2012 SAN DIEGO
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
September 2012
www.regional-stds.com
MISSION STATEMENT: Cost effective government through regional construction standards for San Diego area agencies.

FORWARD

These "2012 San Diego Regional Standard Drawings" (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. They are for use in concert with the "2012 San Diego Regional Supplement to the 2012 Edition of the “Greenbook” Standard Specifications for Public Works Construction" (Regional Supplement). The San Diego region is defined as the land area within the boundaries of the County of San Diego.

The San Diego Regional Standard Drawings are published every three years and are posted on the website: http://www.regional-stds.com. Updates to the Standard Drawings will be posted to the website as they are adopted by the RSC.

The website contains information about membership, operating procedures, meeting schedules, agenda and minutes, Standard Drawings, Regional Supplement, a link to the Greenbook Committee and a form for submitting proposed revisions. Users of the Regional Supplement and the Standard Drawings are encouraged to submit proposed changes to the Regional Standards Committee (RSC) at:

County of San Diego
Department of Public Works
Attention: Matt Widelski, PE, RSC Coordinator
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The following is a list of the County of San Diego Coordinator and the subcommittee chairpersons who over the last three years have made this publication possible by integrating the input from all agencies in the County:

Matt Widelski, PE  County of San Diego Coordinator  County of San Diego
Tim Regello, PE, PLS  Drainage/NPDES Committee Chair  City of Vista
Dennis Gerschoffer  Dry Utilities and Misc Committee Chair  SDG&E
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Tim Shell, PE  Retaining Walls & ADA Committee Chair  City of Vista
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Blair Knoll, PE, PLS  Wet Utilities Committee Chair  San Dieguito 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, water and sewer districts, utility companies, construction associations, consultant associations, and various private industry organizations with in the San Diego region.
The County Department of Public Works provides coordination and staff support for the Regional Standards Committee. The RSC Chairman is selected by the committee members and serves a three-year term.

The 2012 San Diego Regional Standard Drawings has discontinued the use of dual units and adopted U.S. Standard Measures, also referred to as Customary System Units or English Units, based on Local Agencies requests and the State of California and most other states returning to English only units. The 2012 Greenbook continues to have U.S. Customary System Units followed by International System of Units also referred to SI or metric units in parenthesis.

Timothy N. Stanton, PE
Chairman, Regional Standards Committee
# Proposed Revision to the Regional Standards

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**Reason for Revision:**

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**Submitted By:**

**Name:**

**Agency:**

**Address:**

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**Subcommittee:**

**Date:**

**Regional Standards Committee**

**Date:**

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- [ ] As Modified
- [ ] Rejected
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SP-2  Pipe Bedding and Trench Backfill for Sewer Facilities
SP-3  Concrete Protection for Sewer Pipe
SP-5  Slope Protection Installations
SP-7  Cutt-Off Wall Installation in Traveled Areas
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WP-2  Pipe Bedding and Trench Backfill for Potable and Recycled Water Mains
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<table>
<thead>
<tr>
<th>WV-1</th>
<th>Gate Well Cap Installation for Valves 4” and Larger</th>
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<tr>
<td>WV-2</td>
<td>Gate Well Cap &amp; Can Installation for Valves 4” and Larger</td>
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<td>WV-3</td>
<td>Gate Well Identification</td>
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<td>WV-4</td>
<td>Steel Valve Stem Extension for Valves 4” and Larger</td>
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<tr>
<td>WV-5</td>
<td>Steel Valve Stem Extension for Valves 2” and Smaller</td>
</tr>
</tbody>
</table>

## APPENDIX A

Traffic Control Plans
**TYPICAL SECTION**

**ELEVATION**

Horizontal reinf. not shown

**TYPICAL SECTION**

**OVER 5'-4''**

**DIMENSIONS AND REINFORCING STEEL**

<table>
<thead>
<tr>
<th></th>
<th>3'-8''</th>
<th>5'-4''</th>
<th>8'-0''</th>
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<tr>
<td>H (max)</td>
<td>3'-8''</td>
<td>5'-4''</td>
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<tr>
<td>T (min)</td>
<td>0'-8''</td>
<td>0'-10''</td>
<td>1'-0''</td>
</tr>
<tr>
<td>W (min)</td>
<td>2'-4''</td>
<td>3'-6''</td>
<td>5'-4''</td>
</tr>
<tr>
<td>A Bars</td>
<td>#4@32''</td>
<td>#4@32''</td>
<td>#4@32''</td>
</tr>
<tr>
<td>B Bars</td>
<td></td>
<td>#4@32''</td>
<td>#4@32''</td>
</tr>
<tr>
<td>C Bars</td>
<td></td>
<td></td>
<td>#6@16''</td>
</tr>
<tr>
<td>D Bars</td>
<td>#4 Total 4</td>
<td>#4 Total 5</td>
<td>#4 Total 6</td>
</tr>
</tbody>
</table>

| max soil pressure | 500psf | 600psf | 800psf |

**NOTES:**

1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.
1 1/2 : 1 sloping backfill or 250 psf live load surcharge

Mortar cap
#4 Total 2

A Bars

B Bars
#4 Total 5

Key

W/2

T

W

3" C.L.

12" x 12"

ELEVATION
Horizontal reinforc. not shown

TYPICAL SECTION
over 3'-8"

PLAN

Edge of Footing

Layout Line

H=5'-4"

H=3'-8"

H=3'-8" max

H=3'-8" max

1 1/2 : 1 sloping backfill or 250 psf live load surcharge

Mortar Cap

1"-6"

#4

@ 12"

#4 Total 2

B Bars

#6@16"

#4 @ 16"

max soil pressure

700 psf

550 psf

NOTES:
1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.
TYPICAL SECTION
over 5'-4"

ELEVATION
Horizontal reinfor. not shown

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>3'-8&quot;</th>
<th>5'-4&quot;</th>
<th>8'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T (min)</td>
<td>0'-8&quot;</td>
<td>0'-10&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>W (min)</td>
<td>2'-4&quot;</td>
<td>3'-2&quot;</td>
<td>4'-9&quot;</td>
</tr>
<tr>
<td>A Bars</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
</tr>
<tr>
<td>B Bars</td>
<td></td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
</tr>
<tr>
<td>C Bars</td>
<td></td>
<td></td>
<td>#6 @ 16&quot;</td>
</tr>
<tr>
<td>D Bars</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 16&quot;</td>
<td>#6 @ 16&quot;</td>
</tr>
<tr>
<td>E Bars</td>
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<tr>
<td>max soil pressure</td>
<td>1100psi</td>
<td>1600psi</td>
<td>2200psi</td>
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</table>

NOTES: 1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.
TYPICAL SECTION over 3'-8"

**DIMENSIONS AND REINFORCING STEEL**

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<tr>
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<td>3'-8&quot;</td>
</tr>
<tr>
<td>T (min)</td>
<td>0'-10&quot;</td>
<td>0'-8&quot;</td>
</tr>
<tr>
<td>W (min)</td>
<td>4'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>A Bars</td>
<td>#4@16&quot;</td>
<td>#4@16&quot;</td>
</tr>
<tr>
<td>B Bars</td>
<td>#6@16&quot;</td>
<td></td>
</tr>
<tr>
<td>C Bars</td>
<td>#6@8&quot;</td>
<td>#6@16&quot;</td>
</tr>
<tr>
<td>K (min)</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>Toe Press.</td>
<td>2700 psf</td>
<td>1700 psf</td>
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</table>

**NOTES:**

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

**DIMENSIONS AND REINFORCING STEEL**

<table>
<thead>
<tr>
<th></th>
<th>H (max)</th>
<th>T (min)</th>
<th>W (min)</th>
<th>A Bars</th>
<th>B Bars</th>
<th>Max Toe Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5'-4&quot;</td>
<td>0'-10&quot;</td>
<td>3'-10&quot;</td>
<td>#6@16&quot;</td>
<td>#4@16&quot;</td>
<td>2,000 psf</td>
</tr>
<tr>
<td></td>
<td>3'-8&quot;</td>
<td>0'-8&quot;</td>
<td>2'-9&quot;</td>
<td>4@16&quot;</td>
<td>4@16&quot;</td>
<td>1,400 psf</td>
</tr>
</tbody>
</table>

**TYPICAL SECTIONS**

**PLAN**
- 1-1/2:1 sloping backfill or 250 psf live load surcharge
- Mortar Cap
- Layout Line

**ELEVATION**
- Horizontal reinf. not shown
- H=5'-4"
- H=3'-8"
- W
- 2'-8" min, 2'-8" max
- 3" CLR
- 3" CLR
- 1'-6" @ 12"
- 12" 11'-3"
- 12" 10" 8" block
- 2" 3" CLR
- #4 total 2
- #5 @ 16"
- Key
- #4 total 5
- #4 total 2
- #4 total 2
- W 0'-8"
- 12" 11"
- 12" 10" 8" block
- Mortar Cap

**TYPICAL SECTION**
- over 3'-8"
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:
- $F_c = 1200 \text{ psi}$
- $F'c = 3000 \text{ psi}$
- $F_s = 20,000 \text{ psi}$
- $n = 10$

Reinforced Masonry:
- $F'm = 600 \text{ psi}$
- $F'm = 200 \text{ psi}$
- $F_s = 20,000 \text{ psi}$
- $n = 50$
- Earth = 120 pcf and Equivalent Fluid
- Pressure = 36 psi per 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 $\phi = 42^\circ$.

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 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 96’ intervals maximum.

CONCRETE:
Footing concrete shall be 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 4’ or full height for walls up to 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 2,000 psi in 28 days and mortar shall attain 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 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 12” into undisturbed natural soil or approved compacted fill. Soil should be dampened prior to placing concrete in footings.
Notes:
1. All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.
2. 4" diameter drain may be formed by placing a block on its side.
### Elevation

<table>
<thead>
<tr>
<th>WALL TYPE</th>
<th>HEIGHT</th>
<th>BASE</th>
<th>CONCRETE CF/FT</th>
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<td>1.50</td>
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<tr>
<td>B</td>
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<td>4&quot;</td>
<td>4.99</td>
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<tr>
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<td>10&quot;</td>
<td>7.66</td>
</tr>
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<td></td>
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<td>4&quot;</td>
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<td>12.00</td>
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</tbody>
</table>

**NOTE:**
See C-10 for Section A-A, notes and details.
CONCRETE
Concrete shall be 560–C–3250.

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

DESIGN DATA
F_c = 1200 psi
F'c = 3000 psi
Earth = 120 psf
and equivalent fluid pressure = 36 psf per 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 φ = 42°.
Note: Maximum toe pressure under wall footing = 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 2,500 psi in compression as determined by test cylinders, or until 28 days after wall has been placed.

Filler Material: 1" max crushed aggregate 4 cu. ft. min at each drain.
4" dia. drains with 1/4" galv. wire mesh screen, 8" above outside ground surface, slope 1/2" per ft. Locate drains @ 15°-0" center to center or as directed by the Engineer.

TYPICAL DRAINAGE
WHEN H IS GREATER THAN 4'-0"
1/2" Expansion joint, fill with premolded expansion joint filler. Locate joints at approx. 30'-0" centers or as directed by the Engineer.

1/2" chamfer
Water stop, use only when watertight joint is required, see water stop detail.

RUBBER WATERSTOP
Use only when watertight joint is required.
NOTES:
1. For SPREAD FOOTING SECTION see C-11B
2. For TYPICAL LAYOUT EXAMPLE see C-11C
3. For 4ST PILE FOOTING SECTION see C-11C
4. For TABLE OF REINFORCING STEEL DIMENSIONS AND DATA see C-11D
NOTES:
1. For details not shown and drainage notes see "Retaining Wall Details No. 1".
   Standard Drawings C-13A to C-13D.
2. Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".

SPREAD FOOTING SECTION

For design limits of surcharge and slope see "Retaining Wall Details No. 1".

EXTERIOR FACE

IF H=10' thru 18'
C=1'-0"
IF H=20' to 30'
C=2'-6"

2" Clear

STOP

#4 @ 18"

#4 @ 36"

#4 total 7

#5 total 4

8" for H ≤ 10'
1'-0" for H ≥ 12'
W/4 for ≤ H 10'
W/3 for ≥ H 12'

H ≤ 16'-0" 35 Dia
H >16'-0" 42 Dia

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL

TYPE 1

DRAWING NUMBER C-11B
TYPICAL LAYOUT EXAMPLE

For joints required, see Details 3-3 and 3-4, drawing C-15
<table>
<thead>
<tr>
<th>Design H</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
<th>22'</th>
<th>24'</th>
<th>26'</th>
<th>28'</th>
<th>30'</th>
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<tbody>
<tr>
<td>W</td>
<td>3'-2&quot;</td>
<td>4'-2&quot;</td>
<td>5'-2&quot;</td>
<td>6'-2&quot;</td>
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<td>12'-0&quot;</td>
<td>13'-3&quot;</td>
<td>14'-3&quot;</td>
<td>15'-3&quot;</td>
<td>16'-9&quot;</td>
</tr>
<tr>
<td>C</td>
<td>1'-0&quot;</td>
<td>1'-4&quot;</td>
<td>1'-8&quot;</td>
<td>2'-0&quot;</td>
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<tr>
<td>F Spread Ftg.</td>
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<td>2'-4&quot;</td>
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</tbody>
</table>

- **Reinforce Concrete Retaining Wall:** Type 1

<table>
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<tr>
<th>SAN DIEGO REGIONAL STANDARD DRAWING</th>
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</thead>
<tbody>
<tr>
<td>DRAWING NUMBER C-11D</td>
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<tr>
<td>ORIGINAL RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE</td>
</tr>
<tr>
<td>Date 7/26/2006</td>
</tr>
</tbody>
</table>

**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.
SPREAD FOOTING SECTION

Place concrete in toe against undisturbed material, except as permitted by the Engineer.

NOTES:
Design H may be exceeded by 6" before going to the next size. Footing key is required except when found unnecessary by Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data:
fc = 1300 psi  \( f'c = 3250 \text{ psi} \)  fs = 24,000 psi  n = 10 earth 120 pcf

Case I – Equivalent fluid pressure = .36 psf max for determination of toe pressure. 27 psf min for determination of heel pressure.

Case II – Earth pressure determined from Rankine’s formula with \( \phi = 33'–42' \).

NOTE:
Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown. see Pile Layout on plans.
45T PILE FOOTING SECTION

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

<table>
<thead>
<tr>
<th>Design H</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
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<tbody>
<tr>
<td>W</td>
<td>3'-2&quot;</td>
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<td>5'-2&quot;</td>
<td>6'-2&quot;</td>
<td>7'-2&quot;</td>
</tr>
<tr>
<td>C</td>
<td>1'-0&quot;</td>
<td>1'-4&quot;</td>
<td>1'-8&quot;</td>
<td>2'-0&quot;</td>
<td>2'-4&quot;</td>
</tr>
<tr>
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<td>2'-2&quot;</td>
<td>2'-10&quot;</td>
<td>3'-6&quot;</td>
<td>4'-2&quot;</td>
<td>4'-10&quot;</td>
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</tbody>
</table>

<table>
<thead>
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<th>@ bars</th>
<th>@ bars</th>
<th>@ bars</th>
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</thead>
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<tr>
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<td>#5@22&quot;</td>
<td>#5@22&quot;</td>
<td>#7@18&quot;</td>
</tr>
<tr>
<td>#5@24&quot;</td>
<td>#5@22&quot;</td>
<td>#5@11&quot;</td>
<td>#8@15</td>
</tr>
<tr>
<td>@ bars</td>
<td>@ bars</td>
<td>@ bars</td>
<td>@ bars</td>
</tr>
<tr>
<td>6-#5</td>
<td>6-#6</td>
<td>6-#6</td>
<td>10-#7</td>
</tr>
<tr>
<td>10-#7</td>
<td>4-#7</td>
<td>4-#7</td>
<td></td>
</tr>
</tbody>
</table>

Case I - Toe Press. 1590psf 1930psf 2240psf 2550psf 2840psf
Case II - Toe Press. 1060psf 1460psf 1860psf 2280psf 2700psf
Spread Steel lbs/ft 15lb 21lb 27lb 46lb 70lb
Footing Conc CF/ft 8.6lb 11.8lb 14.9lb 18.1lb 21.3lb
Pile Flg Steel lbs/ft 25lb 32lb 38lb 75lb 101lb
Pile Conc CF/ft 9.9lb 11.9lb 15.3lb 18.8lb 22.2lb

Note:
- Quantities apply to Design H portion and exclude the added portion above.
- "Gutter Elevation": For pile footing Design H=4' use same footing dimensions as Design H=6'.
- Bar cut-offs may be varied in increments of 6"
Backfill sufficiently to prevent ponding. To be done after removal of wall forms and before backfilling behind wall.

