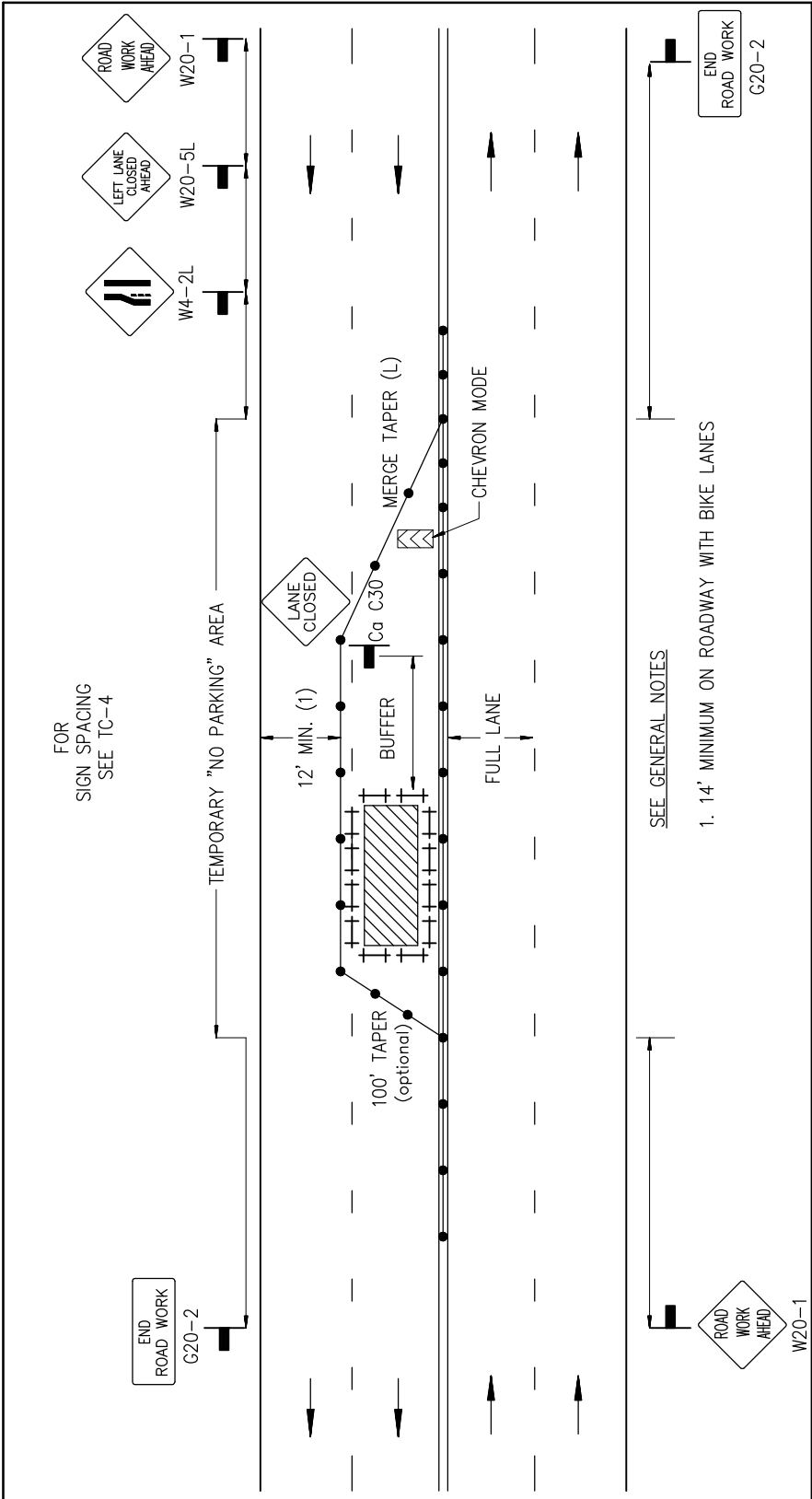
See TC-4 for sign spacing, spacing of cones, and taper and buffer lengths. For hours of darkness, change cones to vertical barricades with steady burn lights. This plan DOES NOT apply to signalized or multi-way stop intersections. Consult the local jurisdiction when preparing Traffic Control Plans near these intersections. This plan MAY NOT apply when the work areas affect bike lanes, sidewalks, pedestrian access and curved or narrow roadways. Consult the approving agency when preparing the Traffic Control Plan or these areas.

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TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS	AGENCY USE
SUBMITTED BY:	APPLICANT USE
	NAME
	COMPANY
	ADDRESS
	PHONE

<table><tr><td>Revision</td><td>By</td><td>Approved</td><td>Date</td></tr><tr><td>DRAWING</td><td>CRH</td><td></td><td>4/06</td></tr><tr><td>ORIGINAL</td><td></td><td></td><td>4/27/06</td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table>				Revision	By	Approved	Date	DRAWING	CRH		4/06	ORIGINAL			4/27/06													APPENDIX "A" SAN DIEGO REGIONAL STANDARD SIDE OF ROAD WORK AREA MULTILANE TRAFFIC CONTROL WITH CENTERLINE RIGHT TRAFFIC LANE CLOSURE - TWO LANES		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE Chairperson R.C.E. 19246 Date DRAWING NUMBER TC-11	
Revision	By	Approved	Date																												
DRAWING	CRH		4/06																												
ORIGINAL			4/27/06																												
FOR SIGN SPACING SEE TC-4 LEGEND CONE BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION				GENERAL NOTES See TC-4 for sign spacing, spacing of cones, and taper and buffer lengths. For hours of darkness, change cones to vertical barricades with steady burn lights. This plan DOES NOT apply to signalized or multi-way stop intersections. Consult the local jurisdiction when preparing Traffic Control Plans near these intersections. This plan MAY NOT apply when the work areas affect bike lanes, sidewalks, pedestrian access and curved or narrow roadways. Consult the approving agency when preparing the Traffic Control Plan or these areas. Nothing contained on this drawing shall prevent local jurisdictions from modifying, changing or adopting new specifications deemed necessary. Criteria for position, location and use of Traffic Control Devices is solely for the purpose of guidance to assist in the set up of the Traffic Control Plans. TC-5 is required for all Traffic Control Plans.																											
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SUBMITTED BY:				APPLICANT USE																											
NAME				NAME																											
COMPANY				COMPANY																											
ADDRESS				ADDRESS																											
PHONE				PHONE																											



FOR SIGN SPACING SEE TC-4

END ROAD WORK G20-2

ROAD WORK AHEAD

LEFT LANE CLOSED AHEAD

W4-2L

W20-5L

W20-1

TEMPORARY "NO PARKING" AREA

LANE CLOSED

12' MIN. (1)

100' TAPER (optional)

MERGE TAPER (L)

Chevron Mode

FULL LANE

END ROAD WORK G20-1

SEE GENERAL NOTES

1. 14' MINIMUM ON ROADWAY WITH BIKE LANES

LEGEND

● CONE

++ BARRICADE

FLAGGER

FLASHING ARROW SIGN

SIGN

WORK AREA

TRAFFIC DIRECTION

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

See TC-4 for sign spacing, spacing of cones, and taper and buffer lengths.

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AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER TC-12

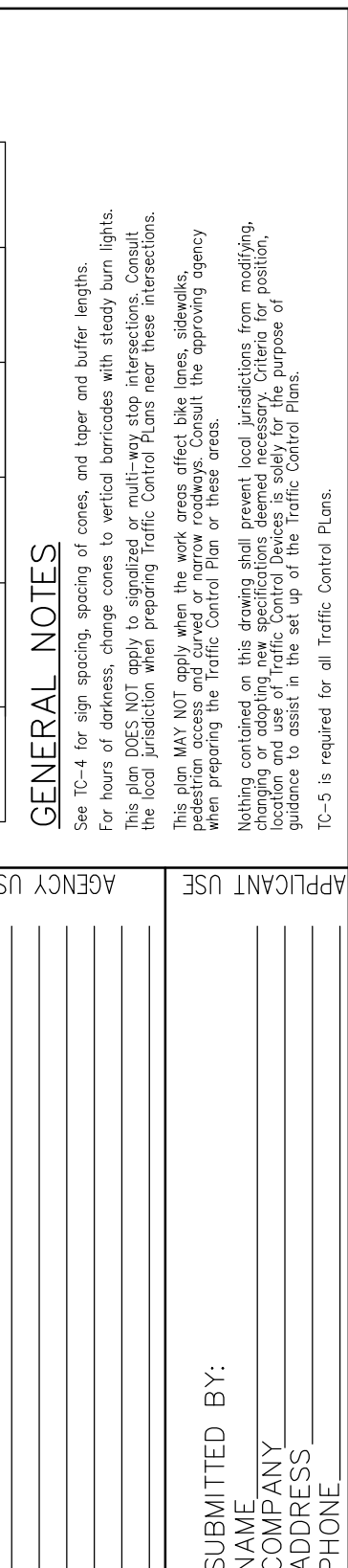
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

MULTILANE TRAFFIC CONTROL WITH CENTERLINE LEFT TRAFFIC LANE CLOSURE - ONE LANE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

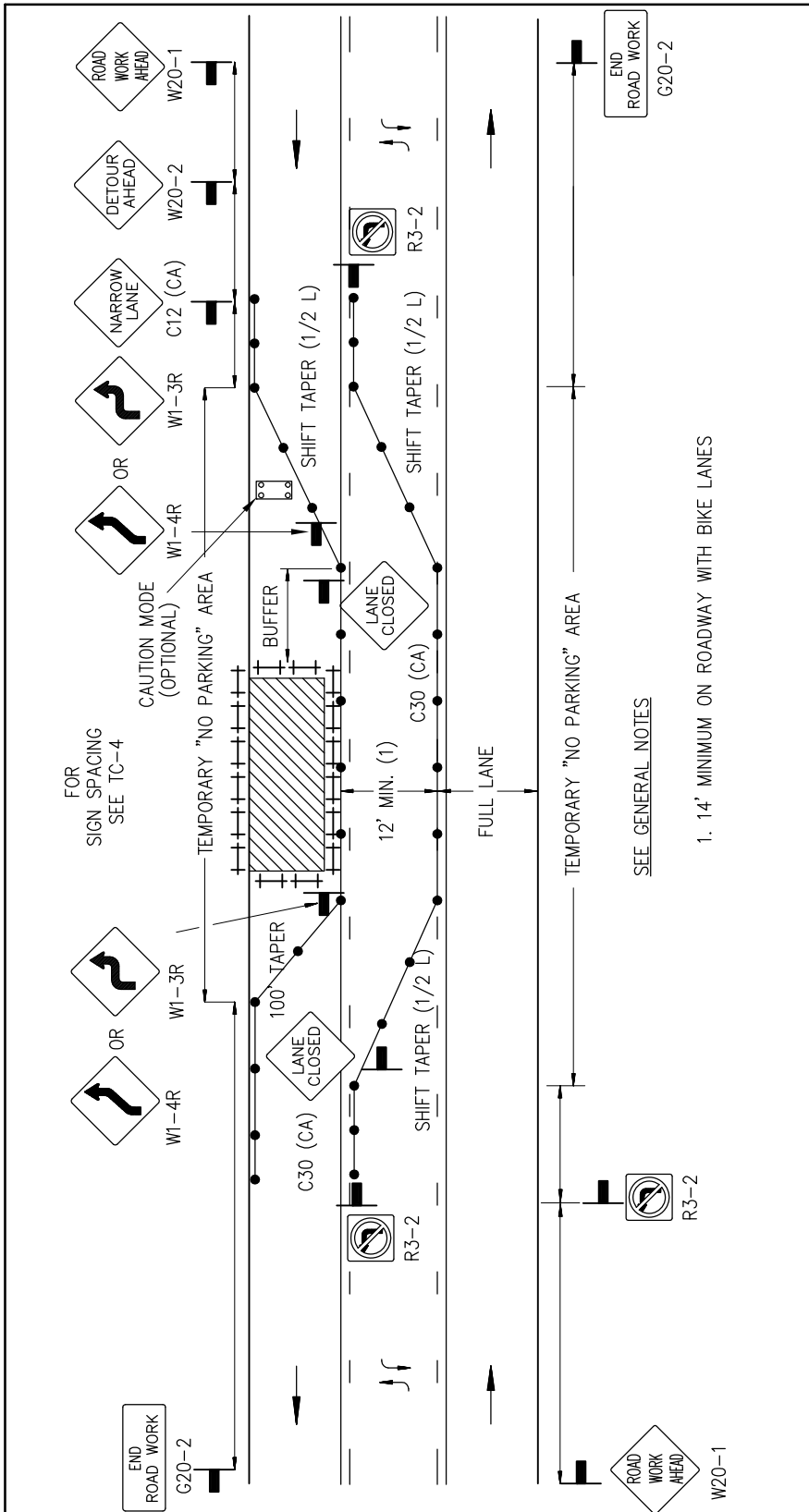


RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING TC-13
NUMBER



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER TC-14

APPENDIX "A" SAN DIEGO REGIONAL STANDARD SIDE OF ROAD WORK AREA MULTILANE TRAFFIC CONTROL WITH TWO WAY LEFT TURN RIGHT LANE TRAFFIC CLOSURE - ONE LANE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