Place concrete in toe against undisturbed material except as permitted by the Engineer.

**DESIGN AND DRAINAGE**

**STEM WIDTH AT BASE OF HAUNCH**

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.

**FOOTING STEP**

**20’ VC AT TOP OF WALL SLOPE CHANGE**

Where shown on the plans.

**DETAIL OF DESIGN LOADING CASES**

CASE I  Level + 2’ surcharge

CASE II  2:1 unlimited slope

CASE III  1-1/2:1 limited slope (7’-0” max height) + 2’ surcharge

NOTE: Surcharge limits shown apply to retaining walls Type 1 and 3.
PLAN
(For return wall type "A")

PLAN
(For return wall type "B")

PLAN
(For return wall type "C")

*Omit when Detail 3-4, C-15 is not required

*Omit when Detail 3-4, C-15 is not required
PLAN OF WALL WITH DETAIL 3–4
(see C-15)

PLAN OF WALL WITH EXPANSION JOINT ONLY

Offset as follows:
H 4"=1/4"
H 6"=3/8"
H 8"=1/2"
H 10"=5/8"
H 12"=3/4"
H 14"=1"
H 16"=1–1/4"
H 18"=1–1/2"
H 20"=1–3/4"
H 22"=2"
H 24"=2–1/4"
H 26" thru 36"=2–1/2"

Vertical LOL

Stem as constructed

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 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:
fc = 1300 psi  f'c = 3250 psi  fs = 24,000 psi
n = 10  earth = 120 pcf
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 \( \theta = 33°–42° \).
WEEP HOLE AND PERVERS BACKFILL
DETAIL 3-1

NOTES
A. 4" diameter drain @ 25' max center to center (9' c-c for Type 3 and 9'-3" c-c for Type 4 Retaining Walls). For walls adjacent to sidewalks or curbs, provide 4" cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3' ± above finished grade.

B. 6" square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter 0.03") Anchor firmly to backface.

C. One cubic foot pervious backfill material in a burlap sack, securely tied.

D. Pervious backfill material continuous behind retaining wall.

WALL EXPANSION JOINT
DETAIL 3-4

WATERSTOP
DETAIL 3-6

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

SAN DIEGO REGIONAL STANDARD DRAWING
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

REINFORCED CONCRETE
RETAINING WALL DETAILS No. 3

DRAWING NUMBER C-15
NOTES
1. See D-11A, D-11B, & D-12 for additional notes and details.
2. Types are designated on plans as follows: A (no wing), A-1 (one wing), or A-2 (two wings).
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Steps shall be installed when V exceeds 4'. See 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 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Use of top slab to match sidewalk finish and slope.
9. Maintain 1-1/2" clear spacing between reinforcing and concrete surface unless otherwise noted.
10. If required by local agency, extend top slab steel reinforcement 12" into adjacent sidewalk.
11. Elevations shall be shown on plans where indicated by "O" symbol.

SECTION C-C
- Length shown on plans
- Plan: L = length shown on plans
- Slope to match curb profile or as shown on plans
- 30 D Lap (typ)
- 6" min. (typical both sides)
- Y is determined by pipe size - 4' min, 8' max

SECTION A-A
- Plan:
- Optional construction joint 6" min above invert
- 4-#4 around pipe
- Slope floor 12:1 towards outlet
- #4 @ 6"
- 10" unless shown otherwise
- Optional construction joint 6" min above invert

LEGEND ON PLANS
- CURB INLET - TYPE A

SAN DIEGO REGIONAL STANDARD DRAWING

Revised
- Kereheal 12/75
- T. Stanton 03/03
- T. Stanton 04/06
- T. Stanton 02/09
- S.S. T. Regello 03/11

DRAWING NUMBER D-01

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
NOTES
1. See D-11A, D-11B & D-12 for additional notes and details.
2. Types are designated on plans as follows: B (no wing), B-1 (one wing) or B-2 (two wings).
3. Maintain 1-1/2" clear spacing between reinforcing and concrete surface unless otherwise noted.
4. Steps shall be installed when V exceeds 4'. See 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 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. If required by local agency, extend top slab steel reinforcement 12" into adjacent sidewalk.
10. Elevations shall be shown on plans where indicated by "O" symbol.
11. If required by local agency, enlarge curb inlet top to width of adjacent sidewalk (X + T not to exceed S'-6") by length of inlet including wing(s). Reinforcing steel shall be extended across enlarged top to clear distances shown.

LEGEND ON PLANS

CURB INLET - TYPE B

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER D-02

Revised By Approved Date
Kerscheval 12/75
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.T. Regello 03/11
NOTES
1. See D-11A through D-15 for additional notes and details.
2. Types are designated on plans as follows: C (no wing), C-1 (one wing) or C-2 (two wings).
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Steps shall be installed when V exceeds 4'. See 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 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 1-1/2" clear spacing between reinforcing and concrete surface unless otherwise noted.
10. Where inlet is to be constructed on grade and concrete apron per D-03B is required, lift down-grade end of grate as shown on D-03B.
11. If required by local agency, extend top slab steel reinforcement 12" into adjacent sidewalk.
12. Elevations shall be shown on plans where indicated by "O" symbol.
13. Diameter "D" shall be 24" maximum; for larger diameter pipes this drawing must be modified.
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 Section B–B of D–03A.
4. Concrete shall be 520–C–2500.

LEGEND ON PLANS
NOTES
1. See D–11A & 11B for additional notes and details.
2. When V exceeds 4’ steps shall be installed. See D–11A for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2”.
4. Construct openings on both sides unless otherwise shown on plans.
5. Maintain 1–1 1/2” clear spacing between reinforcing and concrete surface.
6. Install 1” steel protection bar across opening.
7. Diameter "D" shall be 18” max, for larger diameter pipes this drawing must be modified. Pipe diameters to be shown on plans.
8. If constructed adjacent to sidewalk, the surface of the top slab of the catch basin shall match the sidewalk slope and finish.

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING

CATCH BASIN - TYPE F

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Charpenteon R.C.E 19245  Date

DRAWING NUMBER  D-07
NOTES
1. See D-11A & D-11B for additional notes and details.
2. When $V$ exceeds 4', steps shall be installed. See D-11A for details.
3. Maintain 1" clear spacing between reinforcing and concrete 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 1/2".
7. Designate types as follows: Single G-1, Double G-2 or Triple G-3.
8. Only end bearing grates shall be used. See D-15.

LEGEND ON PLANS

See D-13 and D-15 for frame and grate details

Rounded pipe ends, see D-61

Elev shown on plans

SECTION A-A

2'-11" Single G-1
5' Double G-2
7' Triple G-3
2-#4 bars
#4 bars placed diagonally

#4 @ 8" both ways
Bend down 15" (typ)

PLAN

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PIPE DIAMETER (D1)</th>
<th>X</th>
<th>Y (See Note 8)</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4</td>
<td>up to 39&quot;</td>
<td>4'</td>
<td>4'</td>
<td>6'</td>
</tr>
<tr>
<td>A5</td>
<td>42&quot; to 48&quot;</td>
<td>5'</td>
<td>4'</td>
<td>6'</td>
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<tr>
<td>A6</td>
<td>51&quot; to 60&quot;</td>
<td>6'</td>
<td>4'</td>
<td>6'</td>
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<tr>
<td>A7</td>
<td>63&quot; to 66&quot;</td>
<td>7'</td>
<td>4'</td>
<td>7'</td>
</tr>
<tr>
<td>A8</td>
<td>69&quot; to 78&quot;</td>
<td>8'</td>
<td>4'</td>
<td>8'</td>
</tr>
</tbody>
</table>

Bend down 15" (typ)

Diagonal bars
2-#4 bars

Elev shown on plans

SECTION A-A

See M-3 for manhole frame and cover
See D-11A for step details
4-#4 around pipe
Optional construction joint 6" min above invert
Slope floor 12:1 towards outlet

NOTES
1. See D-11A & D-11B for additional notes and details.
2. Concrete base shall be 560-C-3250.
3. All precast components shall be reinforced with 1/4" diameter steel, wound spirally on 4" centers.
4. All joints shall be set in Class C mortar.
5. Maintain 1-1/2" clear spacing between reinforcing and concrete surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".
7. Manhole cover to be marked "Storm Drain".
8. Modifications to "Y" dimension required if pipe (D2) exceeds 39".
9. If constructed adjacent to sidewalk, top of manhole to match sidewalk slope.

SAN DIEGO REGIONAL STANDARD DRAWING
STORM DRAIN CLEANOUT - TYPE A

LEGEND ON PLANS

- - -
NOTES
1. See 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 1/4" diameter steel wound spirally on 4" centers.
4. Maintain 1-1/2" clear spacing between reinforcing and concrete surface.
5. Concrete base shall be 560-C-3250.
6. Exposed edges of concrete shall be rounded with a 1/2" radius.
7. Manhole cover to be marked "Storm Drain".
8. Modifications to "Y" dimension required if pipe (D2) exceeds 39".
9. If constructed adjacent to sidewalk, top of manhole to match sidewalk slope.

LEGEND ON PLANS

SANDiego REGIONAL STANDARD DRAWING
STORM DRAIN CLEANOUT - TYPE B

Revision | By | Approved | Date
---------|----|----------|-----
ORIGINAL | Kercheval | 12/75
Add Metric | T. Stanton | 03/03
Reformatted | T. Stanton | 04/06
Edited | T. Stanton | 02/09
Edited | S.S. T. Regello | 03/11

DRAWING NUMBER D-10

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
NOTES
1. Concrete shall be 560-C-3250 unless otherwise noted.
2. Reinforcing steel shall comply with this drawing (D-11A and D-11B) 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 on D-11B.
9. Wall thickness shall be stepped on the outside of the box.
10. When the structure depth V exceeds 4', steps shall be cast into the wall at 15" intervals from 15" above floor to within 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, 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.
<table>
<thead>
<tr>
<th>MAXIMUM SPAN X or Y</th>
<th>DEPTH V</th>
<th>THICKNESS T</th>
<th>HORIZONTAL AND FLOOR REINFORCEMENT SIZE AND SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' to 4'</td>
<td>4'</td>
<td>6&quot;</td>
<td>#4 @ 18&quot;</td>
</tr>
<tr>
<td>4'-1&quot; to 7'</td>
<td></td>
<td></td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>7'-1&quot; to 8'</td>
<td></td>
<td></td>
<td>#4 @ 8&quot;</td>
</tr>
<tr>
<td>3' to 4'</td>
<td>4'-1&quot; to 8'</td>
<td>6&quot;</td>
<td>#4 @ 18&quot;</td>
</tr>
<tr>
<td>4'-1&quot; to 5'</td>
<td></td>
<td></td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; to 6'</td>
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<td></td>
<td>#4 @ 8&quot;</td>
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<td>#4 @ 6&quot;</td>
</tr>
<tr>
<td>3' to 4'</td>
<td>8'-1&quot; to 12'</td>
<td>8&quot;</td>
<td>#4 @ 15&quot;</td>
</tr>
<tr>
<td>4'-1&quot; to 5'</td>
<td></td>
<td></td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; to 6'</td>
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<td></td>
<td>#4 @ 8&quot;</td>
</tr>
<tr>
<td>6'-1&quot; to 8'</td>
<td></td>
<td></td>
<td>#4 @ 6&quot;</td>
</tr>
<tr>
<td>3' to 4'</td>
<td>12'-1&quot; to 16'</td>
<td>8&quot;</td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>4'-1&quot; to 5'</td>
<td></td>
<td></td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; to 6'</td>
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<td>#4 @ 8&quot;</td>
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<td>6'-1&quot; to 7'</td>
<td></td>
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<td>#4 @ 6&quot;</td>
</tr>
<tr>
<td>7'-1&quot; to 8'</td>
<td></td>
<td></td>
<td>#5 @ 8&quot;</td>
</tr>
<tr>
<td>3' to 4'</td>
<td>16'-1&quot; to 20'</td>
<td>10&quot;</td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
<td>4'-1&quot; to 5'</td>
<td></td>
<td></td>
<td>#4 @ 12&quot;</td>
</tr>
<tr>
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<td>7'-1&quot; to 8'</td>
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<td></td>
<td>#5 @ 8&quot;</td>
</tr>
<tr>
<td>3' to 4'</td>
<td>20'-1&quot; to 24'</td>
<td>10&quot;</td>
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<tr>
<td>7'-1&quot; to 8'</td>
<td></td>
<td></td>
<td>#5 @ 8&quot;</td>
</tr>
</tbody>
</table>
NOTES
1. Face angle shall be cast into structure continuous for the full length "L."
2. All exposed metal parts shall be hot-dipped galvanized after fabrication.
3. When curb inlet opening height (H) exceeds 6", install 1" steel protection bar. Steel protection bar shall be embedded 8" into curb inset.
4. Install additional bars at 3-1/2" clear spacing above first steel protection bar when opening exceeds 13".
5. When curb inlet opening length exceeds 8' install 1" steel support bolts spaced at not more than 5' OC.
NOTE
Hat dip galvanize all parts after fabrication.
NOTES
1. Hot dip galvanize all parts after fabrication.
2. Dimensions are to centerline of bars unless otherwise noted.
3. Not to be used in pedestrian areas.
4. Weight: 200lbs +/-
NOTES

1. All components shall be galvanized.
2. Inlet and outlet pipes shall be set at factory and positioned as shown on plans.
3. See D-17B for ladder and step details.
4. See D-17A for additional grate details.
5. Grate to be provided when specified.
6. Grate detail shall be as shown on D-17A unless otherwise approved by Agency.
Provide cross bars, optional spacing 4" or 6".

L 3" x 2-1/2" x 3/8"
or L 3" x 3" x 3/8"
Standard end finish
Lug 3/4" dia. x 1 1/2"
1" hole in pipe to receive lug
1/4" (typ)

3/8" dia. 
1/8

3/8" dia. cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

CROSS BAR DETAIL TYPE
WELDED STEEL GRATE

GRATE BAR SPACING TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>NO. OF BARS</th>
<th>CLEAR BAR SPACING</th>
<th>X</th>
<th>Y</th>
<th>4&quot; SPACING</th>
<th>6&quot; SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welded Steel</td>
<td>15</td>
<td>2&quot;</td>
<td>9/16&quot;</td>
<td>3-3/4&quot;</td>
<td>5-3/4&quot;</td>
<td></td>
</tr>
<tr>
<td>Cast</td>
<td>13</td>
<td>2&quot;</td>
<td>2-1/8&quot;</td>
<td>3-3/4&quot;</td>
<td>5-3/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING
CORRUGATED STEEL PIPE INLETS, DETAILS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Chairperson R.C.E. 19246 Date
DRAWING NUMBER D-17A

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.S. T. Regello 03/11
Grind all exposed corners 1/4" radius

7/8" dia. hole in bracket

1' 1-4" min

2'-3', 4', or 5' units

1/8" 3/16"

1/2" gap

2-1/2" x 3/8" rails

3/4" or 1" dia. galv. steel rungs

6" x 1/4" x 6" plate washer with 7/8" dia. hole
Brackets @ 10' OC max 4-1/2" x 1/4" bent plate 5/8" holes in bracket and rail for 1/2" dia. bolts

2-holes slotted 5/8" x 1" for 1/2" dia. bolts
2-holes 5/8" for 1/2" dia. bolts

2-1/2" x 3/8" x 10"

Splice Plate

SIDE VIEW

1" dia. holes in pipe
3/4" dia. bolt
2" x 3/16" x 2" plate washer
Hex nut 1/2"

H=5' or greater

LADDER DETAIL

NOTE
See Note 3 on D-16 for ladder requirements.