● CONE ++ BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION

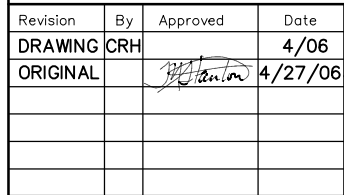
POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

See tc-4 for sign spacing, spacing for cones, and taper and buffer lengths.
For hours of darkness, change cones to vertical barricades with steady burn lights.
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TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS	AGENCY USE
SUBMITTED BY:	APPLICANT USE
	NAME
	COMPANY
	ADDRESS
	PHONE



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
04/27/2006	
Chairperson R.C.E. 19246 Date	
DRAWING NUMBER	TC-15

GENERAL NOTES

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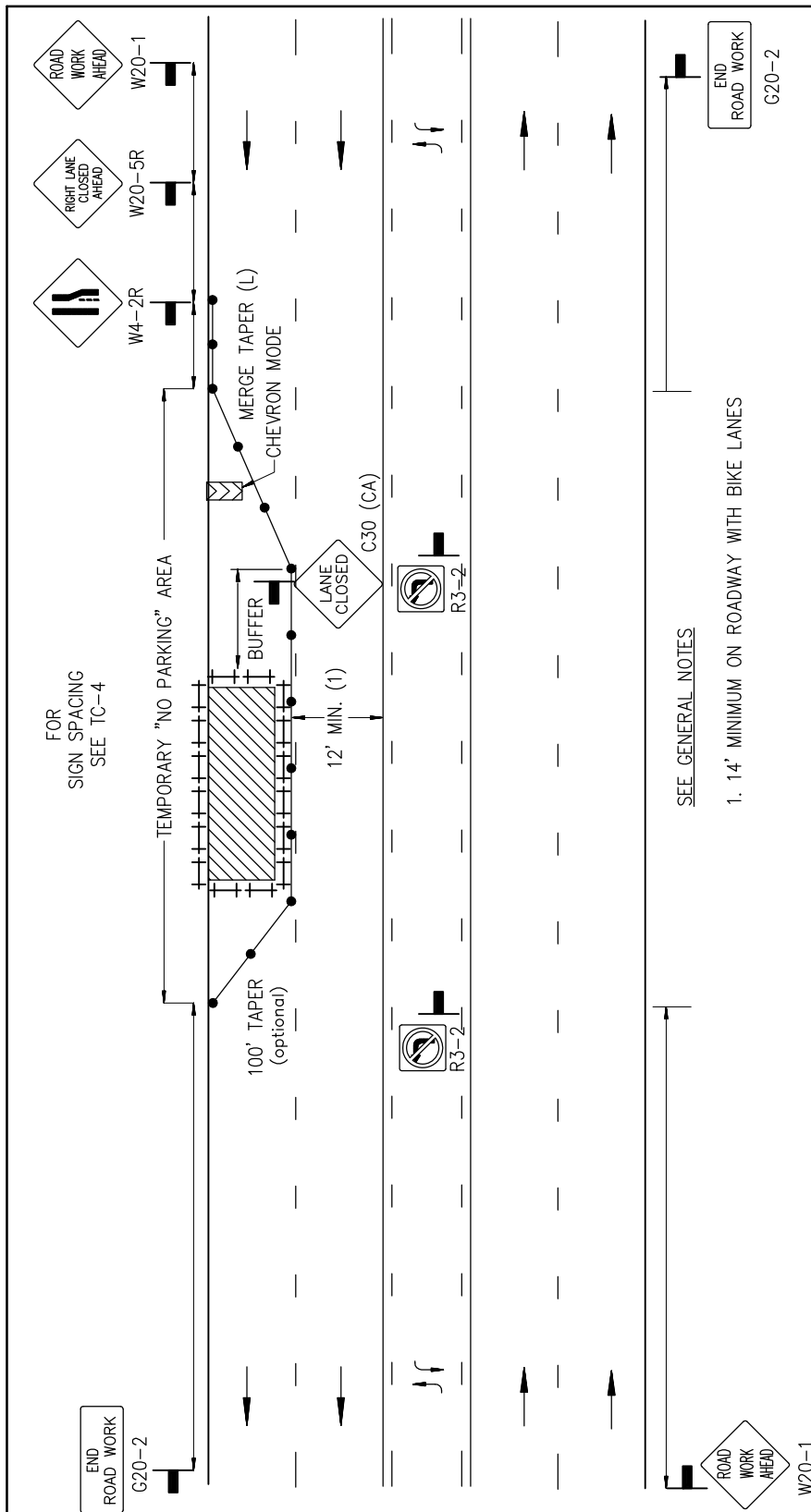
● CONE ++ BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY: _____
NAME _____
COMPANY _____
ADDRESS _____
PHONE _____



LEGEND

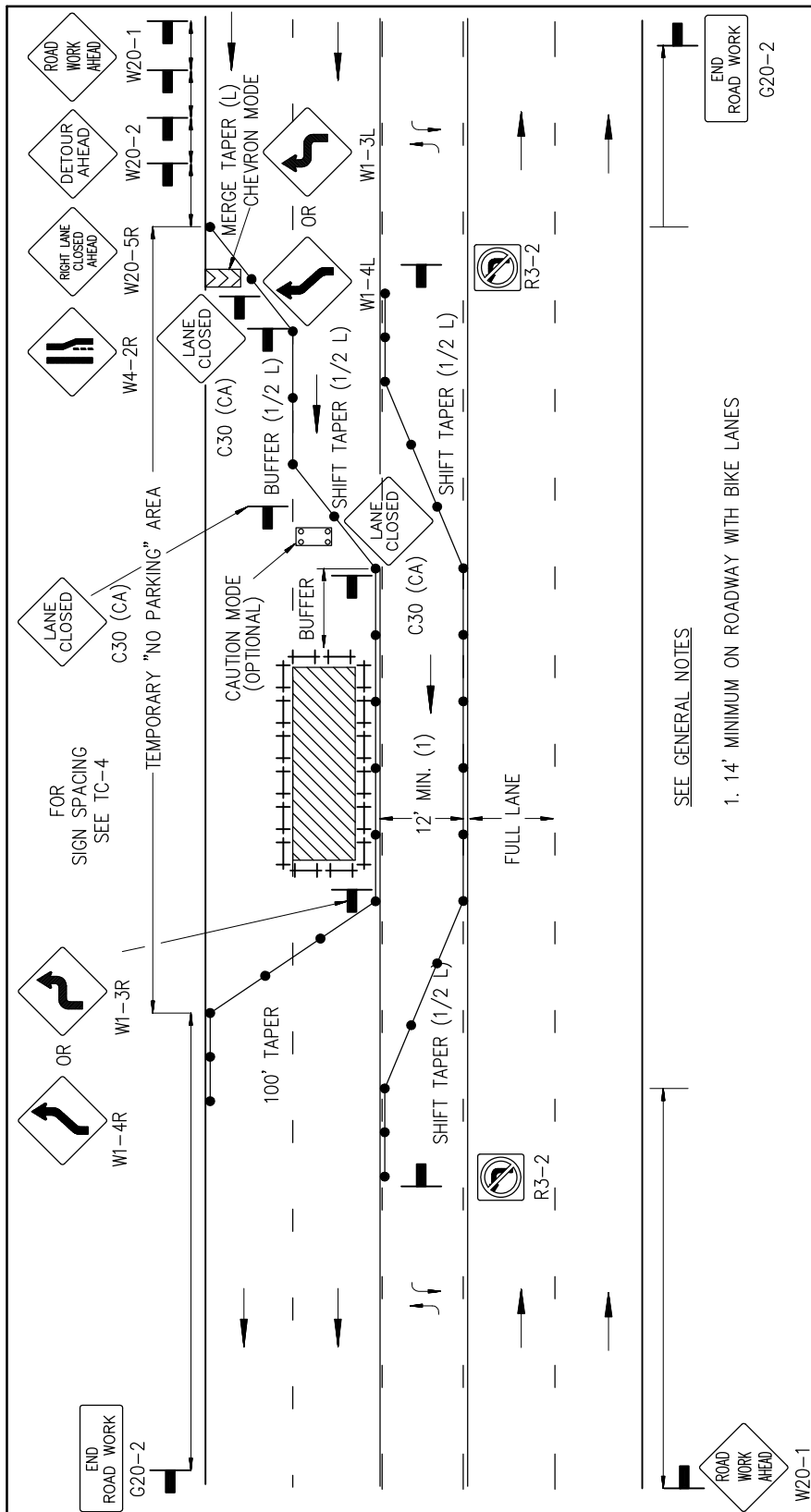
POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

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AGENCY ENGINEER'S COMMENTS	AGENCY USE

APPLICANT USE	AGENCY USE
SUBMITTED BY:	
NAME _____	
COMPANY _____	
ADDRESS _____	
PHONE _____	



SEE GENERAL NOTES

1. 14' MINIMUM ON ROADWAY WITH BIKE LANES

LEGEND

- CONE
- ++ BARRICADE
- FLAGGER
- FLASHING ARROW SIGN
- WORK AREA
- TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

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AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME
COMPANY
ADDRESS
PHONE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

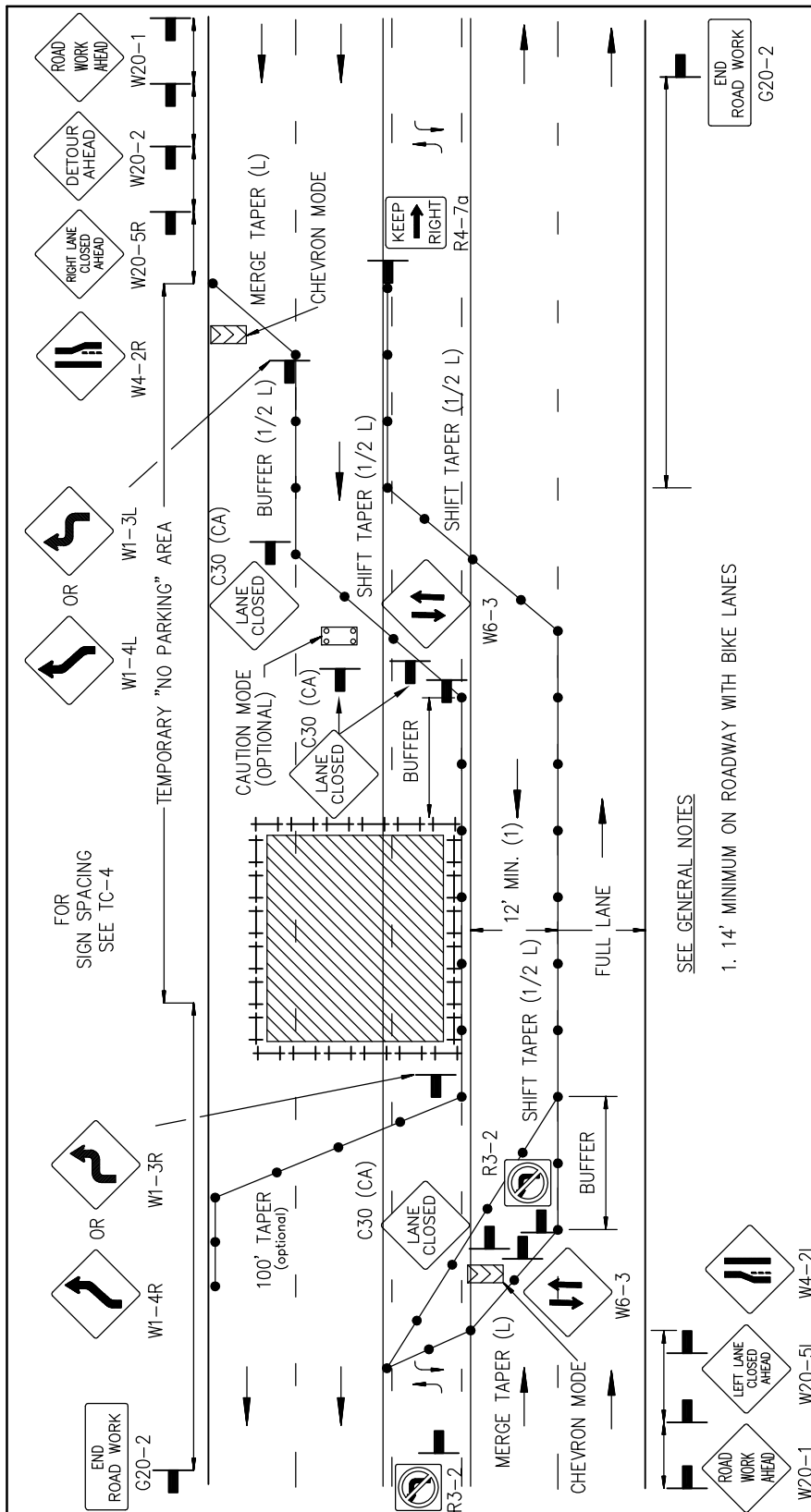
MULTILANE TRAFFIC CONTROL WITH TWO WAY LEFT TURN
RIGHT TRAFFIC LANE CLOSURE - TWO LANES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006
Chairperson R.C.E. 19246 Date

DRAWING NUMBER

TC-17



POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

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AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY: NAME _____ COMPANY _____ ADDRESS _____ PHONE _____

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

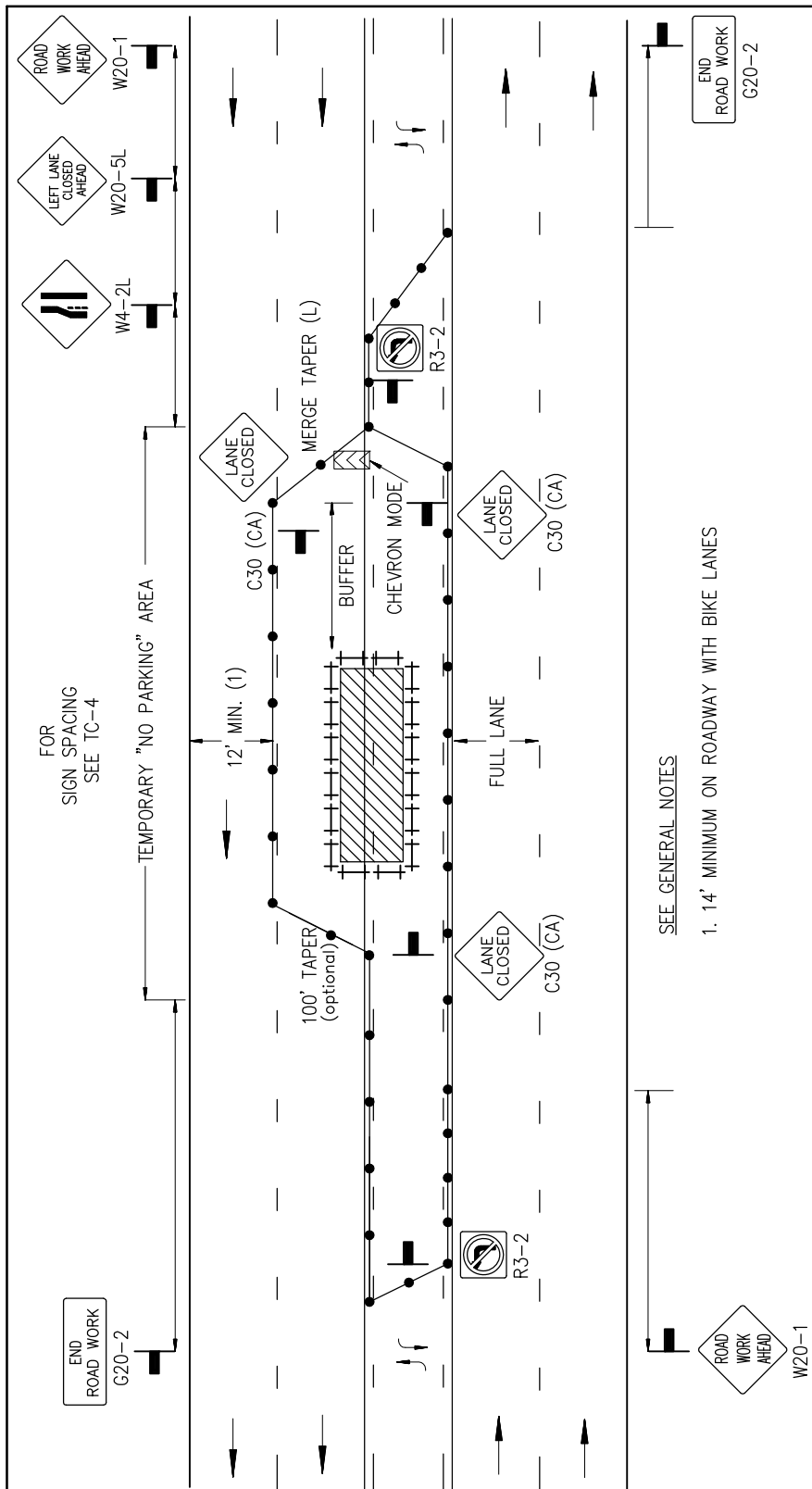
[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-18**

APPENDIX "A"
SAN DIEGO REGIONAL STANDARD
SIDE OF ROAD WORK AREA
 MULTILANE TRAFFIC CONTROL WITH TWO WAY LEFT TURN
 RIGHT TRAFFIC LANE CLOSURE - THREE LANES

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06



GENERAL NOTES

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POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME

COMPANY

ADDRESS

PHONE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

MULTILANE TRAFFIC CONTROL WITH TWO WAY LEFT TURN

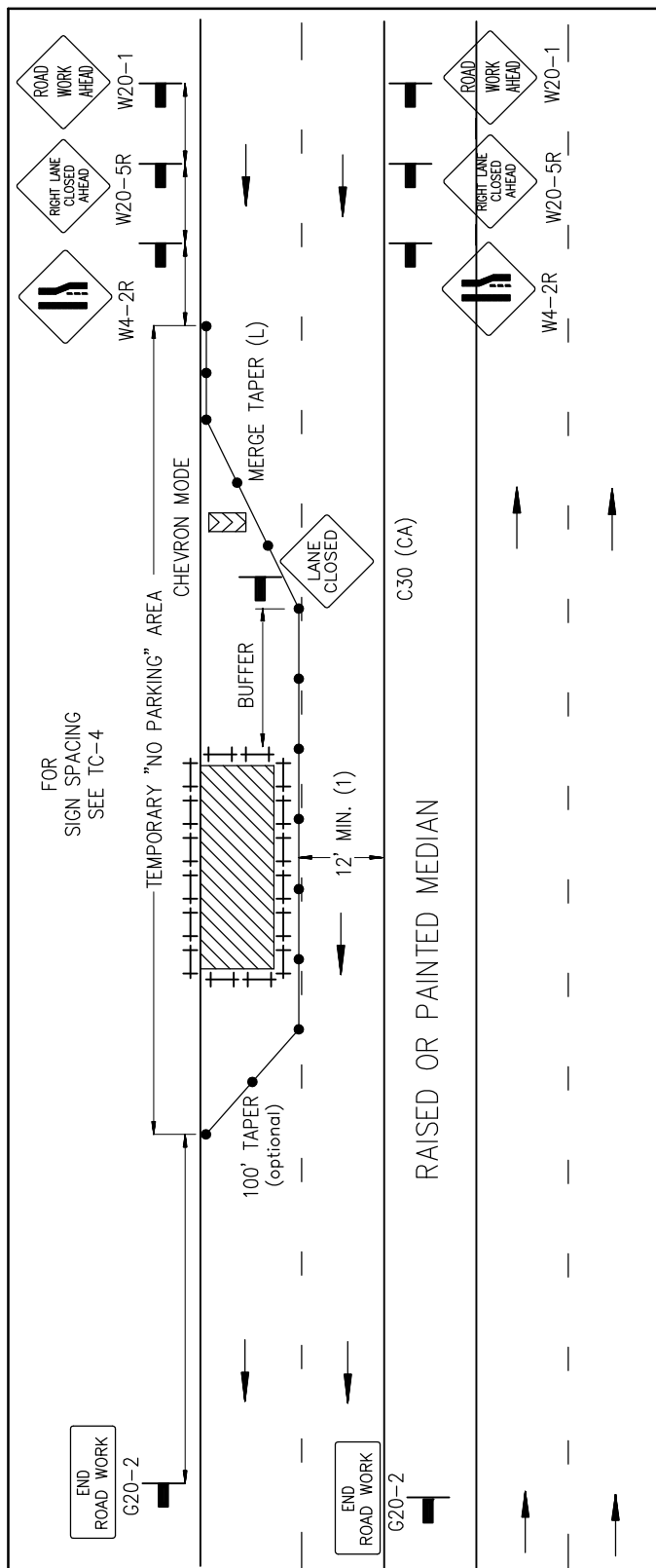
LEFT TRAFFIC LANE CLOSURE - TWO LANES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER TC-19



Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

MULTILANE TRAFFIC CONTROL WITH RAISED MEDIAN
RIGHT TRAFFIC LANE CLOSURE – ONE LANE

LEGEND

-

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH
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GENERAL NOTES

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TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

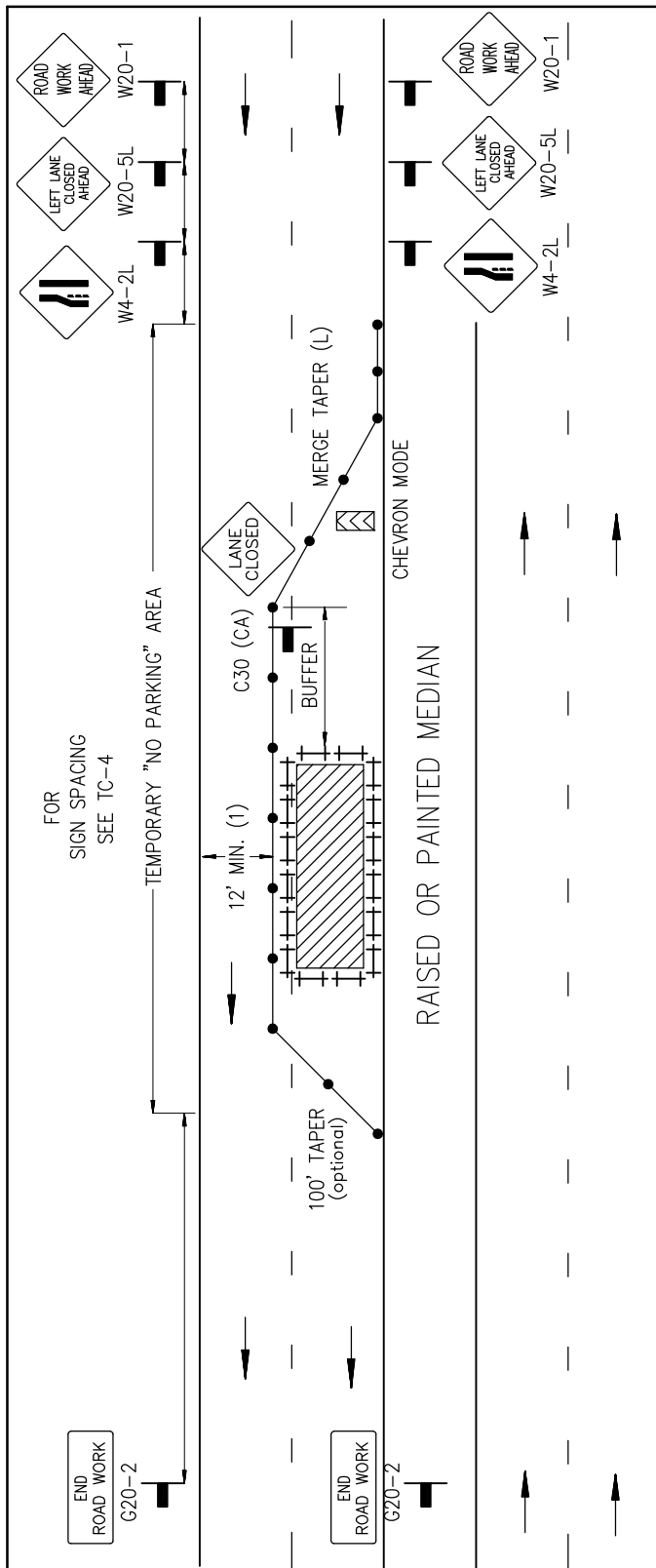
NAME _____
 COMPANY _____
 ADDRESS _____
 PHONE _____

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date 04/27/2006

DRAFTING
NUMBER

TC-21



SEE GENERAL NOTES

1. 14' MINIMUM ON ROADWAY WITH BIKE LANES

LEGEND

- CONE
- ⚡ FLASHING ARROW SIGN
- 🚧 FLAGGER
- 🚧 SIGN
- ➡ TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