3/4" dia. galv. steel step

5/8" dia. holes for 1/2" dia. bolts

2-1/2" x 3/8" x 1'

STEP DETAIL
H=3'-6" to 4'-11"

FRONT VIEW
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 1/2" in 20'.
7. Installation lengths shall be 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.
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 D-18 for additional notes and details.

3. Slotted drain installations shall be encased with 6" PCC 520-C-2500 all around and shall be poured monolithically with the curb and gutter.

**SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS**

**SAN DIEGO REGIONAL STANDARD DRAWING**

**Revision** | **By** | **Approved** | **Date**
--- | --- | --- | ---
ORIGINAL | Kerscheval | 12/75
Add Metric | T. Stanton | 03/03
Reformatted | T. Stanton | 04/06
Edited | T. Stanton | 02/09
Edited | S.S. T. Regello | 03/11
NOTES

1. AC spillway may be used when fill is 10' or less, and where fill slope 1–1/2:1 or flatter.
2. Use 10’ min length of gutter transition on each side of downdrain in sag condition.
3. Cross sectional area of ditch (Section B–B) may be trapezoidal or semi-circular; semi-circular sectional area must provide an equal flow capacity as trapezoidal.
NOTES
1. Downdrain flume may be used where fill slope is 1 1/2:1 or flatter.
2. Use 10' min length of gutter transition on each side of downdrain in sag condition.
3. All metal parts to be galvanized after fabrication.
NOTES
1. Concrete shall be 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 1/4" tooled groove in top slab in line with back of curb.
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 max).
3. Concrete shall be 520-C-2500.
4. Pipe shall be circular rigid plastic, or approved equal.
5. Coring of existing curb may be used as an alternative.
6. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.

### APPROVED DRAIN PIPE SIZES

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CURB HEIGHT AT CURB FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>6&quot; to 8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

---

San Diego Regional Standard Drawing

**SIDEWALK UNDERDRAIN PIPE**

*Chairperson R.C.E. 19246*
NOTES
1. See D-11A & D-11B for additional notes and details.
2. When V exceeds 4', steps shall be installed per D-11A.
### FRONT ELEVATION
**SINGLE HEADWALL**

### FRONT ELEVATION
**DOUBLE HEADWALL**

### SECTION, SINGLE & DOUBLE HEADWALLS

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>SINGLE</th>
<th>DOUBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Steel Lbs.</td>
<td>Concrete C.Y.</td>
</tr>
<tr>
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<td>5'</td>
<td>35 0.60</td>
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<tr>
<td>15&quot;</td>
<td>2'-11&quot;</td>
<td>6'</td>
<td>40 0.75</td>
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<tr>
<td>18&quot;</td>
<td>3'-2&quot;</td>
<td>7'</td>
<td>50 0.91</td>
</tr>
<tr>
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<td>8'-6&quot;</td>
<td>75 1.20</td>
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<tr>
<td>27&quot;</td>
<td>3'-11&quot;</td>
<td>9'-6&quot;</td>
<td>85 1.39</td>
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<td>30&quot;</td>
<td>4'-2&quot;</td>
<td>10'</td>
<td>85 1.52</td>
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<tr>
<td>33&quot;</td>
<td>4'-5&quot;</td>
<td>11'</td>
<td>100 1.73</td>
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<td>4'-8&quot;</td>
<td>12'</td>
<td>105 1.95</td>
</tr>
<tr>
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<td>130 2.09</td>
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<td>140 2.34</td>
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<td>48&quot;</td>
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<td>15'</td>
<td>160 2.75</td>
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<td>51&quot;</td>
<td>5'-11&quot;</td>
<td>16'</td>
<td>180 3.03</td>
</tr>
<tr>
<td>54&quot;</td>
<td>6'-2&quot;</td>
<td>17'</td>
<td>190 3.31</td>
</tr>
</tbody>
</table>

### NOTES
1. Concrete shall be 560-C-3250.
2. All reinforcing shall be #4 bars. All vertical and horizontal tie bars @ 18" maximum spacing.
3. Exposed corners shall be 3/4" chamfered.

### LEGEND ON PLANS
- = = = = = =}

---

### SAN DIEGO REGIONAL STANDARD DRAWING

**SPECIAL HEADWALL - TYPE A**

[CIRCULAR PIPE]

**DRAWING NUMBER**

**S.A.**

**T. Regello 03/11**

**ORIGINAL**

**Kerrechell 12/75**

**Add Metric**

**T. Stanton 03/03**

**Reformatted**

**T. Stanton 04/06**

**Edited**

**T. Stanton 02/09**

**Edited**

**S.A. T. Regello 03/11**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

**Chairperson: R.C.E. 19246 Date**

**7/26/2012**
### NOTES

1. Concrete shall be 560–C–3250.
2. All reinforcing shall be #4 bars. All vertical and horizontal tie bars @ 18" maximum spacing.
3. Exposed corners shall be 3/4" chamfered.

### LEGEND ON PLANS

- [Legend Image]

### C.S.P. ARCH SIZE

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<td>L ft/in</td>
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<td>24x18</td>
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<td>8'-6&quot;</td>
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<td>35x24</td>
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<td>10'-6&quot;</td>
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<td>4'-1&quot;</td>
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<td>71x47</td>
<td>5'-7&quot;</td>
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</table>
# DOUBLE PIPE ELEVATION

![Diagram of Double Pipe Elevation]

# SINGLE PIPE ELEVATION

![Diagram of Single Pipe Elevation]

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<tr>
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<th>DOUBLE</th>
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<td>Concrete C.Y.</td>
<td>Concrete C.Y.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>36&quot;</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
</tr>
</tbody>
</table>

## NOTES

1. Concrete shall be 560–C–3250.
2. Exposed corners shall be 3/4" chamfered.

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**STRAIGHT HEADWALL - TYPE B**

**[CIRCULAR PIPE]**

**DRAWING NUMBER** D-32

---

**Recommended by the San Diego Regional Standards Committee**

Chairperson: R.C.E. 19246 Date: 7/26/2012
3/4" chamfer

DOUBLE PIPE ELEVATION

SECTION A-A

3/4" chamfer

SINGLE PIPE ELEVATION

<table>
<thead>
<tr>
<th>CSP ARCH SIZE</th>
<th>A</th>
<th>B</th>
<th>H</th>
<th>SINGLE L</th>
<th>Concrete CY</th>
<th>DOUBLE L</th>
<th>Concrete CY</th>
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<tbody>
<tr>
<td>18&quot; x 11&quot;</td>
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<td>1'-2&quot;</td>
<td>3'-11&quot;</td>
<td>6'</td>
<td>0.83</td>
<td>7'-3&quot;</td>
<td>0.97</td>
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<td>21&quot; x 15&quot;</td>
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<td>1'-4&quot;</td>
<td>4'-3&quot;</td>
<td>7'</td>
<td>1.08</td>
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<td>1.46</td>
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<td>1.41</td>
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<td>28&quot; x 20&quot;</td>
<td>2'-6&quot;</td>
<td>1'-8&quot;</td>
<td>5'-2&quot;</td>
<td>9'</td>
<td>1.97</td>
<td>12'-6&quot;</td>
<td>2.66</td>
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<tr>
<td>35&quot; x 24&quot;</td>
<td>2'-6&quot;</td>
<td>2'</td>
<td>5'-6&quot;</td>
<td>10'</td>
<td>2.56</td>
<td>14'-5&quot;</td>
<td>3.60</td>
</tr>
</tbody>
</table>

NOTES
1. Concrete shall be 560-C-3250.
2. Exposed corners to be 3/4" chamfered.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
STRAIGHT HEADWALL - TYPE B
CORRUGATED STEEL PIPE - ARCH

DRAWING NUMBER D-33

ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.S. T. Regello 03/11

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Date 7/26/2012

Chkperson R.C.E. 19246
### Diagram Description

The diagram illustrates various components of a U type and Wing type headwalls with different dimensions and reinforcing details. It includes sectional views and elevation details for headwall reinforcement and dimensions.

### Dimensions Table

<table>
<thead>
<tr>
<th>Diameter of Pipe</th>
<th>Dimensions</th>
<th>Single Pipe</th>
<th>Double Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>U Type</td>
<td>Wing Type</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Conc. (CY)</td>
<td>Conc. (LBS)</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Conc. (LBS)</td>
<td>Conc. (LBS)</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2' 3/8&quot;</td>
<td>35</td>
<td>0.63</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3' 1/8&quot;</td>
<td>47</td>
<td>0.93</td>
</tr>
<tr>
<td>30&quot;</td>
<td>4' 1/8&quot;</td>
<td>71</td>
<td>1.29</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4' 11/8&quot;</td>
<td>88</td>
<td>1.69</td>
</tr>
</tbody>
</table>

### Notes

1. Concrete shall be 560-C-3250.
2. Exposed corners to be 3/4" chamfered.
3. Multiple pipes to be set a distance of D/2, with a 1" minimum between outside diameters of pipes.
4. Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
5. Skewed pipes: Dimension W to be increased in width or length due to skew or multiple pipes.
6. For pipe wall thickness greater than 3" use Alternate Detail C.

### Legend on Plans

- `-----` for concrete
- `===` for steel reinforcement

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS**

**FOR 18" TO 36" PIPES**

---

**Revision History**

- Original: Kercheval 12/75
- Add Metric: T. Stanton 03/03
- Reformatted: T. Stanton 04/06
- Edited: T. Stanton 02/09
- Edited: S.S. T. Regello 03/11

---

**Recommended by the San Diego Regional Standards Committee**

---

**Drawing Number:** D-34
NOTE
See D-35B for Dimension Table and General Notes.

SAN DIEGO REGIONAL STANDARD DRAWING
WING AND U TYPE HEADWALLS
FOR 42" TO 84" PIPE

LEGEND ON PLANS
- - -
- - -
### TABLE OF DIMENSIONS AND QUANTITIES FOR HEADWALLS SHOWN ON D-35A

<table>
<thead>
<tr>
<th>DIA OF PIPE</th>
<th>DIMENSIONS</th>
<th>SINGLE PIPE</th>
<th>DOUBLE PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>U TYPE</td>
<td>WING TYPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
</tr>
<tr>
<td>42&quot;</td>
<td>3'-7 1/4&quot;</td>
<td>2' 3'</td>
<td>4'</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4'-6&quot;</td>
<td>2'-6&quot; 3'-9&quot;</td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>5'-4 7/8&quot;</td>
<td>3' 4'-6&quot;</td>
<td>5'</td>
</tr>
<tr>
<td>60&quot;</td>
<td>6'-3 3/4&quot;</td>
<td>3'-6&quot; 5'-3&quot;</td>
<td>5'-6&quot;</td>
</tr>
<tr>
<td>66&quot;</td>
<td>7'-2 1/2&quot;</td>
<td>4' 6'</td>
<td>6'</td>
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<tr>
<td>72&quot;</td>
<td>8'-1 3/8&quot;</td>
<td>4'-6&quot; 6'-9&quot;</td>
<td>6'-6&quot;</td>
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<tr>
<td>78&quot;</td>
<td>9' 5' 7'-6&quot;</td>
<td>7'</td>
<td>4.50</td>
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<td>84&quot;</td>
<td>9'-10 3/4&quot;</td>
<td>5'-6&quot; 8'-3&quot;</td>
<td>7'-6&quot;</td>
</tr>
</tbody>
</table>

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. Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
3. Concrete shall be 550-C-3250.
4. Exposed corners shall be 3/4" chamfered.
5. Multiple pipes shall be set a distance of D/2, with a 1' minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 3" use Alternate Detail C.

### LEGEND ON PLANS

- `==` WING PIPE
- `==` HEADWALL

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS FOR 42" TO 84" PIPE**

**Recommended by the San Diego Regional Standards Committee**

**Drawing Number** D-35B
### TABLE

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>L/2</th>
<th>3'-4&quot; STEEL (LBS)</th>
<th>3'-4&quot; CONC. (CY)</th>
<th>4'-10&quot; STEEL (LBS)</th>
<th>4'-10&quot; CONC. (CY)</th>
<th>6'-4&quot; STEEL (LBS)</th>
<th>6'-4&quot; CONC. (CY)</th>
<th>7'-10&quot; STEEL (LBS)</th>
<th>7'-10&quot; CONC. (CY)</th>
<th>9'-4&quot; STEEL (LBS)</th>
<th>9'-4&quot; CONC. (CY)</th>
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<td>1.11</td>
<td>—</td>
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<tr>
<td>18&quot;</td>
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<tr>
<td>21&quot;</td>
<td>3'-5&quot;</td>
<td>3'-9&quot;</td>
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<tr>
<td>30&quot;</td>
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<td>5'</td>
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<td>2.42</td>
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<td>7'-3&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>2.97</td>
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<td>—</td>
<td>—</td>
<td>235</td>
<td>3.91</td>
<td>250</td>
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</table>

### NOTES

1. Concrete shall be 560-C-3250.
2. All reinforcing steel shall be #4 bars. All vertical and horizontal tie bars shall have 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be D/2 (1' min). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.
4. Exposed corners shall be 3/4" chamfered.

---

**LEGEND ON PLANS**

---

**SANDiego REGIONal STANDARDS DRAWING**

**L TYPE HEADWALLS**

(circleAr pipes)

**Reference**: RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

**Date**: 7/26/2012

**Drawing Number**: D-36

---

**Revision**

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<th>Approved</th>
<th>Date</th>
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<td>T. Stanton</td>
<td>03/03</td>
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</tr>
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### NOTES

1. Concrete shall be 560–C–3250.
2. All reinforcing steel shall be #4 bars. All vertical and horizontal tie bars shall have 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be S/2 (1' min). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.
4. Exposed corners shall be 3/4" chamfered.