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AGENCY USE

APPLICANT USE

SUBMITTED BY:
NAME
COMPANY
ADDRESS
PHONE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

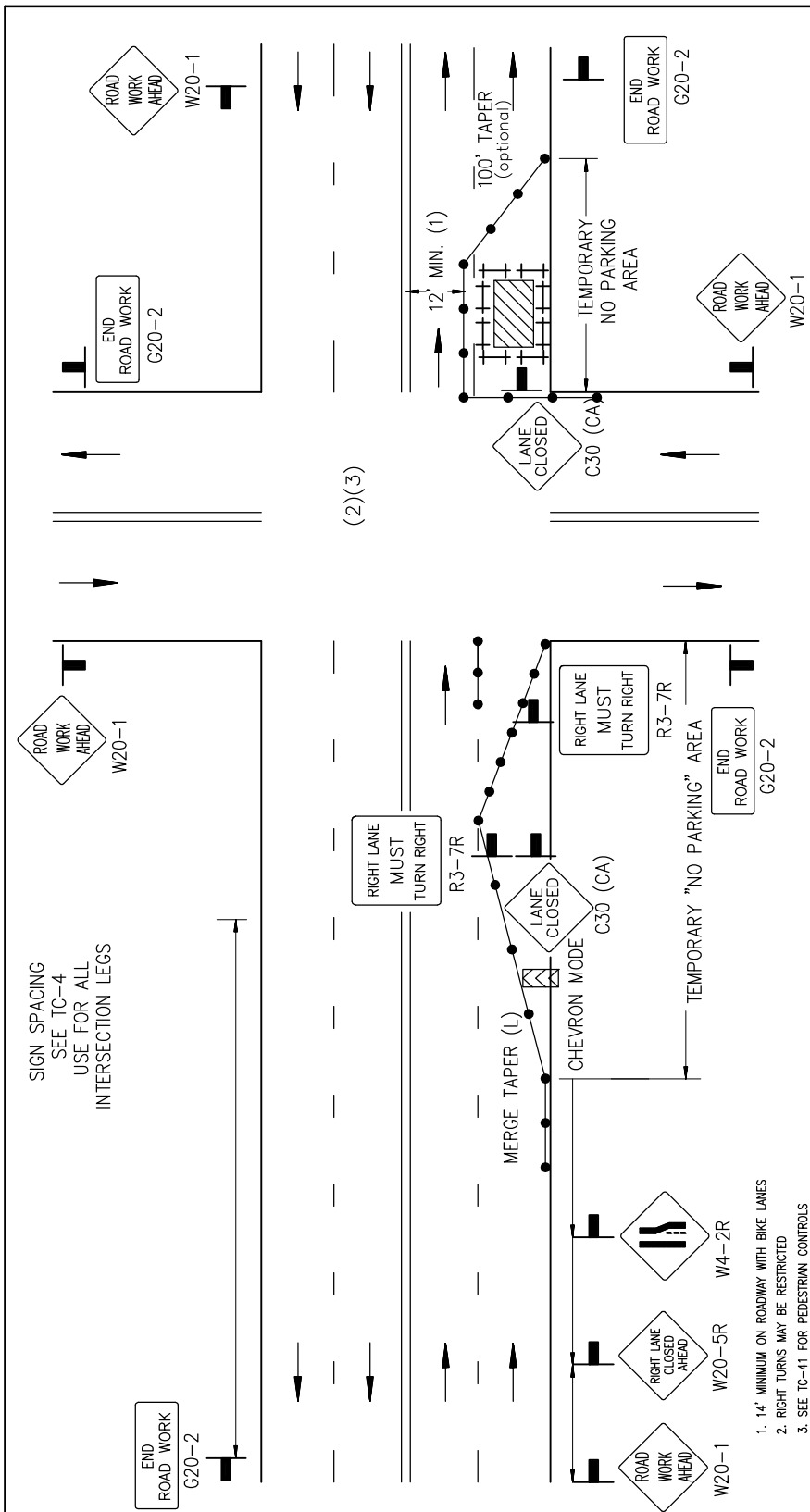
DRAWING NUMBER TC-22

APPENDIX "A" SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

MULTILANE TRAFFIC CONTROL WITH RAISED MEDIAN
LEFT LANE TRAFFIC LANE CLOSURE - ONE LANE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06



POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

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AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

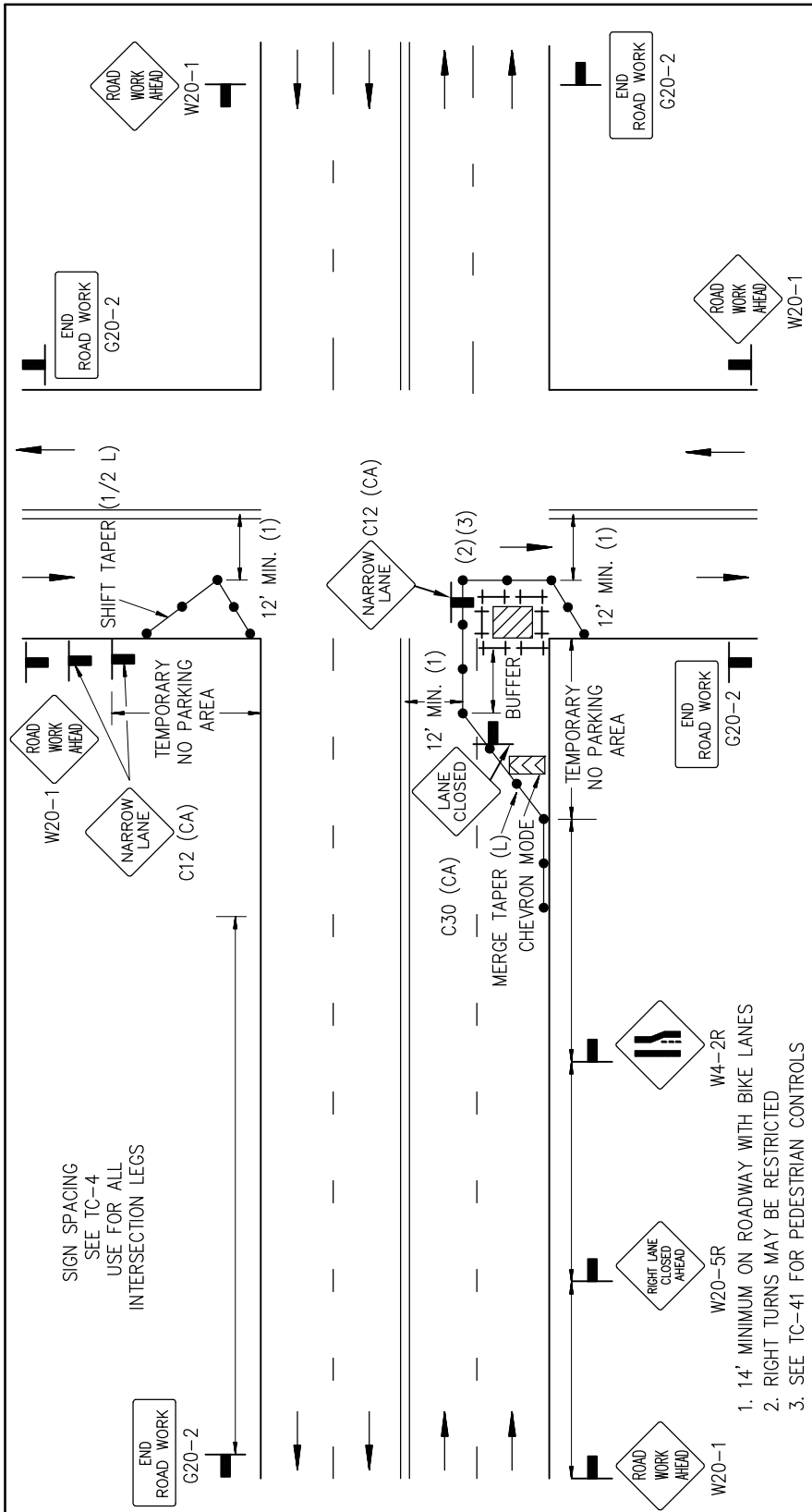
APPENDIX "A"
SAN DIEGO REGIONAL STANDARD
SIDE OF ROAD WORK AREA
 INTERSECTION TRAFFIC CONTROL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-23**



AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME

COMPANY

ADDRESS

PHONE

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING	BUFFER LENGTH

GENERAL NOTES

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RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER TC-24

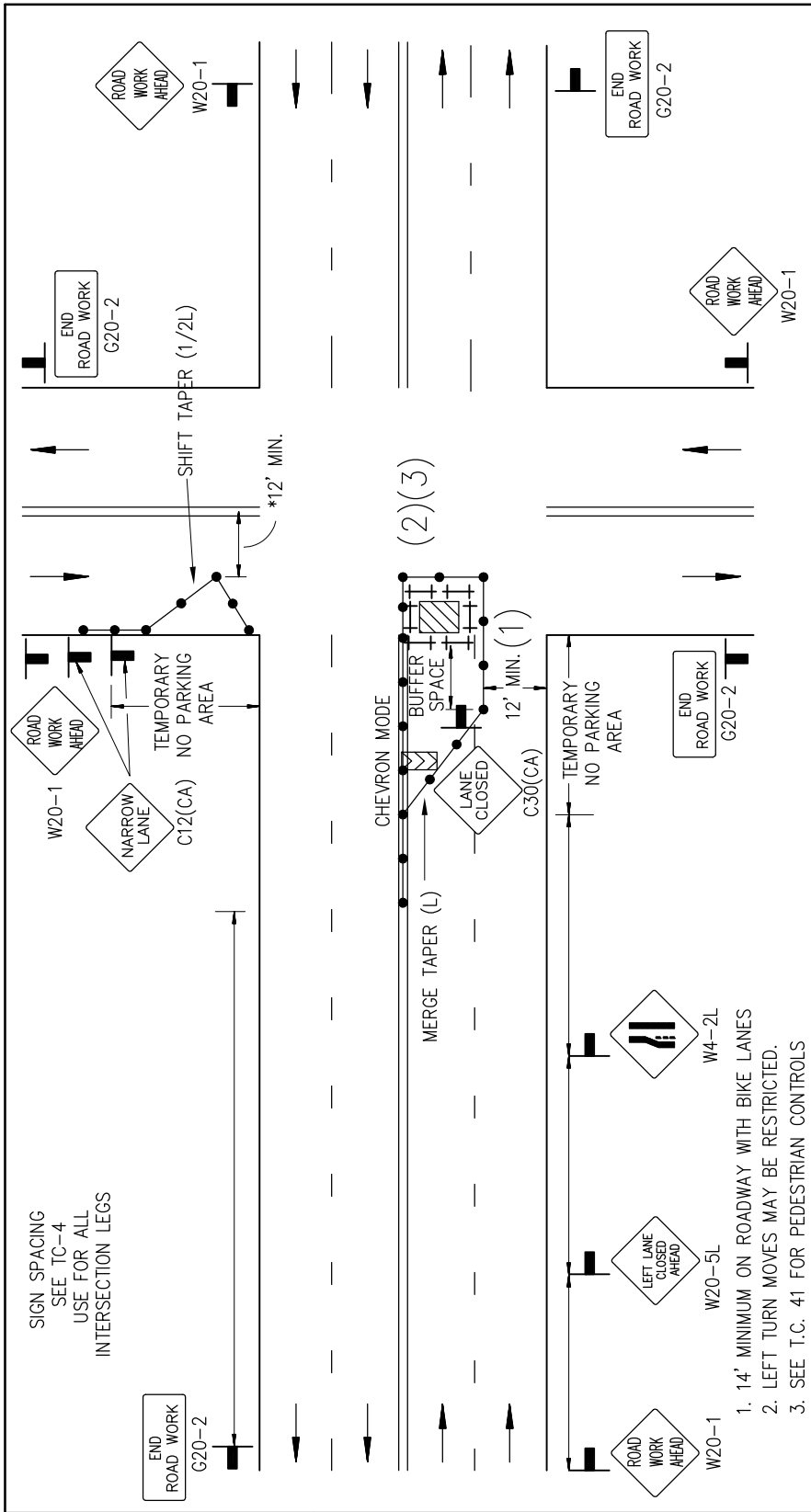
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

INTERSECTION TRAFFIC CONTROL

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06



CONES	FLASHING ARROW SIGN	FLAGGER	SIGN	BARRICADE	TRAFFIC DIRECTION
•	⬇	⚑	⚓	⚓	→

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

GENERAL NOTES

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TC-5 is required for all Traffic Control Plans.

AGENCY USE

APPLICANT USE

SUBMITTED BY: _____

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date *04/27/2006*

DRAWING NUMBER **TC-26**

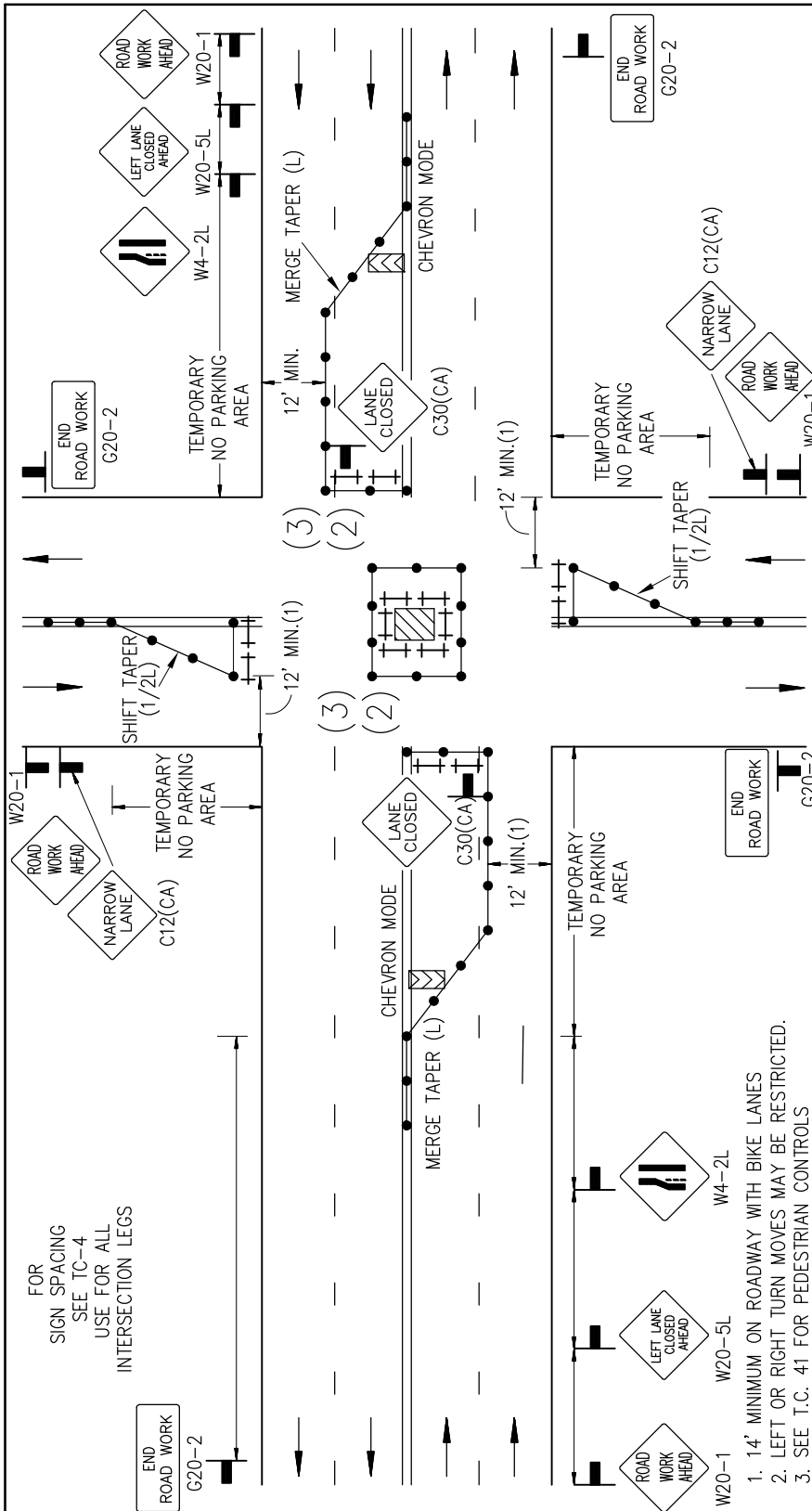
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

INTERSECTION TRAFFIC CONTROL

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>Chairperson</i>	4/27/06



LEGEND

● CONE ++ BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

GENERAL NOTES

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AGENCY USE

APPLICANT USE

SUBMITTED BY: NAME _____ COMPANY _____ ADDRESS _____ PHONE _____

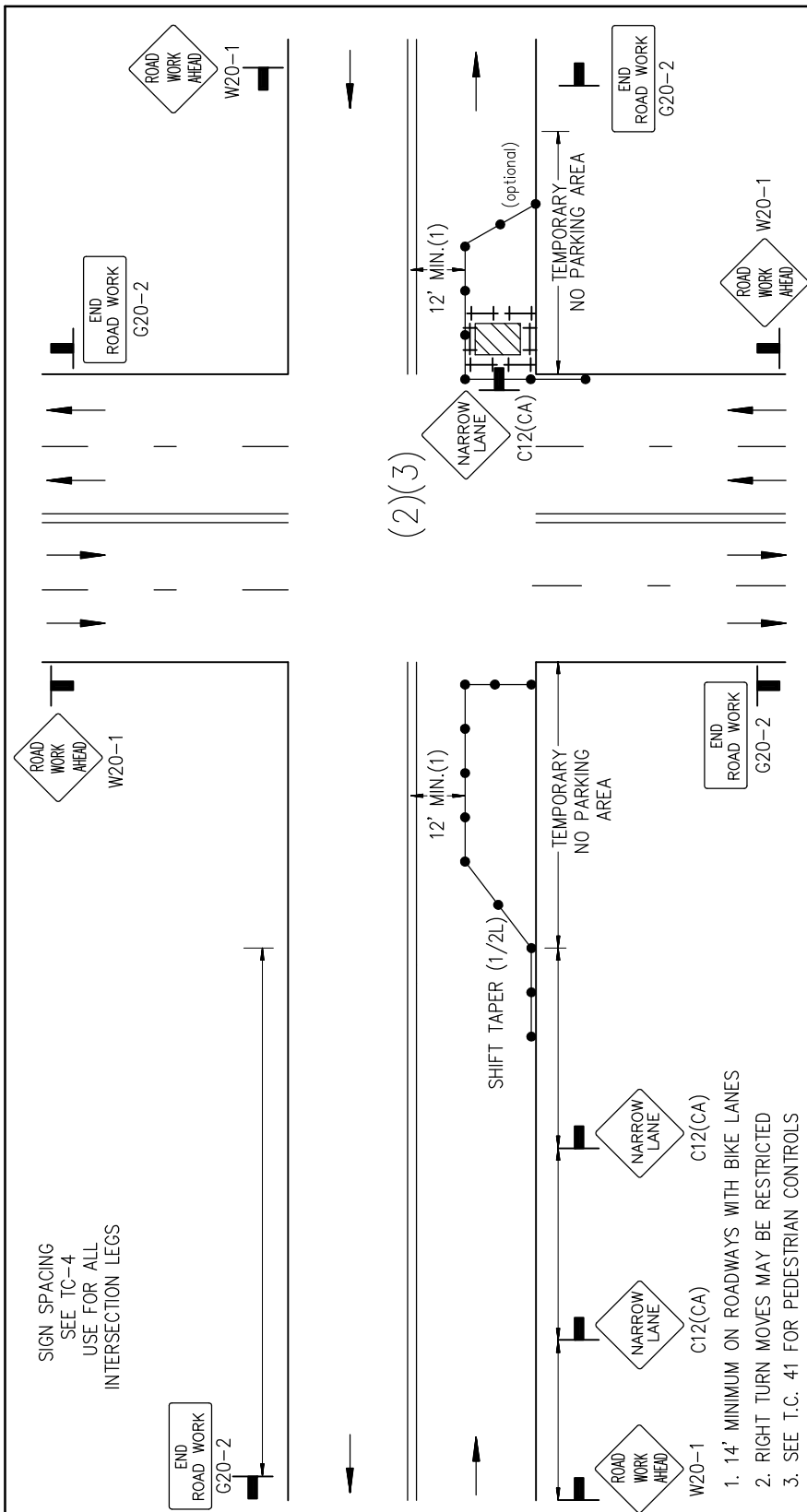
Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

APPENDIX "A"
SAN DIEGO REGIONAL STANDARD
CENTER OF ROAD WORK AREA
INTERSECTION TRAFFIC CONTROL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-27**



POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

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AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY: NAME _____ COMPANY _____ ADDRESS _____ PHONE _____

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-28**

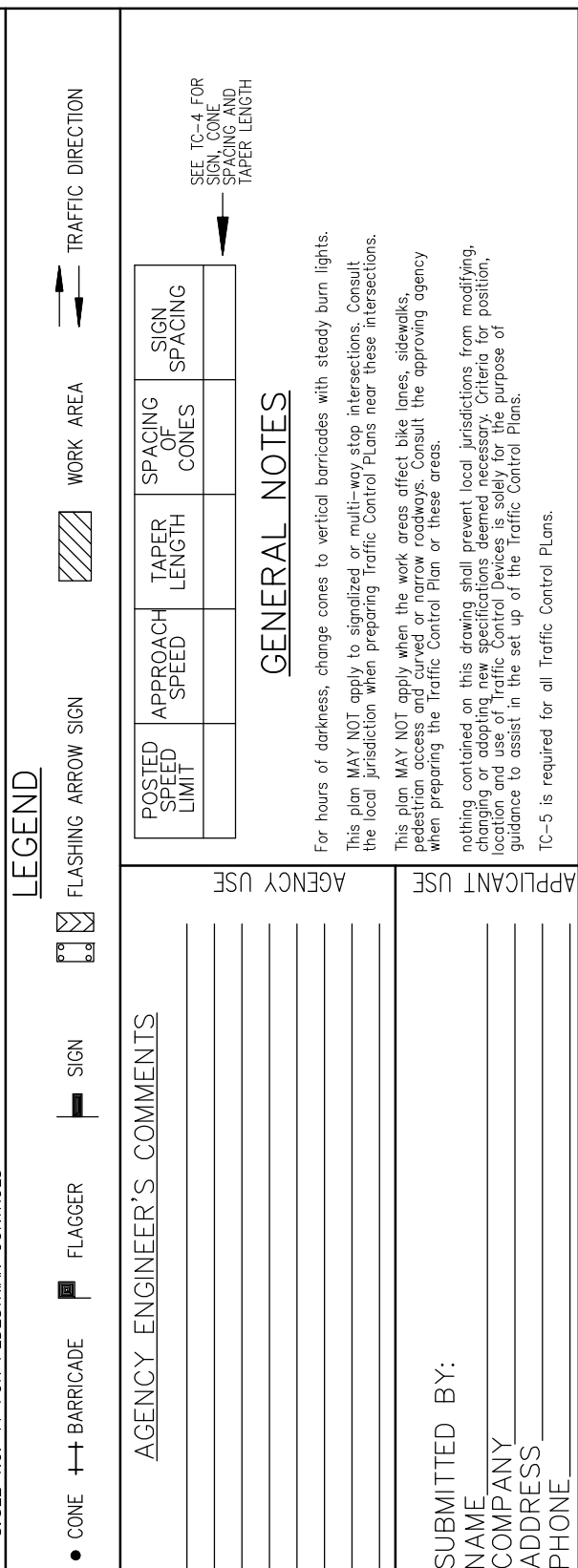
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