### LEGEND ON PLANS

---

<table>
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<th>CSP ARCH SIZE</th>
<th>H</th>
<th>L/2</th>
<th>3'-4&quot;</th>
<th>4'-10&quot;</th>
<th>6'-4&quot;</th>
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<td>2'-7&quot;</td>
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<td>130</td>
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<td>49&quot;x33&quot;</td>
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<td>7'-3&quot;</td>
<td>130</td>
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<td>145</td>
<td>2.37</td>
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<td>215</td>
<td>3.56</td>
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**SAN DIEGO REGIONAL STANDARD DRAWING**

**L TYPE HEADWALLS**

(CORRUGATED STEEL PIPE - ARCH)
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 560-C-3250.
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
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<tbody>
<tr>
<td>12&quot; TO 24&quot;</td>
<td>1'</td>
<td>2'</td>
<td>10&quot;</td>
</tr>
<tr>
<td>21&quot; TO 36&quot;</td>
<td>1&quot;-6&quot;</td>
<td>2&quot;-6&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>39&quot; TO 48&quot;</td>
<td>2'</td>
<td>3'</td>
<td>12&quot;</td>
</tr>
<tr>
<td>51&quot; TO 60&quot;</td>
<td>2&quot;-6&quot;</td>
<td>3'</td>
<td>14&quot;</td>
</tr>
<tr>
<td>63&quot; &amp; LARGER</td>
<td>3'</td>
<td>3'</td>
<td>14&quot;</td>
</tr>
</tbody>
</table>
NOTES
1. When more than one pipe is used the profile view shown shall hold for the distance across all pipe openings. Section A-A and B-B shall be from the outermost pipe. The distance between pipes shall be D/2 for round and Span/3 for arch pipe (12" minimum).
2. Culvert shall be cut off even with apron surface when required by the Agency.
3. Use Inlet Apron only where a flared and section can not be utilized.
4. Place weep holes when required by the Agency.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

INLET APRON FOR CULVERTS
UP TO 42" DIAMETER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

7/6/2012

DRAWING NUMBER D-39
Table 7-1 (below) per July 2005
San Diego County Drainage Design Manual

<table>
<thead>
<tr>
<th>Design Velocity ft/sec*</th>
<th>Rock Class</th>
<th>Rip-Rap Thickness &quot;T&quot; (min)</th>
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<tr>
<td>6–10</td>
<td>No. 2 backing</td>
<td>1.1ft</td>
</tr>
<tr>
<td>10–12</td>
<td>1/4 ton</td>
<td>2.7ft</td>
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<td>12–14</td>
<td>1/2 ton</td>
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<td>14–16</td>
<td>1 ton</td>
<td>4.4ft</td>
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<tr>
<td>16–18</td>
<td>2 ton</td>
<td>5.4ft</td>
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</table>

*over 20 ft/sec requires special design

D = Pipe Diameter
W = Bottom Width of Channel

NOTES
1. Plans shall specify:
   (A) Rock Class and rip-rap thickness (T). T shall be at least 1.5 times the nominal equivalent diameter of stone (de) of the specified rip-rap.
   (B) Filter blanket material, number of layers and thickness.
2. Rip rap shall be either quarry stone or broken concrete (if shown on the plans). Cobbles are not acceptable.
3. Rip rap shall be placed over filter blanket material, which may be either granular material or non-woven geotextile filter fabric; material at weight specified in plans or specifications.
4. See Table 200–1.7 in San Diego Regional Supplement to Greenbook for selection of filter blanket.
5. 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.
NOTES

1. Design: Equivalent Fluid Pressure (Earth Loading) = 60 pcf
   Maximum Outlet velocity = 35 fps
2. Concrete shall be 560–C–3250.
3. Reinforcing shall conform to ASTM designation A615 and may be grade 40 or 60.
   Reinforcing shall be placed with 2" clear concrete cover unless noted otherwise.
   Splices shall not be permitted except as indicated on the plans.
4. For pipe grades not exceeding 20%, inlet box may be omitted.
5. If inlet box is omitted, construct pipe collar as shown.
6. Unless noted otherwise, all reinforcing bar bends shall be fabricated with standard hooks.
7. Five foot high chain link fencing, embed post 18" deep in walls and enclose with class B mortar.
8. In Sandy and Silty soil:
   a) Riprap and aggregate base cutoff wall required at the end of rock apron.
   b) Filter cloth (Polyfilter X or equivalent) shall be installed on native soil base,
      minimum of 1 ft. overlaps at joints.
9. Rip rap and subbase classification shall be as shown on plans.

FOR DIMENSIONS, SEE D–41B.
# Concrete Energy Dissipater Dimension Table

(See D-41A for Structure Details)

<table>
<thead>
<tr>
<th>Pipe Dia (in)</th>
<th>18</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>42</th>
<th>48</th>
<th>54</th>
<th>60</th>
<th>72</th>
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<tr>
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<td>9'-3&quot;</td>
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<td>13&quot;</td>
<td>14'-3&quot;</td>
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<td>H</td>
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<td>6'-3&quot;</td>
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<tr>
<td>L</td>
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<td>10'-6&quot;</td>
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<td>15'-6&quot;</td>
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<td>4'-7&quot;</td>
<td>5'-3&quot;</td>
<td>6&quot;</td>
<td>6'-9&quot;</td>
<td>7'-4&quot;</td>
<td>8&quot;</td>
<td>9'-3&quot;</td>
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<td>b</td>
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<td>5'-1&quot;</td>
<td>6'-1&quot;</td>
<td>7'-1&quot;</td>
<td>8&quot;</td>
<td>8'-11&quot;</td>
<td>10&quot;</td>
<td>11&quot;</td>
<td>12'-9&quot;</td>
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<td>3'-4&quot;</td>
<td>3'-10&quot;</td>
<td>4'-5&quot;</td>
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<td>5'-11&quot;</td>
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<tr>
<td>d</td>
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<td>2'</td>
<td>2'-2&quot;</td>
<td>2'-5&quot;</td>
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<td>e</td>
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<td>0'-8&quot;</td>
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NOTES
1. Place reinforcing, as noted, at center of wall (or slab).
2. Match location of reinforcing with that in headwall, end sill and foundation slab.
3. All reinforcing shall be placed with 2" concrete cover, unless noted otherwise.
CONCRETE ENERGY DISSIPATER
(REINFORCEMENT)
36" TO 72" DIAMETER PIPE
SECTION D–D

<table>
<thead>
<tr>
<th>Pipe dia. (in.)</th>
<th>36&quot;</th>
<th>42&quot;</th>
<th>48&quot;</th>
<th>54&quot;</th>
<th>60&quot;</th>
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<tr>
<td>A bar</td>
<td># 5 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#7 @ 12&quot;</td>
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</tr>
<tr>
<td>B bar</td>
<td># 5 @ 12&quot;</td>
<td></td>
<td>#6 @ 12&quot;</td>
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<tr>
<td>C bar</td>
<td># 4 @ 12&quot;</td>
<td></td>
<td>#5 @ 12&quot;</td>
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<td></td>
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<tr>
<td>D bar</td>
<td># 4 @ 12&quot;</td>
<td>#5 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
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</tr>
<tr>
<td>E bar</td>
<td># 4 @ 12&quot;</td>
<td></td>
<td>#5 @ 12&quot;</td>
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<tr>
<td>F bar</td>
<td># 4 @ 9&quot;</td>
<td>#5 @ 9&quot;</td>
<td>#6 @ 9&quot;</td>
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</tr>
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<td>G bar</td>
<td># 7</td>
<td></td>
<td># 11</td>
<td></td>
<td></td>
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</tbody>
</table>

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.
PLAN

TYPICAL FOR MAXIMUM H > 10'

TYPICAL FOR MAXIMUM H ≤ 10'

NOTE
See notes on D-44D.

END ELEVATION

If at upstream end, fillet is not shown

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-44A

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited S.S. T. Regella 03/11
PART LONGITUDINAL SECTION

TYPICAL FOR MAXIMUM
H > 10'

TYPICAL FOR MAXIMUM
H ≤ 10'

NOTES
1. RCP is shown. When using metal pipe eliminate the expansion joint and use hook bolts @ 19" spacing (size and length provided by manufacturer).
2. Where abrasion is anticipated, increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.
ALTERNATIVE WARPED WINGWALL
Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.

SECTION A–A

1/2" exp joint filler, where H max > 10'

Dim is 1' where H ≤ 10'
Dim is 2' where H > 10'

SECTION B–B

Extend wall spacers 2'± into headwall or endwall.
<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>SLOPE</th>
<th>H</th>
<th>8' OR LESS</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
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<td>#4012</td>
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<td>#5056</td>
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<tr>
<td></td>
<td>Rear face</td>
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<td>#4012</td>
<td>#4012</td>
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<tr>
<td></td>
<td>Rear face</td>
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<table>
<thead>
<tr>
<th>WALL DIMENSIONS AND REINFORCING</th>
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<tbody>
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<td>Wall Max</td>
</tr>
<tr>
<td>6'</td>
</tr>
<tr>
<td>8'</td>
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<td>10'</td>
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<tr>
<td>12'</td>
</tr>
<tr>
<td>14'</td>
</tr>
<tr>
<td>16'</td>
</tr>
</tbody>
</table>

NOTES
1. Walls designed for 2' surcharge; earth density = 120 # / cu. ft.; equivalent fluid pressure = 36 #/cu. ft.
2. Vary "D" at warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 12'.
3. Dimensions "L", "W", "H", "M", "N", "Elev a", "Angle of flare", and end "slope" (as apply) are shown on the plans.
4. All exposed concrete edges to be chamfered 3/4".
NOTES
1. See D-11A, D-11B & D-12 for additional notes and details.
2. Dimension shown becomes 2" when opening on both sides. Adjust manhole as required.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4' steps shall be installed. See 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 (unless specified otherwise).
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS
- P -

SAN DIEGO REGIONAL STANDARD DRAWING
MEDIAN CURB INLET - TYPE J

Chairperson R.C.E. 19246 Date

Revision By Approved Date
ORIGINAL H. Hecht 10/82
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.S. T. Regello 03/11

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 7/26/2012
DRAWING NUMBER D-45
NOTES

2. (*) indicates minimum relative compaction.
3. Top 12" of trench backfill in street section shall be 95% relative compaction unless specified otherwise.
NOTE
The rounded areas may be built up of cement mortar or poured in place with the drainage structure.
NOTES
1. Pipe collar does not have to be finished if covered.
2. Concrete shall be 560–6–3250.
3. Where gap exceeds 3" but is not more than 6"
   an internal form shall be used.

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE COLLAR
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 24" ID.
3. The OD of the smaller pipe shall not be more than 2/3 the size of the ID of the larger pipe.
560-C-3250 concrete or air placed concrete reinforced with 6 x 6-W1.4 x W1.4 WWR

When depth exceeds 3' weep holes must be added at 10' OC (see detail below)

TYPICAL SECTION

4" dia perforated/ slotted cap
4" dia plastic weep holes at 10' OC
20" radius

3/16" premolded joint material or 1/8" sawed joint

WEAKENED PLANE JOINT

1" max crushed rock filter material placed a minimum of 18" each side of weep hole

Optional construction joint

PREMOLDED JOINT MATERIAL

1-1/2"

EXPANSION JOINT

NOTES
1. AC or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 12" to 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 D-72.
4. Chainlink fence shall be as required by Agency.
5. For bottom widths greater than 8 feet see D-71.
6. Reinforcement shown is minimum.
7. Alternate invert: 2% cross sectional slope toward one side of channel.
NOTES

1. AC or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 12’ to 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 D-72.
4. Chainlink fence shall be as required by Agency.
5. Reinforcement shown is minimum.
6. Minimum bottom width shall be 6’ to facilitate cleaning.
NOTES
1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cutoff wall shall be the same as that required in channel.
3. Concrete shall be 560-C-3250.

LEGEND ON PLANS

ELEVATION

SECTION A-A

See D-70 & D-71 for lined channel

Flow line of channel
NOTES:

1. Concrete shall be 560–C–3250.
2. Pipe shall connect to channel as high as possible and not be constructed directly above a weep hole.
3. The maximum angle of connection is 60° downstream. In no case shall a pipe angle upstream.
4. Install 6 x 6–W1.4 x W1.4 WWR in concrete around pipe.
NOTE
The following shall be specified by Agency and included in the plan design:
  a) Low flow channel location
  b) Filter blanket thickness, type and location
  c) Cutoff wall
  d) Fence
NOTES
1. Longitudinal slope of lined ditch shall be 2% minimum.
2. Over slope down ditches shall employ 6” thickened edge section at both sides of ditch.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>1'-6&quot;</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
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<td>B</td>
<td>C</td>
<td>A</td>
<td>G</td>
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<td>0'</td>
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<tr>
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<tr>
<td>SPANS UP TO 5'</td>
<td>(all measurements in feet and/or inches)</td>
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</tr>
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</table>

**SPANS**
- 1' - 6'
- 2'
- 3'
- 4'
- 5'

**SPAN**
- 1' - 6" | 2 | 3 | 4 | 5 |
- 11/32 | 1/2 | 1/4 | 1/8 | 1/16 |

**HEIGHT**
- A
- B
- C
- A
- G

**CLASSIFICATION**
- A
- B
- C
- A
- G

**MAX FILL OVER TOP**
- 0'
- 0'
- 0'
- 0'
- 0'

**SLEEVE**
- 6"
- 6"
- 6"
- 6"
- 6"

**SPANS UP TO 5'** (all measurements in feet and/or inches)

**SPAN**
- 1' - 6" | 2 | 3 | 4 | 5 |
- 11/32 | 1/2 | 1/4 | 1/8 | 1/16 |

**HEIGHT**
- A
- B
- C
- A
- G

**CLASSIFICATION**
- A
- B
- C
- A
- G

**MAX FILL OVER TOP**
- 0'
- 0'
- 0'
- 0'
- 0'

**SLEEVE**
- 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 spaces and quantities.
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<th>SPAN</th>
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**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.
### SPAN 7’ (all measurements in feet and/or inches unless otherwise noted)

<table>
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<td>1/8</td>
<td>7/16</td>
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<tr>
<td><strong>Bottom Slab</strong></td>
<td>T2</td>
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<td>7/16</td>
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<td><strong>Sidewalls</strong></td>
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**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.
SPAN 8' (all measurements in feet and/or inches unless otherwise noted)

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<td>56</td>
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**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.
## SPAN 10’ (all measurements in feet and/or inches unless otherwise noted)

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</table>

### CONC.

**“a”**

- **Size Bar** | A  | B  | A  | B  | A  | B  | C  | A  |
- **Spacing** | 9  | 18 | 9  | 18 | 9  | 18 | 8  | 18 |
- **Length** | 9-5 | 9-5 | 9-5 | 9-5 | 9-5 | 9-5 | 9-5 | 9-5 |

**“b”**

- **Size Bar** | A  | B  | A  | B  | A  | B  | C  | A  |
- **Spacing** | 9  | 18 | 9  | 18 | 9  | 18 | 8  | 18 |
- **Dimension “d”** | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 |
- **Length** | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 | 3-10 |

**“c”**

- **Size Bar** | A  | B  | A  | B  | A  | B  | C  | A  |
- **Spacing** | 9  | 18 | 9  | 18 | 9  | 18 | 8  | 18 |
- **Dimension “d”** | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 |
- **Length** | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 | 2-8 |

**“d”**

- **Top Slab—No. of Bars** | 9  | 5  | 9  | 5  | 9  | 5  | 9  | 5  |
- **Bottom Slab—No. of Bars** | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  |
- **Spacers** | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |

**Reinforced Steel**

- **Spacers Total Number** | 34 | 36 | 40 | 44 | 48 |
- **Concrete: C.Y. per lin. ft.** | 75 | 94 | 82 | 108 | 86 | 108 | 92 | 115 | 97 | 121 | 150 | 106 | 126 | 157 | 118 | 132 | 165 |
- **Reinf Lbs per lin. ft.** | 143 | 221 | 148 | 228 | 154 | 235 | 160 | 244 | 164 | 250 | 265 | 170 | 259 | 273 | 178 | 267 | 281 |
SPAN 12’ (all measurements in feet and/or inches unless otherwise noted)

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</table>

| “a” | Size Bar | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
| Length | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 |

| “b” | Size Bar | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
| Dimension “x” | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 |
| 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 |

| “c” | Size Bar | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 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 |
| Length | 10-210 | 4-11 | 2-12 | 4-13 | 2-14 | 4-15 | 2-16 | 4-17 | 2-18 | 4-19 | 2-20 | 4-21 |

| “d” | Size Bar | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 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 |
| 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 |

| “e” | Top Slab No. of Bars | 10 | 6 | 10 | 6 | 10 | 6 | 10 | 6 | 10 | 6 | 10 |
| Bottom Slab No. of Bars | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Spacing | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |

| **QUAN.** | Spacers Total Number | 36 | 44 | 44 | 44 | 48 | 52 |
| Concrete: C.Y. per lin. ft. | 95 | 138 | 103 | 144 | 108 | 152 | 118 | 158 | 130 | 165 | 198 |
| Reinf. lbs. per lin. ft. | 203 | 293 | 213 | 304 | 218 | 311 | 223 | 317 | 387 | 231 | 326 | 397 | 243 | 341 | 415 |

**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.
TYPICAL SECTIONS 2' THRU 6' SPANS

For cover less than 2' provide #4 @ 18" ea way & adjust quantities

Spacing in table

DETAIL "A"

For reinforcement clearance, except at bottom, see "Miscellaneous Details," on D-81A and D-81B

TYPICAL SECTIONS 7' THRU 12' SPANS

For cover less than 2' provide #4 @ 18" ea way & adjust quantities

ALTERNATIVE TRENDS
(When specified)

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS NO.2

DRAWING NUMBER D-76G
**SPAN 5’** (all measurements in feet and/or inches unless otherwise noted)

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**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.
SPAN 6' (all measurements in feet and/or inches unless otherwise noted)

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<td>3'</td>
</tr>
<tr>
<td>4'</td>
</tr>
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<td>5'</td>
</tr>
<tr>
<td>6'</td>
</tr>
<tr>
<td><strong>HEIGHT</strong></td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
</tr>
<tr>
<td>Conc. Top Slab</td>
</tr>
<tr>
<td>Bottom Slab</td>
</tr>
<tr>
<td>Sidewalls</td>
</tr>
<tr>
<td>Size Bar</td>
</tr>
<tr>
<td>Spacing</td>
</tr>
<tr>
<td>Size Bar</td>
</tr>
<tr>
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<tr>
<td>Spacing</td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>Size Bar</td>
</tr>
<tr>
<td>Spacing</td>
</tr>
<tr>
<td>Spacers Number</td>
</tr>
<tr>
<td>Concrete C.Y. per lin. ft.</td>
</tr>
<tr>
<td>Reinf.:lbs per lin. ft.</td>
</tr>
</tbody>
</table>

**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.
### SPAN 8' (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
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<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
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<tbody>
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<td><strong>HEIGHT</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Strength Classification</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Max Fill Over Top</td>
<td>3</td>
<td>14</td>
<td>25</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>7.1/2</td>
<td>10.1/2</td>
<td>12.3/4</td>
<td>7.1/2</td>
<td>10.1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

**Reinforcement**

| Size Bar # | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 7   | 6   | 6   | 7   | 7   | 7   |
| Spacing     | 12  | 9   | 1/2 | 10  | 1/2 | 12  | 9   | 1/2 | 10  | 11  | 1/2 | 10  | 8   | 1/2 | 10  | 8   | 1/2 | 10  | 8   | 1/2 | 10  | 8   |
| Length      | 17.7 | 17-8 | 17-9 | 17-7 | 17-8 | 17-9 | 17-7 | 17-8 | 17-9 | 17-10 | 17-10 | 18-5 | 17-10 | 17-10 | 18-5 | 17-10 | 17-10 | 18-5 | 17-10 | 18-5 | 17-10 |
| "b"        | 17-5 | 17-8 | 17-9 | 17-5 | 17-8 | 17-9 | 17-5 | 17-8 | 17-9 | 17-10 | 17-10 | 18-5 | 17-10 | 17-10 | 18-5 | 17-10 | 18-5 | 17-10 | 18-5 | 17-10 | 18-5 |
| "c"        | 4   | 5   | 7   | 4   | 6   | 7   | 4   | 6   | 7   | 4   | 5   | 7   | 4   | 5   | 7   | 4   | 5   | 7   | 4   | 5   | 7   |

**Reinforcement**

| Size Bar # | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 6   | 6   | 7   | 7   | 6   | 6   | 7   | 7   | 7   | 6   |
| Spacing     | 12  | 9   | 1/2 | 10  | 1/2 | 12  | 9   | 1/2 | 10  | 11  | 1/2 | 10  | 8   | 1/2 | 10  | 8   | 1/2 | 10  | 8   | 1/2 | 10  | 8   |

**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.
### SPAN 10' (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>17</td>
<td>30</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>8</td>
<td>1/4</td>
<td>13.1/2</td>
<td>16.1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>8</td>
<td>1/4</td>
<td>13.1/2</td>
<td>16.1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>8</td>
<td>1/4</td>
<td>13.1/2</td>
<td>16.1/2</td>
</tr>
</tbody>
</table>

### Reinforcing Steel

| Size Bar #a | 6 | 7 | 8 |
| Spacing | 11 | 10 | 10 |
| Length | 22-4 | 22-2 | 22-2 |

| Size Bar #b | 6 | 7 | 8 |
| Spacing | 11 | 10 | 10 |
| Length | 21-7 | 21-10 | 22 |

| Size Bar #c | 6 | 7 | 8 |
| Spacing | 11 | 10 | 10 |
| Length | 10-6 | 10-6 | 10-6 |

### Dist. Bars

| Top Slab-Tot. No. | 18 | 10 | 10 |
| Bottom Slab-Tot. No. | 10 | 10 | 10 |
| Size Bar #d | 4 | 4 | 5 |
| Spacing | 18 | 10 | 10 |

### Concrete

| Concrete: C.Y. per lin. ft. | 1.40 | 2.05 | 2.46 |
| Reinf. lbs per lin. ft. | 236 | 254 | 310 |

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6'</th>
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<th>8'</th>
<th>9'</th>
<th>10'</th>
<th>12'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>14</td>
<td>26</td>
<td>2</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>10</td>
<td>14</td>
<td>17 1/2</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>9 1/4</td>
<td>14 3/4</td>
<td>18</td>
<td>9 1/4</td>
<td>15 1/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T2</td>
<td>6</td>
<td>6</td>
<td>6 1/2</td>
<td>7</td>
<td>7 1/2</td>
</tr>
</tbody>
</table>

| Size Bar # | 9 1/2 | 8 1/2 | 6 1/2 | 5 1/2 | 4 1/2 | 3 1/2 |
| Spacing | 6 1/2 | 5 1/2 | 4 1/2 | 3 1/2 | 2 1/2 | 1 1/2 |
| Length | 26-4 | 26-2 | 26-4 | 26-2 | 26-4 | 26-2 |

**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.
TYPICAL SECTION
(Showing reinforcement for interior walls 8" and over)

③ For reinforcement clearance, except at bottom, see "Miscellaneous Details," on D–81A and D–81B.

"FLAT INVERT" ALTERNATIVE
(When specified)
### SPAN 4' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
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<th>SPAN</th>
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<th></th>
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<th>4'</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>10</td>
<td>24</td>
<td>38</td>
<td>10</td>
<td>24</td>
<td>38</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Top Slab</td>
<td>( T_1 )</td>
<td>6 1/4</td>
<td>6 1/4</td>
<td>7 1/4</td>
<td>6 1/4</td>
<td>6 1/4</td>
<td>7 1/4</td>
<td>6 1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>( T_2 )</td>
<td>6</td>
<td>7</td>
<td>8 1/4</td>
<td>6</td>
<td>7</td>
<td>8 1/4</td>
<td>6</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>( T_3 )</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conc.</th>
<th>( &quot;a&quot; )</th>
<th>( &quot;b&quot; )</th>
<th>( &quot;b_1&quot; )</th>
<th>( &quot;c&quot; )</th>
<th>( &quot;d&quot; )</th>
<th>( &quot;e&quot; )</th>
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</thead>
<tbody>
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<td>5</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>11 1/2</td>
<td>13</td>
<td>11</td>
<td>11 1/2</td>
<td>13</td>
</tr>
<tr>
<td>Length</td>
<td>14-9</td>
<td>14-8</td>
<td>14-9</td>
<td>14-8</td>
<td>14-8</td>
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<td>Size Bar #</td>
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<tr>
<td>Spacing</td>
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<td>11 1/2</td>
<td>13</td>
<td>11</td>
<td>11 1/2</td>
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</tr>
<tr>
<td>Length</td>
<td>14-2</td>
<td>14-2</td>
<td>14-3</td>
<td>14-2</td>
<td>14-2</td>
<td>14-3</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>11 1/2</td>
<td>13</td>
<td>11</td>
<td>11 1/2</td>
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<td>9</td>
<td>9</td>
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<tr>
<td>( &quot;d&quot; ) Dist Bar</td>
<td>Top Slab—Tot. No.</td>
<td>15</td>
<td>9</td>
<td>9</td>
<td>9</td>
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</tr>
<tr>
<td>Bottom Slab—Tot. No.</td>
<td>9</td>
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<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>( &quot;e&quot; ) Bars</td>
<td>Size Bar #</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Spacing</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>34</td>
<td>38</td>
<td>42</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| Reinforcement Steel | Concrete: C.Y. per lin. ft. | 0.67 | 0.71 | 0.81 | 0.75 | 0.79 | 0.89 | 0.82 | 0.86 | 0.96 |
| Spacing | Reinf lbs per lin. ft. | 122 | 110 | 133 | 127 | 115 | 138 | 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 all cells.
## SPAN 5' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>HEIGHT</th>
<th>2'</th>
<th>3'</th>
<th>5'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>8</td>
<td>17</td>
<td>26</td>
<td>8</td>
<td>17</td>
<td>26</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
<td>6</td>
<td>3/4</td>
<td>6</td>
<td>3/4</td>
<td>7</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
<td>6</td>
<td>1/4</td>
<td>7</td>
<td>1/4</td>
<td>8</td>
</tr>
<tr>
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<tr>
<td>Spacing</td>
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<td>13</td>
<td>10</td>
<td>1/2</td>
<td>13</td>
</tr>
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<td>b</td>
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<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
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<td>10</td>
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<tr>
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<td>1/2</td>
<td>13</td>
<td>10</td>
<td>1/2</td>
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<td>18</td>
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<tr>
<td>Dist. Top Slab-Tot. No.</td>
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<td>9</td>
<td>18</td>
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<td>9</td>
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<tr>
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<td>4</td>
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</tr>
<tr>
<td>Bars Bottom Slab-Tot. No.</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Spacers Number</td>
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<td>38</td>
<td>38</td>
<td>42</td>
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</tr>
<tr>
<td>Concrete: C.Y. per ln. ft.</td>
<td>0.82</td>
<td>0.87</td>
<td>0.98</td>
<td>0.90</td>
<td>0.95</td>
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</tr>
<tr>
<td>Reinf.: lbs per ln. ft.</td>
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<td>126</td>
<td>153</td>
<td>155</td>
<td>130</td>
<td>157</td>
</tr>
</tbody>
</table>

**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 all cells.
SPAN 6’ (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3’</th>
<th>4’</th>
<th>6’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>3</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>7 1/2</td>
<td>7 1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6</td>
<td>7 3/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Conc.</td>
<td>Size Bar #</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>13</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>Spacing</td>
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<td>14</td>
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<td>13</td>
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<tr>
<td>&quot;d&quot; Dist</td>
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</tr>
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<td>9</td>
<td>9</td>
</tr>
<tr>
<td>&quot;e&quot;</td>
<td>Size Bar #</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>40</td>
<td>40</td>
<td>52</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>1.05</td>
<td>1.15</td>
<td>1.29</td>
</tr>
<tr>
<td>Reinfr :lbs per lin. ft.</td>
<td>181</td>
<td>168</td>
<td>196</td>
</tr>
</tbody>
</table>

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 all cells.
### SPAN 8' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Cont.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>8 1/4</td>
<td>8 1/4</td>
<td>10 1/4</td>
<td>8 1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6 1/2</td>
<td>9</td>
<td>11</td>
<td>6 1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size Bar</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Length</td>
<td>26-10</td>
<td>26-9</td>
<td>26-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size Bar</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Length</td>
<td>26-10</td>
<td>26-9</td>
<td>26-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size Bar</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Length</td>
<td>26-10</td>
<td>26-9</td>
<td>26-9</td>
</tr>
</tbody>
</table>


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 all cells.
### SPAN 10' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
<td>9</td>
<td>10</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
<td>7</td>
<td>1/2</td>
<td>10</td>
<td>3/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### 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 all cells.
## SPAN 12’ (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
<th>12’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>10</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>10</td>
<td>1/4</td>
<td>11</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>8</td>
<td>1/4</td>
<td>12</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>&quot;a&quot;</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>&quot;b&quot;</td>
<td>38-7</td>
<td>38-1</td>
<td>39-9</td>
</tr>
<tr>
<td></td>
<td>&quot;c&quot;</td>
<td>38-7</td>
<td>38-1</td>
<td>39-9</td>
</tr>
<tr>
<td></td>
<td>&quot;d&quot;</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>&quot;f&quot;</td>
<td>36</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>&quot;g&quot;</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Name</td>
<td></td>
<td>76</td>
<td>80</td>
<td>84</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>2.60</td>
<td>3.18</td>
<td>3.82</td>
<td>2.70</td>
</tr>
<tr>
<td>Rainfall lbs per lin. ft.</td>
<td>469</td>
<td>505</td>
<td>628</td>
<td>497</td>
</tr>
</tbody>
</table>

**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 all cells.
For cover less than 2', extend c bars full length, top slab only. Provide additional #4 @ 18" on and adjust quantities

Provide paving notch when top is exposed and where PCC pavement or approach slab is used

TYPICAL SECTION

© For reinforcement clearance, except at bottom, see "Miscellaneous Details" on D-81A and D-81B.

FLAT INVERT ALTERNATIVE
(When specified)

NOTES
1. Spacers shall be #4 @ 18" oc in top slab and sidewall mats.
2. Remaining #4 Spacers shall be equally distributed in bottom slab mats.
NOTE
Use Type 2 retaining wall where 1 1/2:1 surcharge exceeds 5'.

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT WINGWALL
TYPES A, B & C
DETAILS NO. 1

Revised: Kercheval 12/75
Add Metric: T. Stanton 03/03
Reviewed: T. Stanton 04/06
Edited: S.S. T. Regello 03/11

Recommended by the San Diego Regional Standards Committee
TYPICAL SECTION
H=4' Thru 12'

#4 along top of wall

#4@3'

#4@18"

2" CLR

Vertical unless adjacent to battered section, then match

Vertical or shoulder

c bars

Gutter or shoulder

d bars

Fill slope

5' max for 1-1/2:1 fill slopes, unlimited for flatter than 1-1/2:1

Weep holes @ 15" centers 1' above invert, see C-15, detail 3-1

35 dia.

2" CLR

Short c bars

C W/3 W

B

#4 total 7

3" CLR

9" R

1"
TYPICAL SECTION  
H=13' Thru 16'
Figures at top of c bars indicate distance from top of footing to upper end of c bars.

TYPICAL LAYOUT EXAMPLE 1
TYPICAL LAYOUT EXAMPLE 2

NOTES

1. Unit Stresses: $F_s=20,000$ psi, $F_c=1,200$ psi, $N=10$
   Maximum Toe Pressure = 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.

2. Walls designed for 2' liveload surcharge, 1–1/2:1 sloping surcharge not to exceed 5' in elevation plus 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.