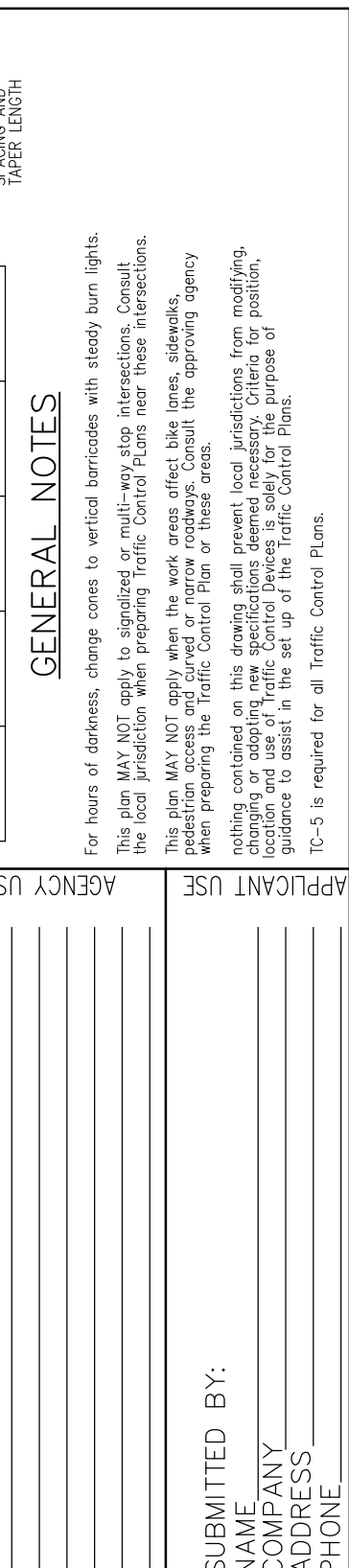
INTERSECTION TRAFFIC CONTROL

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06



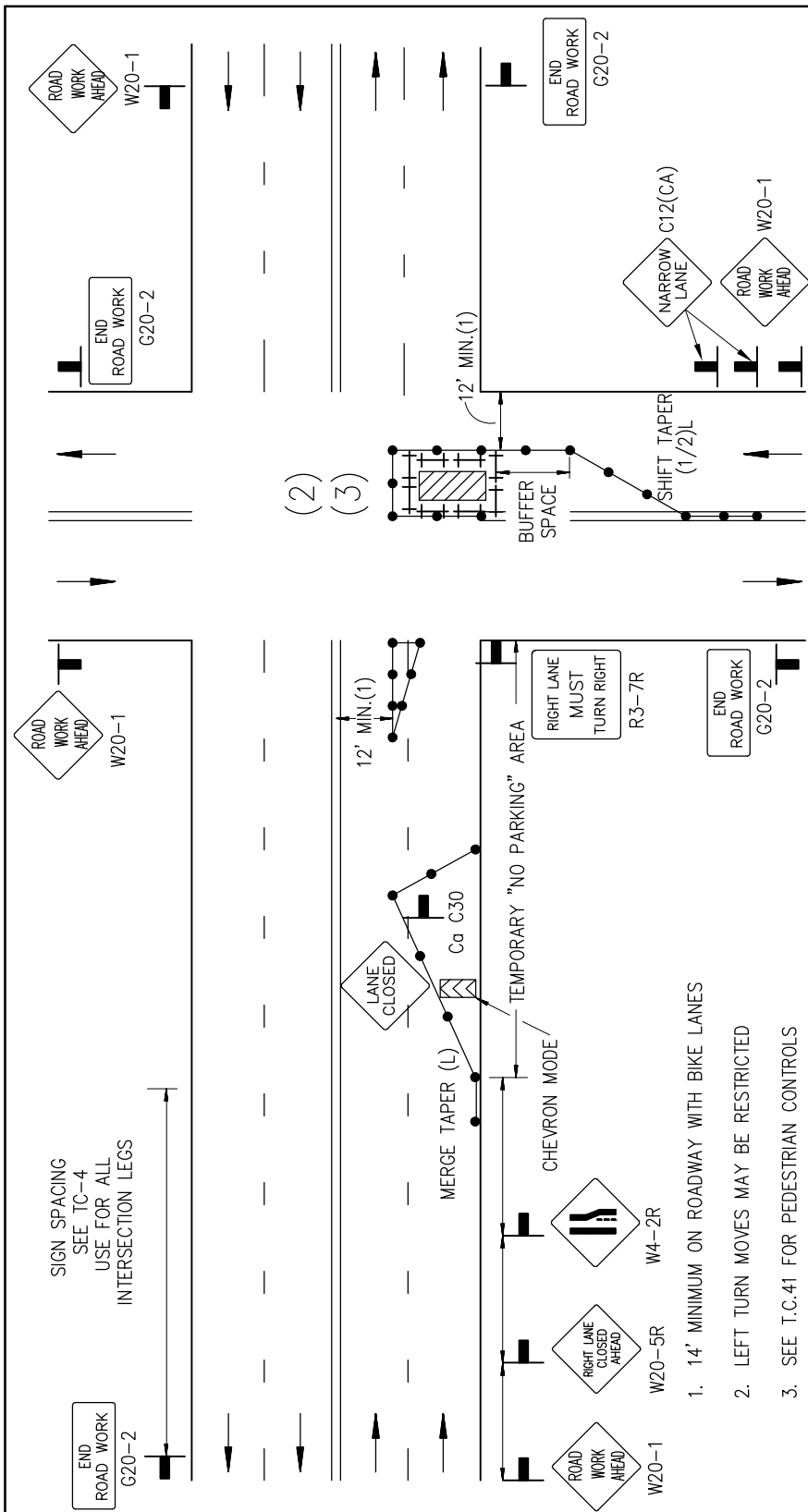
APPENDIX "A"
SAN DIEGO REGIONAL STANDARD
CENTER OF ROAD WORK AREA
INTERSECTION TRAFFIC CONTROL

August 2009



TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS	AGENCY USE	APPLICANT USE
		SUBMITTED BY:
		NAME
		COMPANY
		ADDRESS
		PHONE



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POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

CENTER OF ROAD WORK AREA

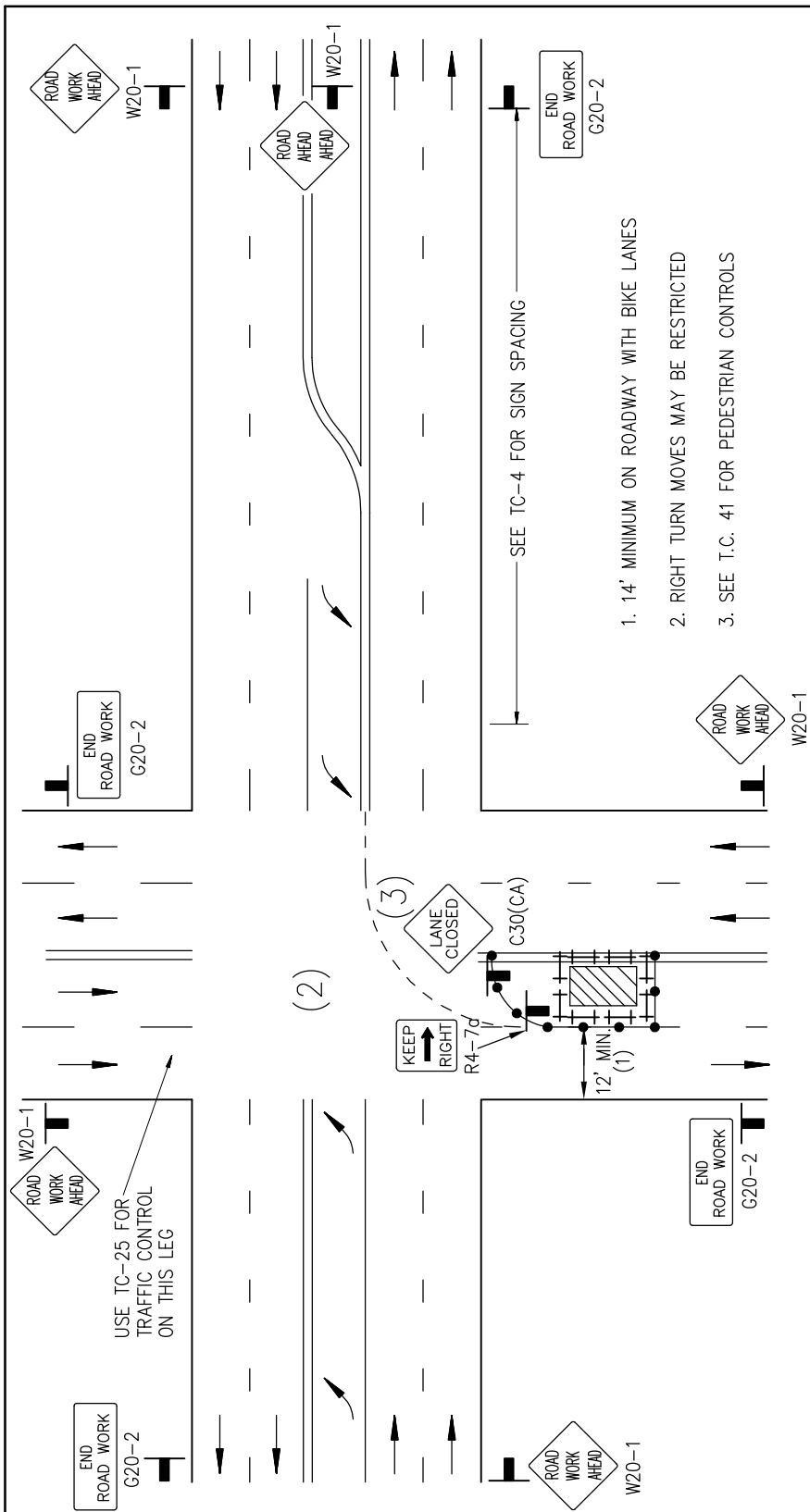
INTERSECTION TRAFFIC CONTROL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-31**



GENERAL NOTES			
POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SIGN SPACING
SEE TC-4 FOR SIGN, CONE SPACING AND TAPER LENGTH			

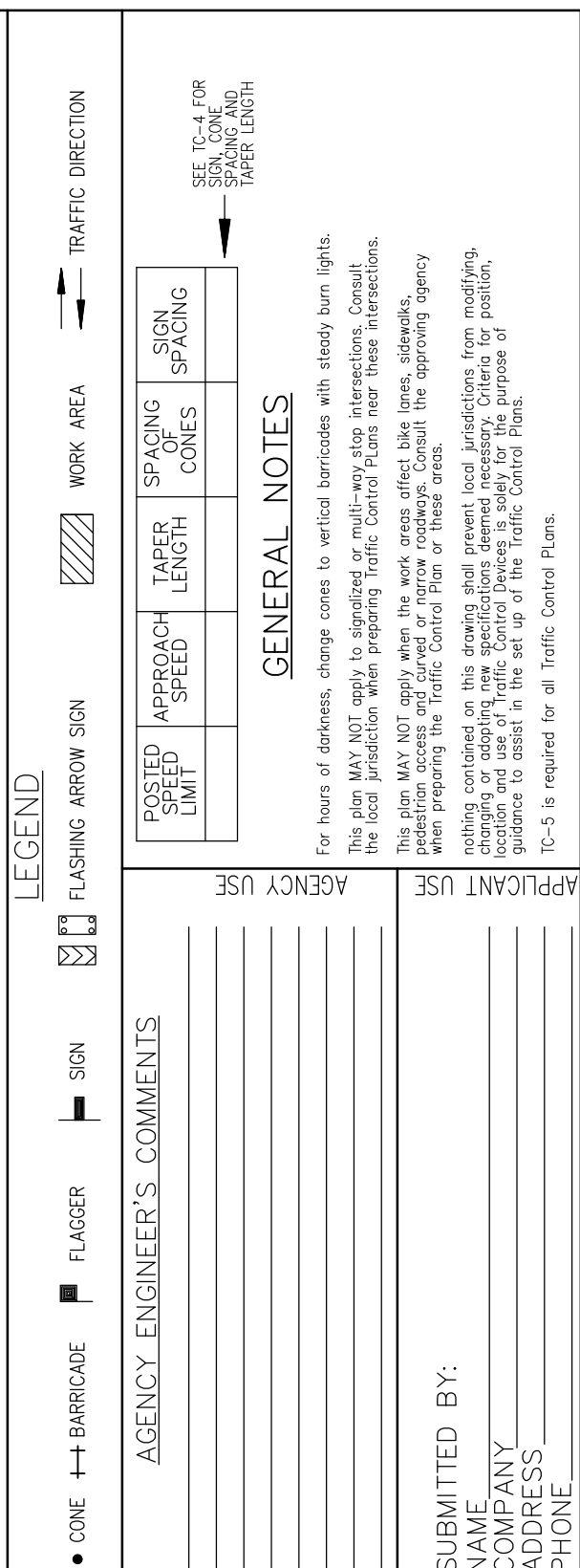
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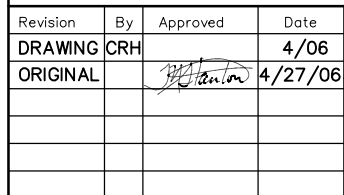
TC-5 is required for all Traffic Control Plans.