3. Wall height may be exceeded by 6' before going to next greater H.
   Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.
<table>
<thead>
<tr>
<th>H</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
<th>11'</th>
<th>12'</th>
<th>13'</th>
<th>14'</th>
<th>15'</th>
<th>16'</th>
</tr>
</thead>
</table>
| 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"  | 1'-2"| 1'-4"| 1'-6"| 1'-8"| 1'-10"| 2'  | 2'-2"| 2'-4"| 2'-6"| 2'-8"| 2'-10"| 3"  |
| 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  |     |     |     |     |     |     |     |     |     |     |     |     |     |

Batter  1'-2"

S  1"  1"  1"  1'  1"  1"  1"  1"  1'-6 1"  1'-7"  1'-7 1"  1'-8"

c Bars  #4@24  #4@18  #5@20  #5@14  #5@10  #5@7  #6@7  #6@6  #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 %/f  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 #/f  13  16  19  25  30  37  49  62  75  73  90  104  125

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

DRAWING NUMBER D-80A

<table>
<thead>
<tr>
<th>Revision</th>
<th>By</th>
<th>Approved</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGINAL</td>
<td>Kercheval</td>
<td>12/75</td>
<td></td>
</tr>
<tr>
<td>Add Metric</td>
<td>T. Stanton</td>
<td>03/03</td>
<td></td>
</tr>
<tr>
<td>Reviewed</td>
<td>T. Stanton</td>
<td>04/06</td>
<td></td>
</tr>
<tr>
<td>Edited</td>
<td>S.S. T. Regello</td>
<td>03/11</td>
<td></td>
</tr>
</tbody>
</table>
NOTES
1. Walls designed for 2' surcharge; earth density = 120 lbs./cu. ft.; equivalent fluid pressure = 36 lbs./cu. ft.
2. Vary D of warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 12'.
3. Where abrasion is anticipated increase apron thickness to 7” minimum to provide 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 560-C-3250 and reinforcing steel shall be minimum Grade 40 (unless otherwise specified).
### WALL DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>H</th>
<th>8' or less</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4:1</td>
<td></td>
<td>Front face reinf</td>
<td>#4@12</td>
<td>#4@ 7</td>
<td>#5@ 7</td>
<td>#5@ 5</td>
<td>#6@ 6</td>
<td>#7@ 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
</tr>
<tr>
<td>3/4:1</td>
<td></td>
<td>Front face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@10</td>
<td>#4@ 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@ 7</td>
<td>#4@ 6</td>
<td>#4@ 6</td>
</tr>
<tr>
<td>1 1/4:1</td>
<td></td>
<td>Front face reinf</td>
<td>#4@ 8</td>
<td>#4@ 8</td>
<td>#4@ 8</td>
<td>#4@ 5</td>
<td>#5@ 6</td>
<td>#6@ 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear face reinf</td>
<td>#4@ 8</td>
<td>#4@ 8</td>
<td>#4@ 8</td>
<td>#4@ 5</td>
<td>#5@ 6</td>
<td>#6@ 5</td>
</tr>
<tr>
<td>D at Cutoff Wall</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
<td></td>
</tr>
<tr>
<td>D at Culvert</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
<td>1&quot;-1'</td>
<td></td>
</tr>
</tbody>
</table>

### STIFFENING BEAM DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>H max</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
<th>25'</th>
<th>30'</th>
<th>35'</th>
<th>40' or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'</td>
<td>No beam. Place 2-#6 in each face along top of wall.</td>
<td>A=1'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8'</td>
<td>B=9&quot;</td>
<td>A=1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10'</td>
<td>B=9&quot;</td>
<td>A=1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12'</td>
<td>Total 6-#6</td>
<td>B=1'</td>
<td>A=1'-10&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14'</td>
<td>Total 6-#6</td>
<td>B=1'</td>
<td>A=2'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16'</td>
<td>Total 6-#7</td>
<td>B=1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18'</td>
<td>Total 6-#8</td>
<td>Total 8-#9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20'</td>
<td>Total 8-#9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**BOX CULVERT WARPED WINGWALL DETAILS No. 3**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

**Revised by:** A. Kercheval 12/75

**Add Metric:** T. Stanton 03/03

**Reviewed:** T. Stanton 04/06

**Edited:** S. S. T. Regella 03/11

**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 (e.g. 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.

REINFORCEMENT PLACEMENT: Main Reinforcement is positioned transverse or, for curved culverts, radial. When radial reinforcing spacing is measured along C/L.

CONSTRUCTION NOTES

CONCRETE: Bottom slab & walls shall be Class 560-B-3250. Top slab shall be Class 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 1/2" expansion joint filler at 50± centers outside the paved roadway lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. When cover depth is greater than span length, place 1/2" expansion joint filler at 50± centers and additional 1/2" expansion joints at locations of change of foundation character as directed by the Engineer.

CONSTRUCTION LOADS: Not permitted until concrete has reached a strength of 3,000 p.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/L of RCB. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIFICATIONS


Sections designed for culvert in trenches on hard foundation or culvert underpinned on yielding foundation. Special design will be required for culverts on piles or rock foundations.

LOADING

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

COVER LESS THAN 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 7.5 longitudinally and uniformly over the breadth of the culvert.

COVER 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 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 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: Fs = $20,000$ psi, $N = 10$

Fcm = $1,200$ psi

Reinforcement embedment is 1-1/2 dia. clear, min 1” and in 1/4” increments, except as noted.

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

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

Classification "B" to "E": Top and bottom slabs #4 @ 18" max.

USE OF STANDARD DRAWING

"Strength Classification," as symbolized by the letters ("A", "B", "C" or "D") 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 top slab.

LIVE LOAD & R.C.B. DIRECTIONAL TERMINOLOGY

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT

MISCELLANEOUS DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER D-81A
PARAPET DETAILS FOR SINGLE SPAN CULVERTS

PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

PARAPET DETAIL FOR SKewed CULVERTS W/O WINGWALLS

COVER: 1' AND GREATER

CULVERT EXTENSION
20° SKew MAXIMUM

SAN DIEGO REGIONAL STANDARD DRAWING
BOX CULVERT
MISCELLANEOUS DETAILS NO. 2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date
3" steel posts
Tension cables
Ground line

Backfill to natural ground after fence installation

Length and post layout shown on plans

ELEVATION

Channel bottom

2" unless shown otherwise

Stream flow

560-C-3250 concrete

2' min

3"

See D-40 for rip rap size and length to be shown on plans.

NOTES

1. Fence fabric shall be 2" mesh, 9 gage galvanized steel wire, placed on the upstream side of the posts and tension cables.
2. Tension cable shall be 5/16" dia. steel at 18" OC, secured at ends with cable clamps. Secure fence to cable with 12 gage galvanized steel wire looped at 6" OC.
3. Posts shall be 3" steel pipe, 5.79 lb/ft. Fill with mortar after placing.
4. Fence fabric shall be secured to posts with 9 gage wire clips at 9" OC.
ELECTRICAL SYSTEMS
DIRECT BURIAL FOUNDATION

<table>
<thead>
<tr>
<th>POLE HEIGHT</th>
<th>MOUNTING HEIGHT</th>
<th>LAMP SIZE (WATTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25' ±2'</td>
<td>27' ±1'</td>
<td>170 M.V. 100 H.P.S. 90 L.P.S.</td>
</tr>
<tr>
<td>28' ±2'</td>
<td>30' ±1'</td>
<td>400 M.V. 250 H.P.S. 180 L.P.S.</td>
</tr>
<tr>
<td>23' -0&quot;</td>
<td>26' -9&quot;</td>
<td>70 H.P.S.</td>
</tr>
<tr>
<td>26' -6&quot;</td>
<td>30' -0&quot;</td>
<td>150 H.P.S.</td>
</tr>
</tbody>
</table>

560–C–3250 P.C.C. Anchor base square or round, add 1’ to each dimension for loose soil or soft clay conditions.

ANCHOR BASE FOUNDATION

Finished Grade Anchor bolts must not protrude

1/4" minimum bolt clearance

Anchor bolts (4 req.) 1"x36"x4" hook, galvanized. Use two leveling nuts with washers (all galv.) on each bolt.
1. 3/4" x 8' copper covered steel ground rod.
2. Alternate Ground: 15' no. 4 stranded copper wire, coiled.
3. Approved non-metallic conduit.
4. Steel conduit.

**STEEL CONDUIT**

**DIRECT BURIAL FOUNDATION**

**STEEL CONDUIT**

**ANCHOR BASE FOUNDATION**

**NON-METALLIC CONDUIT**

**Attach ground wire under anchor nut.**

**1/2" Rigid Steel Conduit**

**Steel Conduit**

**Anchor Rods**

See Detail A

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**GROUNDING OF CONCRETE LIGHTING STANDARDS**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

**DRAWING NUMBER** E-2

**Revision** By Approved Date

ORIGINAL Kercheval 12/75

Add Metric T. Stanton 03/03

Reformatted T. Stanton 04/06

Delete Metric D. Gerschatter 06/12

Chapman R.C.E. 19246 Date

7/26/2012
1 1/2" min. cover for bars and conduits

Galvanized steel conduits. Size and number as required.

1/4" x 2" galvanized steel bars.

10" Diameter, use Sonotube for smooth finish (Class 1)

Permissible to auger hole and pour against soil.

16" dia.

36"

Length as required

SECTION A-A
STEEL & CONCRETE DIMENSIONS

SECTION B-B
CONDUIT & EQUIPMENT

3/4" x 8" copper covered steel ground rod.

Grout cap protrusion to be sloped for drainage.

2" min.

4'-6" min. max.

6'-3" max.

Panel Board

Ground Line

NOTE: Concrete shall be class 560-C-3250
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE STANDARD DRAWINGS G-9 AND G-10 FOR JOINT DETAILS.
3. SLOPE TOP OF CURB 2% MAX TOWARD GUTTER.

GUTTER

LEGEND ON PLANS
<table>
<thead>
<tr>
<th>TYPE</th>
<th>W</th>
<th>*AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>24&quot;</td>
<td>1.34 SQ. FT.</td>
</tr>
<tr>
<td>H</td>
<td>30&quot;</td>
<td>1.80 SQ. FT.</td>
</tr>
</tbody>
</table>

* 6" CURB FACE

NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE STANDARD DRAWINGS G-9 AND G-10 FOR JOINT DETAILS.
3. SLOPE TOP OF CURB 2% MAX TOWARD GUTTER.
NOTES:
1. CONCRETE SHALL BE 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.
4. CURB HEIGHT=6" UNLESS OTHERWISE INDICATED ON PLANS.

GROOVE 1/4" DEEP, 1/4" R
2% MAX CROSS-SLOPE
1/2" R
1" R
1/2"
6"
18"
1/2" R
2" WEAKENED PLANE JOINT
6"
NOTES:
1. TRANSITION TO TYPE G OR H CURB AT ALL CURB RETURNS, EXCEPT WHERE CURB RAMPS ARE PROVIDED, AND AT ALL CUL-DE-SAC'S WITH DRAINAGE STRUCTURES. SEE STANDARD DRAWING G-4B FOR DETAILS.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE STANDARD DRAWINGS G-9 AND G-10 FOR JOINT DETAILS.
NOTES:
1. REFER TO RSD G–2, TYPE G AND G–4 FOR SPECIFIC DIMENSIONS RELATED TO EACH TYPE OF CURB.
2. TRANSITIONS SHOULD OCCUR ALONG THE BACK OF CURB, HOLDING EDGE OF PAVEMENT PARALLEL AND CONCENTRIC WITH STREET CENTERLINE. ALTERNATE ALIGNMENTS MAY BE REQUIRED AND ARE AT AGENCY'S DISCRETION.
NOTES:
1. DIKES SHALL BE PLACED ON A 2" SECTION OF A.C. SURFACING, EXTENDING THROUGHOUT THE WIDTH OF THE DIKE.
2. PC-70-10 GRADE ASPHALT TO BE USED FOR ALL DIKES.
3. SHAPE AND COMPACT DIKES WITH AN EXTRUSION MACHINE OR OTHER EQUIPMENT CAPABLE OF SHAPING AND COMPACTING THE MATERIAL TO THE REQUIRED CROSS-SECTION.

APPROX. DIKE QUANTITIES

<table>
<thead>
<tr>
<th>TYPE</th>
<th>REQD PER LIN. FT.</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
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<tr>
<td>C-6&quot;</td>
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<tr>
<td>D</td>
<td>0.0062 TON</td>
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<tr>
<td>E</td>
<td>0.0407 TON</td>
</tr>
<tr>
<td>F</td>
<td>0.0623 TON</td>
</tr>
</tbody>
</table>

LEGEND ON PLANS
NOTES:
1. CONCRETE SHALL BE 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.
4. SLOPE TOP OF CURB 2% MAX TOWARD CUTTER/PAVEMENT.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
CURBS AND GUTTER - MEDIANS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
CHAIRPERSON R.C.E. 19246 DATE
DRAWING NUMBER G-6
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE STANDARD DRAWINGS G-9 AND G-10 FOR JOINT DETAILS.
NOTES:

1. EXPANSION JOINTS ——— AT CURB RETURNS, ADJACENT TO STRUCTURES AND AT 45' INTERVALS. 
   (SEE STANDARD DRAWING G-10).

2. WEAKENED PLANE JOINTS——— AT MID POINT OF CURB RETURN, WHEN REQUIRED, AND AT 15' INTERVALS FROM P.C.R. 
   (SEE STANDARD DRAWING G-10).

3. 1/4" GROOVES ——— WITH 1/4" RADIUS EDGES AT 5' INTERVALS.
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.
NOTES:
1. CONCRETE SHALL BE 560-C-3250.
2. --------- = WEAKENED PLANE JOINTS.
3. --------- = TYPICAL FLOWLINES.
4. a = ELEVATIONS TO BE SHOWN ON PLANS.
5. RETURN SEGMENTS TO BE 7" THICK.
6. CURB BETWEEN P.C.R.S SHALL BE CONSIDERED AS PART OF THE CROSS GUTTER.
7. IN ALL CASES SUBGRADE SHALL BE COMPACTED TO 95% MIN. RELATIVE COMPACTION TO DEPTH OF 12".
TRANSITION GUTTER CROSS SLOPE TO MATCH CROSS GUTTER SLOPE

Curb 5' 10' 5' Curb

GUTTER CROSS SLOPE

CROSS GUTTER SLOPE

PLAN

10' UNLESS OTHERWISE SHOWN ON PLAN 1/2" R TYP.

7" 1.5% 1.5% TOP OF PAVING

BASE MATERIAL AS SHOWN ON PLANS

SECTION

NOTES:
1. CROSS GUTTER TO BE CONSTRUCTED WHERE THE DRAINAGE IS CARRIED ACROSS THE STREET.
2. MINIMUM ALLOWABLE CROSS GUTTER SLOPE IS 0.5%.
3. CONCRETE SHALL BE 560-C-3250.
4. IN ALL CASES SUBGRADE SHALL BE COMPACTED TO 95% MINIMUM RELATIVE COMPACTION TO DEPTH OF 12".
5. O = ELEVATIONS SHOWN ON PLANS.

LEGEND ON PLANS
### NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY THE AGENCY.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520-C-2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560-C-3250.
3. SEE STANDARD DRAWINGS G-15 AND G-16 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND 10’ FROM CURB FACE OR TO PROPERTY LINE WHICHEVER IS LESS.
5. PLACE EXPANSION JOINT AT RIGHT-OF-WAY OR 10’ WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS G-2 AND G-10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6” CURB HEIGHT.