AGENCY ENGINEER'S COMMENTS	

AGENCY USE		APPLICANT USE	
SUBMITTED BY:		NAME	
COMPANY		COMPANY	
ADDRESS		ADDRESS	
PHONE		PHONE	



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE		APPENDIX "A" SAN DIEGO REGIONAL STANDARD		Revision	By	Approved	Date
 04/27/2006		SIDE OF ROAD WORK AREA LEFT TURN INTERSECTION TRAFFIC CONTROL		DRAWING	CRH		4/06
Chairperson R.C.E. 19246 Date				ORIGINAL			4/27/06
DRAWING NUMBER TC-34							



APPENDIX "A"
SAN DIEGO REGIONAL STANDARD
SIDE OF ROAD WORK AREA
INTERSECTION TRAFFIC CONTROL

LEGEND

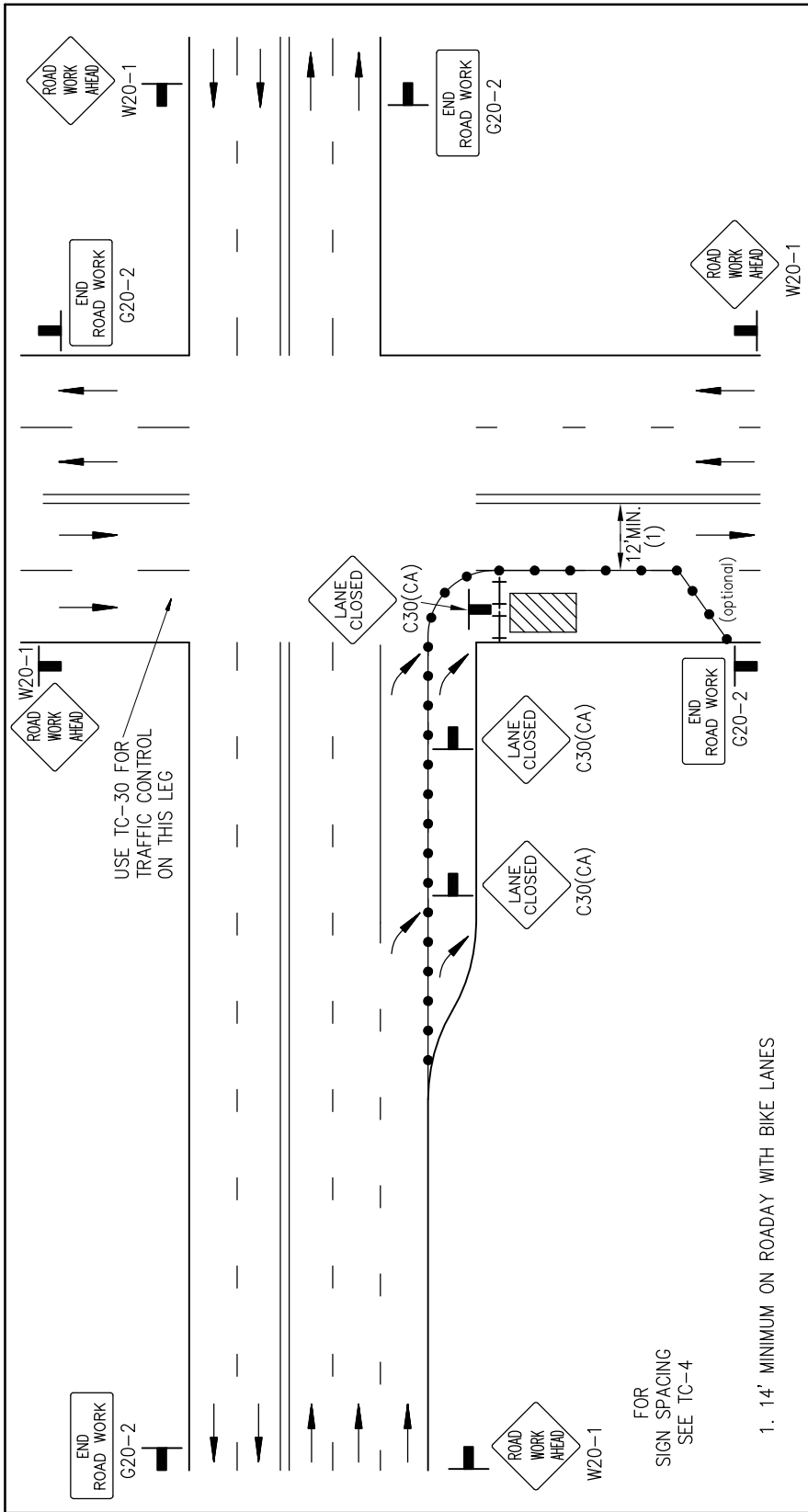
●	CONES	+	BARRICADE	FLAGGER	SIGN	FLASHING ARROW SIGN	WORK AREA	TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

[illegible]

SUBMITTED BY: _____
NAME _____
COMPANY _____
ADDRESS _____
PHONE _____

TC-5 is required for all Traffic Control Plans.



LEGEND

● CONE ++ BARRICADE FLAGGER SIGN FLASHING ARROW SIGN WORK AREA TRAFFIC DIRECTION

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

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AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-38**

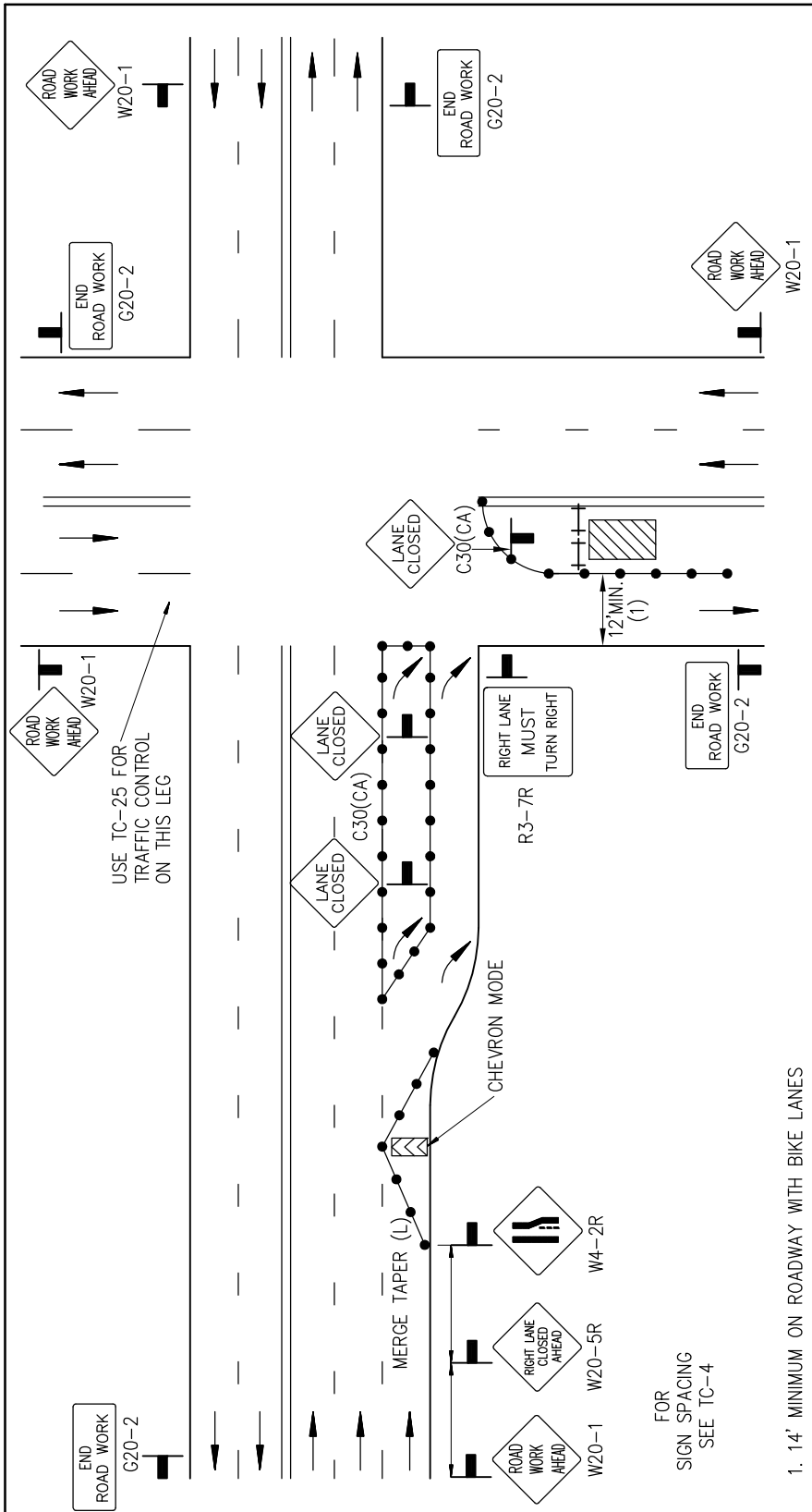
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

RIGHT TURN INTERSECTION TRAFFIC CONTROL

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06



GENERAL NOTES

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POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

SEE TC-4 FOR SIGN, CONE SPACING AND TAPER LENGTH

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA

RIGHT TURN INTERSECTION TRAFFIC CONTROL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-39**

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL		<i>[Signature]</i>	4/27/06

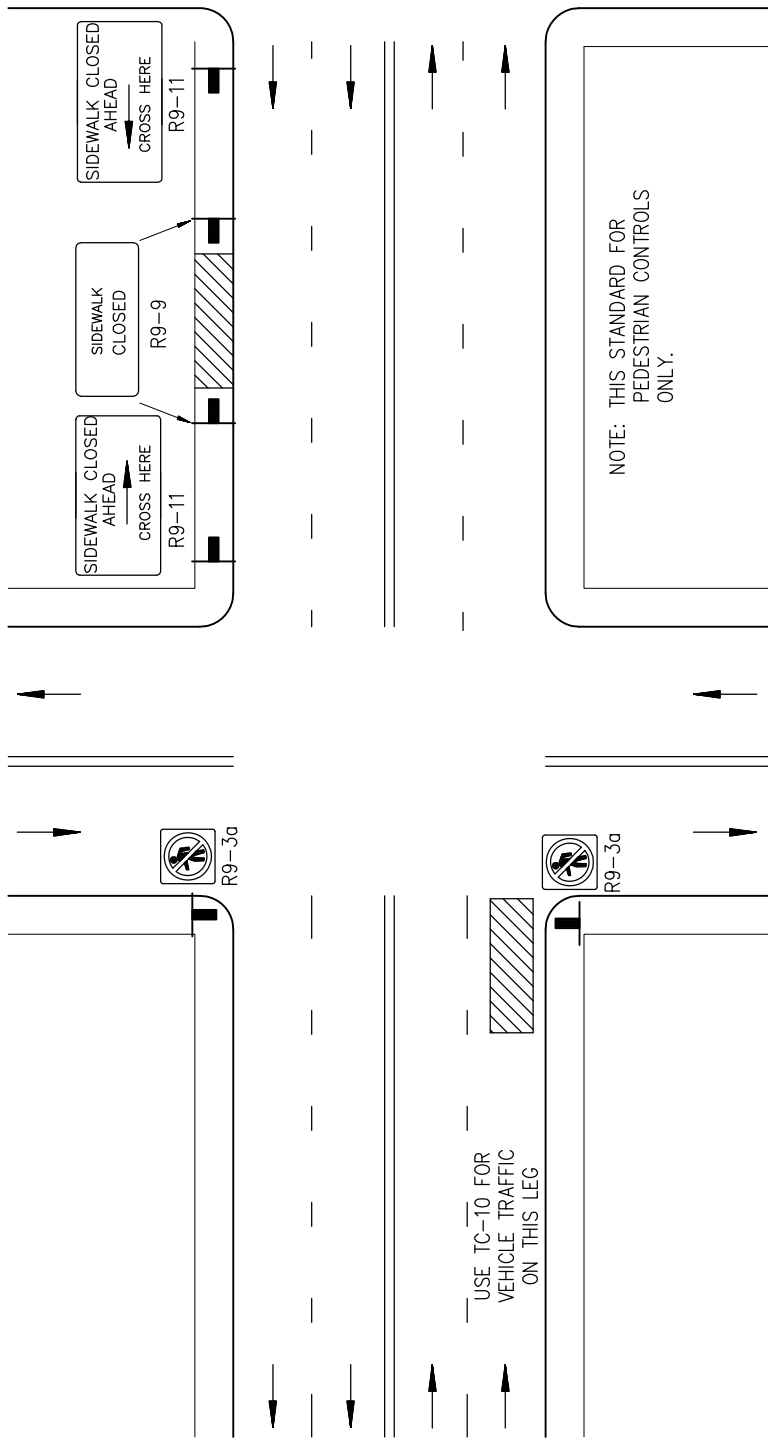
APPENDIX "A"
SAN DIEGO REGIONAL STANDARD

SIDE OF ROAD WORK AREA
TYPICAL PEDESTRIAN CONTROL SIGNS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[Signature] 04/27/2006
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **TC-41**



LEGEND

- CONE ++ BARRICADE FLAGGER SIGN WORK AREA TRAFFIC DIRECTION
- ☒ FLASHING ARROW SIGN

AGENCY ENGINEER'S COMMENTS

AGENCY USE

APPLICANT USE

SUBMITTED BY:

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

GENERAL NOTES

For hours of darkness, change cones to vertical barricades with steady burn lights.

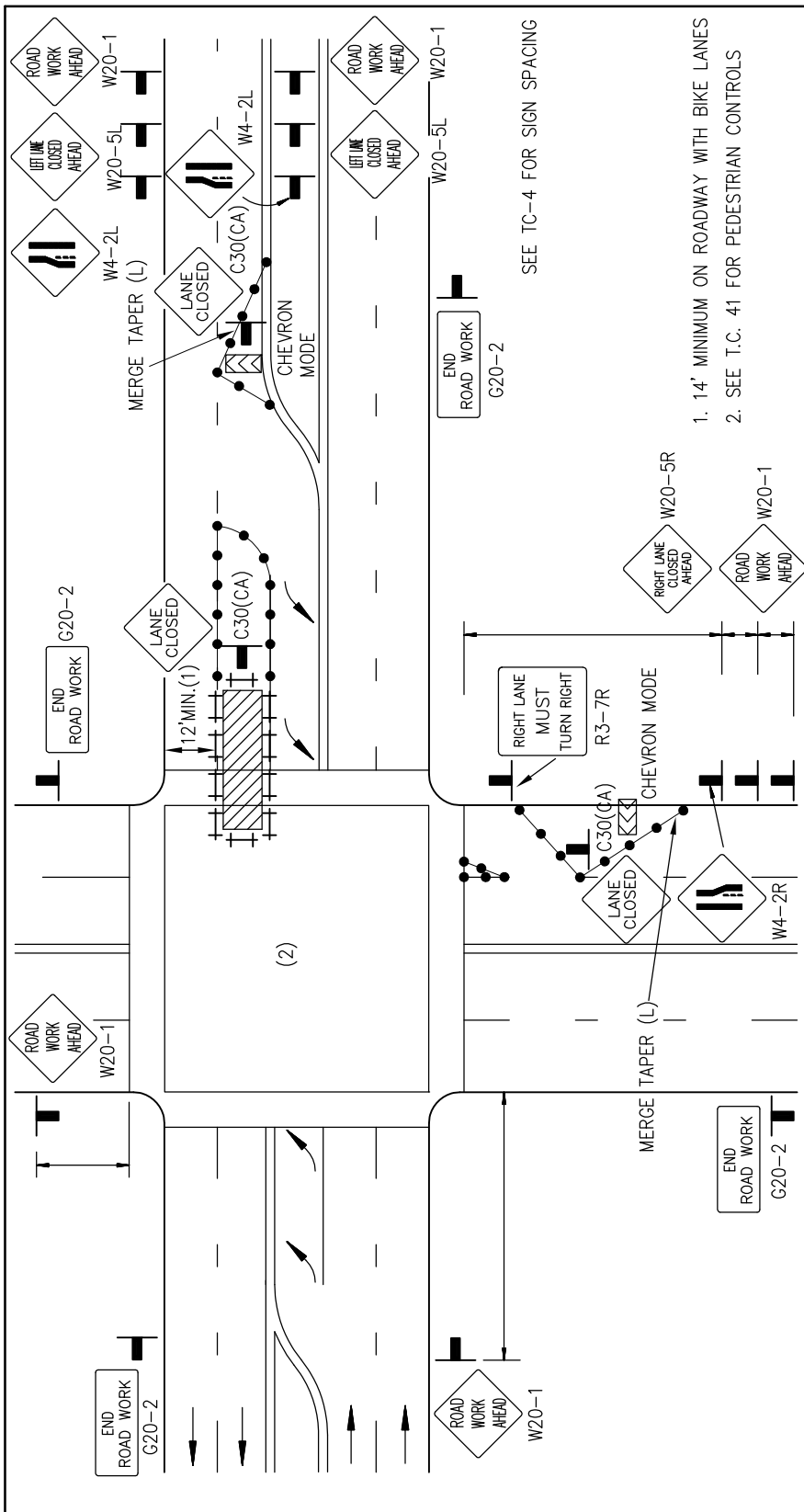
This plan DOES NOT apply to signalized or multi-way stop intersections. Consult the local jurisdiction when preparing Traffic Control Plans near these intersections.

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TC-5 is required for all Traffic Control Plans.

SEE TC-4 FOR
SIGN, CONE
SPACING AND
TAPER LENGTH



SEE TC-4 FOR SIGN SPACING

1. 14' MINIMUM ON ROADWAY WITH BIKE LANES
2. SEE T.C. 41 FOR PEDESTRIAN CONTROLS

LEGEND

- CONE
- ++ BARRICADE
- FLAGGER
- FLASHING ARROW SIGN
- SIGN
- WORK AREA
- TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

POSTED SPEED LIMIT	APPROACH SPEED	TAPER LENGTH	SPACING OF CONES	SIGN SPACING

SEE TC-4 FOR SIGN, CONE SPACING AND TAPER LENGTH

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AGENCY USE

APPLICANT USE

SUBMITTED BY:
NAME
COMPANY
ADDRESS
PHONE

Revision	By	Approved	Date
DRAWING	CRH		4/06
ORIGINAL			4/27/06

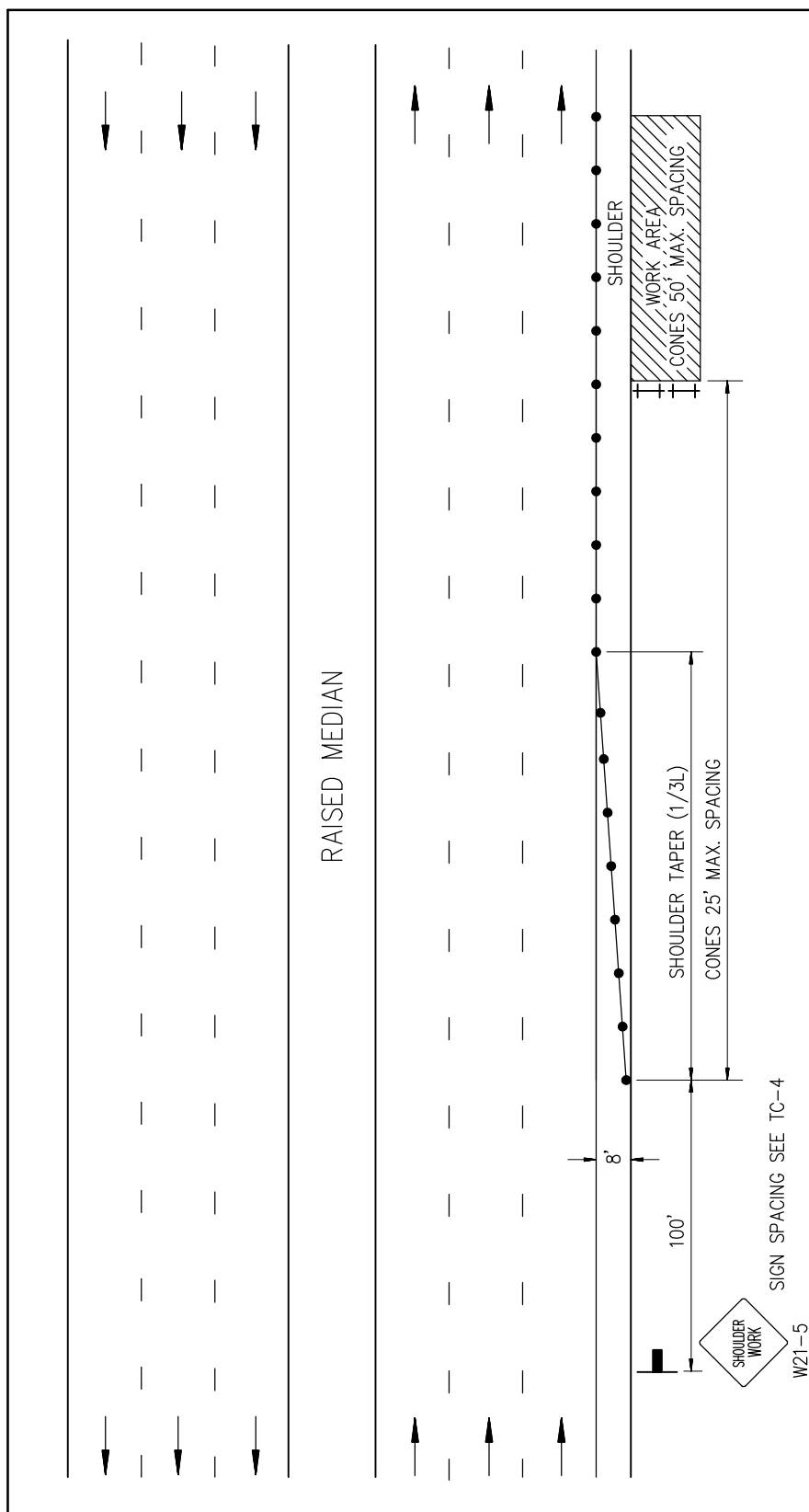
APPENDIX "A"

SAN DIEGO REGIONAL STANDARD

WORK WITHIN INTERSECTION

RIGHT LANE / LEFT LANE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
<i>[Signature]</i> 04/27/2006
Chairperson R.C.E. 19246 Date
DRAWING NUMBER
TC-43



RAISED MEDIAN



GENERAL NOTES

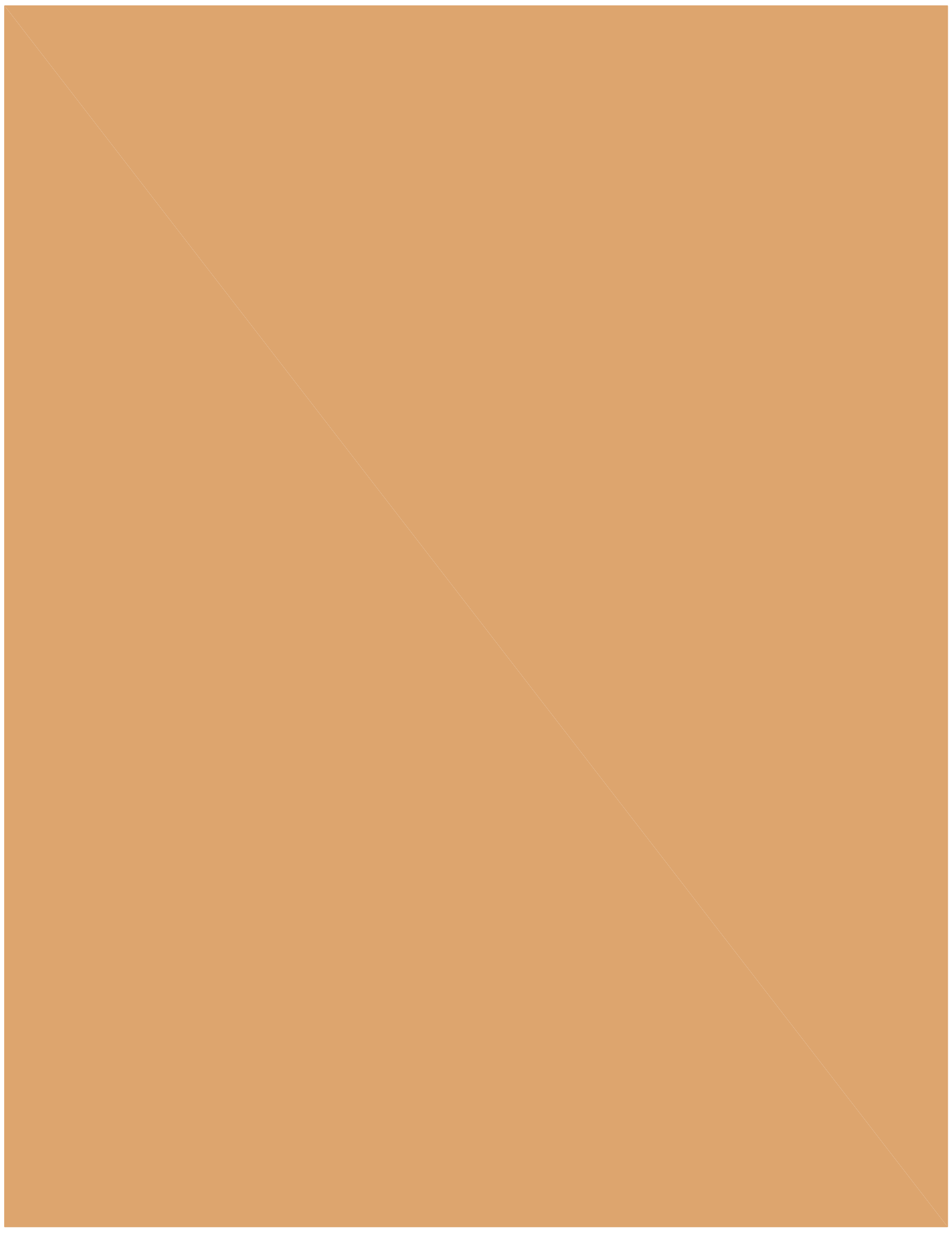
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