<table>
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<tr>
<th>REVISION</th>
<th>BY</th>
<th>APPROVED</th>
<th>DATE</th>
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<tr>
<td>ORIGINAL</td>
<td>R. Munoz</td>
<td></td>
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<td>ADD METRIC</td>
<td>T. Stanton</td>
<td>03/03</td>
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<td>UPDATED</td>
<td>M.R.</td>
<td>MR/CV</td>
<td>02/12</td>
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**SAN DIEGO REGIONAL STANDARD DRAWING**

**CONCRETE DRIVEWAY - TYPE A**

(Contiguous Sidewalk)
NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY THE AGENCY.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520–C–2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560–C–3250.
3. SEE STANDARD DRAWINGS G–15 AND G–16 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10’ FROM CURB FACE OR TO PROPERTY LINE WHICHEVER IS LESS.
5. PLACE EXPANSION JOINT AT RIGHT–OF–WAY OR 10’, WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS G–2 AND G–10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6” CURB HEIGHT.
NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY THE AGENCY.
2. CONCRETE SHALL BE 520–C–2500.
3. SEE STANDARD DRAWINGS G–15 AND G–16 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND 10' FROM FACE OF CURB OR TO PROPERTY LINE WHICHEVER IS LESS.
5. PLACE EXPANSION JOINT AT RIGHT–OF–WAY OR 10', WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS G–2 AND G–10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6" CURB HEIGHT.
NOTE:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY THE AGENCY.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520–C–2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560–C–3250.
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.
5. PLACE EXPANSION JOINT AT RIGHT–OF–WAY.
6. DIMENSIONS SHOWN REFLECT A 6" CURB HEIGHT.
7. RAMP LENGTH CALCULATIONS ARE BASED ON X–1” TO ACCOUNT FOR THE 1” DRIVEWAY LIP.

**TABLE A**

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
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</thead>
<tbody>
<tr>
<td>CURB HEIGHT</td>
<td>RAMP LENGTH</td>
</tr>
<tr>
<td>1&quot;</td>
<td>0’–0”</td>
</tr>
<tr>
<td>2&quot;</td>
<td>1’–0”</td>
</tr>
<tr>
<td>3&quot;</td>
<td>2’–0”</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3’–0”</td>
</tr>
<tr>
<td>5&quot;</td>
<td>4’–0”</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5’–0”</td>
</tr>
<tr>
<td>7&quot;</td>
<td>6’–0”</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7’–0”</td>
</tr>
</tbody>
</table>
NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY AGENCY.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520–C–2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560–C–3250.
3. SEE STANDARD DRAWINGS G–15 AND G–16 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10' FROM CURB FACE OR TO RIGHT–OF–WAY, WHICHEVER IS LESS.
5. PLACE EXPANSION JOINT AT RIGHT–OF–WAY OR 10', WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS G–2 AND G–10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6" CURB HEIGHT.
NOTES:
1. DRIVEWAY PROFILE, WIDTH (W) AND LENGTH (L) SHALL BE SHOWN ON PLANS.
2. DRIVEWAYS WITH GRADES GREATER THAN 15% SHALL BE SURFACED WITH ASPHALT CONCRETE (AC) OR PORTLAND CEMENT CONCRETE (PCC).
3. MAXIMUM GRADE BREAK 14% (5' MINIMUM VERTICAL CURVE PREFERRED).
4. SEE SAN DIEGO AREA REGIONAL STANDARD DRAWINGS G-15 & G-16 FOR DRIVEWAY LOCATION & WIDTH REQUIREMENTS AND G-14 SERIES FOR PCC DRIVEWAYS.
5. 4' MINIMUM ADA ACCESS WHEN WALKWAYS ARE PROVIDED.
6. 4" MINIMUM AC OVER 6" MINIMUM BASE, UNLESS OTHERWISE INDICATED ON PLANS.
   * 1.5% PER CITY OF SAN DIEGO ADA REQUIREMENTS.
REQUIREMENT 1
NO PORTION OF ANY CURB OPENING SHALL BE PERMITTED WITHIN 6' OF THE INTERSECTION OF THE PROLONGED PROPERTY LINES AND THE CURB 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 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 12.5% (OR 1/8) OF THE TOTAL LENGTH OF THE ARC ON THE CURB RETURN, THUS LEAVING AT LEAST 75% (OR 3/4) 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.
NOTES:

1. CURB OPENINGS, EXCEPT FOR JOINT-USE DRIVEWAYS AND DRIVEWAYS ON LOTS HAVING 21'-0" FRONTAGE OR LESS, SHALL BE LOCATED AT LEAST 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 45' ARE ENTITLED TO ONE 12' DRIVEWAY (18' CURB OPENING).

3. ALL DRIVEWAYS AND CURB OPENINGS SHALL BE A MINIMUM OF 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 DRIVEWAY 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.
NOTES:
1. SIDEWALK RAMP SHALL BE INSTALLED AS REQUIRED BY AGENCY.
2. W = WIDTH SHOWN ON PLANS.
3. R = RADIUS SHOWN ON PLANS (3' MINIMUM).
4. O = ELEVATION SHOWN ON PLANS (TOP OF CURB AND GUTTER ELEV.)
5. ---- = 1/2" EXPANSION JOINTS.
NOTES:
1. CONCRETE SHALL BE 560-C-3250.
2. SEE STANDARD DRAWING C-10 FOR JOINT DETAILS.
3. ADJUST 15' INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.
NOTES:
1. CONCRETE SHALL BE 560-C-3250.
2. SEE STANDARD DRAWING G-10 FOR JOINT DETAILS.
3. ADJUST 15' INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.
NOTES:
1. CONCRETE SHALL BE 560–C–3250.
2. SEE STANDARD DRAWING G–10 FOR JOINT DETAILS.
3. ADJUST 15' INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.
NOTES:
1. CONCRETE SHALL BE 560--C--3250.
2. SEE STANDARD DRAWING C--10 FOR JOINT DETAILS.
3. ADJUST 15' INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.
GENERAL NOTES:

1. TRENCH EDGES TO BE SAWCUT A MINIMUM OF 6" WIDER THAN TRENCH FOR 3' WIDE OR LESS, AND 12" WIDER FOR TRENCHES OVER 3' WIDE ON EACH SIDE OF TRENCH, EXCEPT TYPE B.
2. EXISTING A.C. SHALL BE SAWCUT 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 MATCH THE THICKNESS OF EXISTING BASE OR AS SHOWN ON PLAN. A.C. MAY BE SUBSTITUTED FOR BASE MATERIAL WITH PRIOR AGENCY APPROVAL. TYPE C – SEE TABLE.
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. OR AS SHOWN ON PLAN.
   B. A.C. SHALL BE HOT PLANT MIX.
   C. TYPE C – SEE TABLE.
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. PAVEMENT FABRIC SHALL BE INSTALLED WHEN REQUIRED BY AGENCY.

TYPE B & C NOTES:

1. ASPHALT TRENCH CAPS IN STREETS NOT RECEIVING A FULL WIDTH OVERLAY PRIOR TO ACCEPTANCE SHALL BE BASE-PAVED TO MATCH EXISTING ADJACENT PAVEMENT SURFACE. NO LESS THAN 30 DAYS AFTER INITIAL ASPHALT PLACEMENT, TRENCH CAP SHALL BE MILLED AS SHOWN AND RESURFACED WITH 1/2" THICK TYPE III CLASS C2 ASPHALT.
2. UPON APPROVAL OF ALL PIPELINE TESTING AND TIE-INS FROM THE AGENCY, THE CONTRACTOR SHALL COLD MILL THE TRENCH REPAIR TO A DEPTH OF 1-1/2", ONE FOOT WIDER THAN THE TRENCH WIDTH ON BOTH SIDES. WHEN EDGE OF COLD MILL LINE IS WITHIN 18" OF ANY STRUCTURE, EDGE OF PAVEMENT, ADJACENT TRENCH, OR OTHER PAVING JOIN LINE, THE COLD MILL SHALL BE EXTENDED TO THE EXISTING STRUCTURE, JOIN LINE, OR EDGE OF PAVEMENT. 
3. ANY STREET TRENCH 7 FEET IN WIDTH OR GREATER AND LONGER THAN 100 FEET IN OVERALL LENGTH SHALL BE RECONSTRUCTED AS DIRECTED BY AGENCY.

TYPE D NOTES:

1. ALL AREAS OF EXISTING AC LESS THAN 48" WIDE REMAINING AFTER TRENCHING SHALL BE COLD MILLED AND PAVED PER TYPE D – PHASE II FINISH PAVING DETAIL.
2. PHASE II PAVING SHALL BE COMPLETED NOT EARLIER THAN 14 CALENDAR DAYS AND NOT LATER THAN 75 CALENDAR DAYS AFTER PHASE I PAVING.
NOTES:

1. EXISTING CONCRETE PAVEMENT SHALL BE SAWCUT AND REMOVED. PRIOR TO PLACING CONCRETE, PAVEMENT EDGES SHALL BE TRIMMED TO NEAT HORIZONTAL AND VERTICAL LINES.

2. UNLESS OTHERWISE SPECIFIED, CONCRETE TRENCH COVER SHALL BE A MINIMUM OF 5–1/2" FOR ALLEYS, 7" FOR LOCAL THROUGH FOUR-LANE COLLECTOR STREETS, AND 9" THICK FOR ALL MAJOR OR GREATER STREET CLASSIFICATIONS.

3. TRENCH EDGES TO BE CUT A MINIMUM OF 6", WIDER THAN TRENCH FOR 3' WIDE OR LESS AND 12" WIDER FOR TRENCHES OVER 3' WIDE, ON EACH SIDE OF TRENCH.

4. ANY STREET TRENCH 7' IN WIDTH OR GREATER AND LONGER THAN 100' IN LENGTH SHALL BE CONSTRUCTED WITH THE PAVEMENT SECTION PER PLAN OR LOCAL AGENCY REQUIREMENT. STREET TRENCH SECTIONS 7' IN WIDTH OR GREATER BUT LESS THAN 100' IN OVERALL LENGTH SHALL BE SURFACED TO A THICKNESS OF 1" GREATER THAN REQUIRED BY NOTE 2 OR AS INDICATED ON PLAN.

5. IN FOUR-LANE MAJOR OR GREATER STREETS, AN APPROVED SET ACCELERATING ADMIXTURE SUCH AS CALCIUM CHLORIDE SHALL BE USED IN CONCRETE.
NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED BY THE AGENCY.
2. CONCRETE SHALL BE 560–C–3250.
3. SEE STANDARD DRAWINGS G–15 AND G–16 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10' FROM CURB FACE OR TO PROPERTY LINE WHICHEVER IS LESS.
   (FOR COMMERCIAL DRIVEWAYS ONLY)
5. PLACE EXPANSION JOINT AT R/W OR 10', WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS G–2 AND G–10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS REFLECT A 6' CURB HEIGHT.
MONOLITHIC CURB IF SPECIFIED OR REQUIRED

12" WIDE BORDER
SEE DETAIL A
STANDARD DRAWING G-32A

FACE OF CURB
LIP OF GUTTER

PLAN - TYPE A

MONOLITHIC CURB
IF SPECIFIED OR REQUIRED

4' MIN
R/W

TRANSITION AREA

LIP (TOE) OF GUTTER

12" WIDE BORDER
SEE DETAIL A
STANDARD DRAWING G-32A

PLAN - TYPE B

NOTES:
1. SEE STANDARD DRAWING G-32A FOR GENERAL NOTES.
2. FOR TRUNCATED DOMES DETAILS, SEE STANDARD DRAWING G-30.
4. LANDING CROSS SLOPE SHALL BE 2.0% MAX IN BOTH DIRECTIONS.
5. SEE STANDARD DRAWING G-32B FOR X, Y, AND Z DETAILS.

CURB RAMP - TYPES A AND B
(NEW CONSTRUCTION)
NOTES:

1. SEE STANDARD DRAWING G–32A 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 DETAIL, SEE STANDARD DRAWING G–30.
6. SEE STANDARD DRAWING G–32B FOR X, Y, AND Z* DETAILS.
12" WIDE BORDER
SEE STANDARD
DRAWING G–32A,
DETAIL A

TRUNCATED DOMES

MONOLITHIC CURB
MEET SIDEWALK ELEVATION
BACK OF SIDEWALK
EXISTING
SIDEWALK
4’–0”
FACE OF CURB
LIP (TOE) OF GUTTER

PLAN
8.33% MAX
X
TOP OF CURB
CT 4’–0” CT
GUTTER FLOW LINE

ELEVATION
4’–0” MINIMUM LANDING
3’–0” TRUNCATED DOMES
6”

5% MAX GUTTER APRON SLOPE AT RAMP OPENING

SEE NOTE 3

4” THICK MINIMUM

SEE STANDARD DRAWING G–32A, DETAIL B

SECTION A–A

NOTES:
1. TYPE C ARE ONLY TO BE USED TO MITIGATE EXISTING CONDITIONS WHERE INADEUATE RIGHT
OF WAY EXISTS. TYPE C RAMP IS NOT TO BE USED IN NEW CONSTRUCTION, UNLESS APPROVED
BY AGENCY.
2. SEE STANDARD DRAWING G–32A FOR GENERAL NOTES.
3. LANDING CROSS SLOPE SHALL BE 2.0% MAX IN BOTH DIRECTIONS.
4. FOR TRUNCATED DOMES, SEE STANDARD DRAWING G–30.
5. CT (CURB TRANSITION) SHALL BE 8.33% MAXIMUM.
6. SEE STANDARD DRAWING G–32B FOR X, Y, AND CT DETAILS.
NOT TO SCALE

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 THE TILE AND THE CONCRETE.
SEE NOTE 2

EXISTING CONTIGUOUS SIDEWALK

4' - 0" MIN

SEE NOTE 2

TRUNCATED DOMES

3' - 0"

STREET TYPICAL PLAN

THE RAMP SIDE FLARES AND GROOVES MAY BE ELIMINATED BY THE ENGINEER AND REPLACED WITH A MONOLITHIC CURB FLUSH WITH THE EXISTING GROUND AND SIDEWALK.

12" WIDE BORDER SEE STANDARD DRAWING G-32A, DETAIL A

PLAN VIEW

4' - 0" MIN LANDING

3' - 0"

TRUNCATED DOMES

5% MAX GUTTER APRON SLOPE AT RAMP OPENING

SEE NOTE 2

8.33% MAX

4' - 0"

8.33% MIN

4"

THICK MIN

SEE STANDARD DRAWING G-32A, DETAIL B

SECTION A - A

NOTES
1. SEE STANDARD DRAWING G-32A 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.
NOTES

1. THE REMOVAL OF EXISTING CONCRETE CURB, GUTTER, SIDEWALK, AND PAVEMENT FOR PEDESTRIAN RAMP INSTALLATION SHALL COMPLY WITH STANDARD DRAWING G-11. FOR CONSTRUCTION OF CURB RAMPS ON EXISTING SIDEWALKS, REMOVAL OF ADDITIONAL SIDEWALK MAY BE REQUIRED TO COMPLY WITH ADA REQUIREMENTS TO MEET EXISTING GRADE.

2. CONCRETE SHALL BE CLASS 520-C-2500.

3. AREAS SHOWN THUS: ☐ ☐ ☐ ☐ ☐ SHALL HAVE A MEDIUM TO HEAVY BROOM TEXTURE FINISH, PERPENDICULAR TO THE AXIS OF THE RAMP. AREAS SHOWN THUS: ☐ ☐ ☐ ☐ ☐ ARE THE MINIMUM REQUIRED FOR A COMPLETE RAMP INSTALLATION.

4. IF OBSTRUCTIONS SUCH AS INLETS, UTILITY POLES, FIRE HYDRANTS, ETC., ARE ENCOUNTERED, THE RAMP LOCATIONS MAY BE ADJUSTED UPON THE APPROVAL OF THE AGENCY.

5. THE RAMP SLOPES WILL BE MEASURED RELATIVE TO THE SIDEWALK SLOPE. ADJOINING SLOPE BEYOND THE RAMP SHALL NOT EXCEED 20:1 (5%).

6. LANDING CROSS SLOPE SHALL BE 2.0% MAX IN BOTH DIRECTIONS.

7. EDGE OF TRUNCATED DOME PANEL SHALL BE LOCATED 6” MINIMUM AND 8” MAXIMUM FROM THE GUTTER FLOWLINE.
### Table A

<table>
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<tr>
<th>X</th>
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<th>Z</th>
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<tr>
<td>CURB HEIGHT</td>
<td>RAMP LENGTH (12:1)</td>
<td>SIDE SLOPE (10:1)</td>
<td>CURB TRANS.</td>
</tr>
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<td>1&quot;</td>
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**Type A and B Curb Ramps**

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**Type A−1 and B−1 Curb Ramps**

### Table C

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**Type C Curb Ramp**

### Notes

1. Dimensions X, Y, Z, Z1, and CT may be determined by using the tables on this sheet with prior agency approval. Without agency approval, dimensions should not exceed the maximum slope or ratio provided.

2. Z* refers to Z or Z1 in Table B. Z side slope shall be 10:1, except per Note 3.

3. For Type A−1 and B−1 curb ramps, where a 4' landing cannot be constructed due to inadequate right of way, a 3' minimum landing is acceptable with prior agency approval and provided the side slopes are revised to 12:1 per side slope Z1 in Table B.
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 COLD PLANING.
   B. THICKNESS OF ASPHALTIC CONCRETE SHALL BE A MINIMUM OF 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 SCREED OFF TO MATCH EXISTING PAVEMENT GRADE AND FLOATED TO ASSURE PROPER EDGE MATCH.

2. CONCRETE TRENCH COVER SHALL BE A MINIMUM OF 5-1/2" THICK IN ALLEY OR LOCAL RESIDENTIAL STREETS AND 7" THICK IN 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.
NOTES
1. TRENCH RESURFACING SHALL BE DONE ACCORDING TO AGENCY’S REQUIREMENTS.
2. THE SAND USED FOR THE SLURRY BACKFILL SHALL MEET THE REQUIREMENTS (SUBSECTION 200–1.5.3) LISTED IN THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. SLURRY SHALL CURE FOR SEVEN DAYS PRIOR TO TRENCH RESURFACING.
3. SLURRY BACKFILL SHALL NOT BE USED WHERE IT WILL IMPED SUBSURFACE DRAINAGE.
LEGEND

A PROVIDE DIKE OPENING FOR DRAINAGE WHEN REQUIRED.
B PERMANENT STREET SURFACING.
C CONCRETE GUTTER (SEE DETAIL).
D TYPE G C&G (RSD G–2).
E TYPE B DIKE (RSD G–5).
F END OF TEMPORARY IMPROVEMENTS.
G GUARD POST AND BARRICADE (RSD M–9)

CONCRETE GUTTER DETAIL

NOTES:
1. R=26' OR 1/2 R/W–2' WHICHEVER IS GREATER.
NOTES:
1. CURB AND GUTTER (C&G) SHALL CONFORM TO SAN DIEGO AREA REGIONAL STANDARD DRAWINGS (RSD)
2. CONCRETE GUTTER SHALL BE Poured NON–CONTINUOUS TO PROVIDE EXPANSION JOINTS.
NOTES:

1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TFELOON TAPE SHALL BE USED ON THREADDED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. NO FIXED RISERS IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.
6. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER ALL HEADS.

LEGEND ON PLANS

SHOW A NUMBER TO INDICATE TYPE HEAD
NOTES:
1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER OR IN ALL HEADS.
6. NO FIXED RISERS ALLOWED IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.
NOTES:
1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER OR IN ALL HEADS.
6. LATERAL DEPTH SHALL BE 18" WHEN 12" POP-UP BODIES ARE USED.
NOTES:

1. FOR BUBBLER LOCATION, REFER TO TREE PLANTING AND STAKING DRAWING.

2. EACH TREE SHALL HAVE A 2" POP-UP HEAD WITH BUBBLER NOZZLE PER 1–3 AND A FIXED BUBBLER NOZZLE IN A PERFORATED PIPE.

3. NIPPLES AND RISERS SHALL BE PVC SCH 80.

4. FITTINGS SHALL BE PVC SCH 40.

5. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.

6. CLOSE NIPPLES SHALL NOT BE USED.

7. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER ALL HEADS.

SAN DIEGO REGIONAL STANDARD DRAWING

TREE BUBBLER TUBE
NOTES:

1. QUICK COUPLING VALVES SHALL BE SET FLUSH IN LAWN AND PER MULCH DEPTH ABOVE FINISH GRADE IN SHRUB/GROUNDCOVER AREAS.

2. CLOSE NIPPLES SHALL NOT BE USED.

3. NIPPLES, COUPLINGS, AND ELBOWS SIZE SHALL BE 1" RED BRASS.

4. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.

5. UPON PROJECT ACCEPTANCE, THE CONTRACTOR SHALL PROVIDE TWO SETS OF APPROPRIATE QUICK COUPLER VALVE KEY WITH 1" BRASS BALL VALVE AND SWIVEL ADAPTER INCLUDED IN THE ASSEMBLY.

6. INSTALL VALVE BOX PER AGENCY STANDARDS.
NOTES:

1. SPlices SHALL be Soldered with a Properly Set Mechanical Splice Connector, entirely Enclosed in Self-curing Resin and shall be Completely Water-proof.

2. Seal Conduit Openings with Electrical Sealant.

3. Knock Outs Shall not be Enlarged.

4. Install Only One Flow Sensor per Box.

5. Valve Boxes shall be Set Perpendicular to Hardscape per Mulch Depth in Shrub / Groundcover Areas. If Necessary to be Set in Turf, Valve Boxes shall be Set Flush with Finished Grade.

PLANT

CONCRETE RECTANGULAR VALVE BOX WITH CAST IRON, SELF-LOCKING LID, PAINT 'FS' AND CONTROLLER I.D. LETTER ON LID.

45 DEGREE PVC ELL, SCH 80 PVC TO ACHIEVE MAINLINE DEPTH ON DOWNSTREAM SIDE OF FLOW SENSOR.

ELEVATION

FLOW SENSOR

1" MIN BETWEEN TOP OF PIPE AND VALVE BOX KNOCK OUTS (BOTH SIDES)

SCH 80 PVC MAINLINE FROM MASTER VALVE 10 X PIPE DIAMETER W/NO FITTING

CONCRETE VALVE BOX

UNMORTARED STANDARD BRICKS (4)
FOUNDATION ON COMPACTED SUBGRADE
(USE 6 BRICKS FOR OVERSIZED BOXES)

FLOW SENSOR CENTERED IN BOX

LEGEND ON PLANS

F

FS
NOTES:
1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE STANDARD DRAWING SD-115 FOR SPLICING / SOLDERING NOTES.
2. SPLICES SHALL BE SOLDERED WITH A PROPERLY SET MECHANICAL SPICE CONNECTOR, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.
3. SEAL CONDUIT OPENINGS WITH ELECTRICAL CONDUIT SEALANT AS APPROVED BY THE AGENCY.
4. PVC CONDUIT SHALL BE 1" MINIMUM.
5. VALVE / CONTROLLER IDENTIFICATION SHALL BE LABELED OUTSIDE ON THE VALVE BOX LID AND TAGGED INSIDE THE BOX ON THE VALVE.
6. KNOCK OUTS SHALL NOT BE ENLARGED.
7. INSTALL ONLY ONE VALVE PER BOX.
8. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, ABOVE FINISHED GRADE IN SHRUB / GROUND COVER AREAS, PER MULCH DEPTH. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.
9. CLOSE NIPPLES SHALL NOT BE USED.
10. NIPPLES, ELBOWS, AND FITTINGS SHALL BE THREADED RED BRASS, FROM COUPLING THROUGH THE MASTER VALVE.
11. TEFLOW TAPE SHALL BE USED ON THREADED CONNECTOR.
NOTES:

1. TEFLON TAPE, 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 BE 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.
NOTES:
1. GLOBE VALVES SHALL BE FURNISHED WITH A STANDARD BRONZE CROSS HANDLE, CENTERED IN PIPE SLEEVE.
2. VALVE SHALL BE INSTALLED WITHIN 12” OF HARDSCAPE.
3. GLOBE VALVES SHALL BE FURNISHED WITH A REMOVABLE BONNET AND PACKING GLAND NUT.
4. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
5. VALVE BOX SHALL BE MOUNTED FLUSH WITH FINISH GRADE IN TURF AREAS AND PER MULCH DEPTH IN SHRUB AREAS.
6. LOCATE OUTSIDE OF TURF WHEN POSSIBLE.
7. GATE VALVE SHALL BE USED ONLY ON LOOPED MAINLINE.
8. VALVE BOX SHALL BE SET PERPENDICULAR TO HARDSCAPE.
9. PROVIDE TWO VALVE KEYS TO OPERATE VALVE AT DEPTH.

LEGEND ON PLANS
Gate Valve
Globe Valve
NOTES:

1. GLOBE VALVES SHALL BE FURNISHED WITH A STANDARD BRONZE CROSS HANDLE, CENTERED IN PIPE SLEEVE.

2. VALVES SHALL BE INSTALLED WITHIN 12" OF HARDSCAPE.

3. 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 FINISHED GRADE IN TURF AREAS AND ABOVE FINISHED GRADE IN SHRUB AREAS, PER DEPTH OF MULCH.

6. PROVIDE APPROPRIATE LOCKING CAP KEY AND VALVE KEY TO OPERATE VALVE AT DEPTH.

7. LOCATE OUTSIDE OF TURF WHEN POSSIBLE.

8. TEFLON TAPE SHALL BE USED ON ALL THREADED CONNECTIONS.

9. WHEN INSTALLED AS MAINLINE ISOLATION VALVE, NIPPLES AND FITTINGS MAY BE SCH 80 PVC.

10. INSTALL VALE BOX PER AGENCY STANDARDS.

LEGEND

GV
NOTES:

1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE I–15 FOR SPLICE / SOLDERING NOTES.

2. SPLICES SHALL BE SOLDERED WITH A PROPERLY SET MECHANICAL SPLICE CONNECTOR, ENTIRELY ENCLOSED IN SELF–CURING RESIN AND SHALL BE COMPLETELY WATER–PROOF.

3. KNOCK OUTS SHALL NOT BE ENLARGED.

4. INSTALL ONLY ONE VALVE PER BOX.

5. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, 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.

6. CLOSE NIPPLES SHALL NOT BE USED.

7. NIPPLES, ELBOWS, AND FITTINGS SHALL BE THREADED RED BRASS FROM ISOLATION VALVE THROUGH THE VALVE, UNLESS OTHERWISE SPECIFIED.

8. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS

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**LEGEND ON PLANS**

- RCV

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**SAN DIEGO REGIONAL STANDARD DRAWING**

**REMOTE CONTROL VALVE**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**
NOTES:

1. INSTALL PULL BOXES AS SHOWN ON PLANS AND AT EACH END OF CONDUITS. SWEEPS RUNNING UNDER VEHICULAR PAVEMENT.

2. PULL BOX COVER SHALL BE PERMANENTLY MARKED "ELECTRIC".

3. CONDUCTORS FOR EACH CONTROLLER CLOCK SHALL BE HARNESSSED SEPARATELY AND AT SUFFICIENT INTERVALS TO MAINTAIN A DEFINITE BUNDLE.

4. SPLICES SHALL ONLY BE MADE IN PULL BOXES, WITH A PROPERLY SET MECHANICAL SPLICE CONNECTOR, SOLDERED WITH METALLIC ALLOY, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.

5. SPARE WIRE ENDS SHALL BE INSULATED IN THE SAME MANNER AS WIRE SPLICES.

6. MINIMUM SIZE PULL BOX SHALL BE AS SHOWN ABOVE. LARGER BOXES MAY BE NECESSARY TO MEET 4" CLEARANCE REQUIRED.

7. NO SPLICES SHALL BE PERMITTED ON WIRE RUNS OF LESS THAN 300'.

8. THE LETTER "E" SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB-SIDEWALK) DIRECTLY ABOVE THE CONTROL WIRE.
NOTES:

1. BEDDING MATERIAL SHALL BE SE 50 PLASTER OR MORTAR SAND.

2. WIRES WHICH RUN UNDER PAVED AREAS SHALL BE INSTALLED IN PVC CONDUIT TWICE THE DIAMETER OF THE WIRE BUNDLE (2" MINIMUM SIZE), EXTENDING 12" MINIMUM BEYOND EDGE OF PAVEMENT.

3. THE LETTER E SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB–SIDEWALK) DIRECTLY ABOVE THE CONTROL WIRE / CABLE.

4. WHEN CONTROL WIRING CANNOT BE INSTALLED IN A PIPE TRENCH, IT SHALL BE INSTALLED A MINIMUM 18" BELOW FINISH GRADE BUNDLED WITH PLASTIC TAPE.
NOTES:

1. ALL CONTROLLER ASSEMBLIES AND OPTIONS SHALL BE COMPLETELY PRE-ASSEMBLED IN A STAINLESS STEEL ENCLOSURE.

2. CONTROL WIRE CONDUIT SHALL BE TWICE THE DIAMETER OF THE WIRE BUNDLE, 2" MINIMUM.

3. PROVIDE SEPARATE CIRCUIT BREAKER FOR CONTROLLER(S) AT ELECTRICAL CONTROL PANEL AND LABEL.

4. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT, AS APPROVED BY THE AGENCY.

LEGEND ON PLANS:

- STAINLESS STEEL ENCLOSURE
- ENCLOSURE MOUNTING ANCHORS
- PAD - 6" THICK FOR CONTROLLER ENCLOSURE, PADO "SLOPE AWAY FROM CONTROLLER
- PAD - 6" THICK FOR CONTROLLER ACCESS
- PULL BOX
- LABEL ENCLOSURE DOOR WITH CONTROLLER DESIGNATION USING 2" BLACK VINYL LETTERS / NUMBERS.
- PROVIDE RAIN SENSOR IN AN APPROVED LOCATION.
- POWER SWITCH AND GFI RECEPTACLE ON PRE-ASSEMBLED BACKBOARD.
- CONDUIT FROM POWER SOURCE PER LOCAL CODES, SEAL AND WATERPROOF BOTH ENDS.
- CONCRETE ANCHORS PER ASSEMBLY TEMPLATE SHALL BE STAINLESS STEEL.
- PROVIDE SILICONE SEALANT AROUND BASE OF CONTROLLER ENCLOSURE.
- CONTROL WIRE TERMINAL STRIP AS PRE-ASSEMBLED ON BACKBOARD, LABELED WITH STATION / FUNCTION NUMBER
- CONDUITS - PVC SCH 40
  1. FOR CONTROL WIRES (SEE NOTE #3 BELOW)
  2. 1" FOR MASTER VALVE WIRE
  3. 1" FOR FLOW SENSING CABLE
  2. 1" SPARE
- SEAL AND WATERPROOF CONDUITS (BOTH ENDS)
- GROUNDING ROD PER MANUFACTURER'S SPECIFICATIONS.
- COMPACTED SUBGRADE, AS REQUIRED.
- PULL BOX INSTALLED WITHIN 3" OF CONTROLLER ENCLOSURE, PER I-15 AND LABEL W/ CONTROLLER DESIGNATION.
- CONDUIT SWEPS TO TRENCH DEPTH, REFER TO TRENCH DETAIL.
NOTES:

1. CONTROL WIRE CONDUIT SHALL BE TWICE THE DIAMETER OF THE WIRE BUNDLE, 2" MINIMUM.

2. PROVIDE SEPARATE CIRCUIT BREAKERS FOR CONTROLLER(S) AT ELECTRICAL CONTROL PANEL, AND LABEL.

3. PROVIDE RAIN SENSOR AND INSTALL IN AN APPROVED LOCATION.
HEAVY-DUTY STAINLESS STEEL ENCLOSURE WITH LIGHT ACCESS THROUGH GRID ON TOP AND INTERNAL CLAMP FOR COLUMN

HIGH SECURITY STAINLESS STEEL DISC LOCK

SOLAR IRRIGATION CONTROLLER

GALV STEEL COLUMN PER MANUFACTURER SPECS

RAIN SENSOR ENCLOSED IN STAINLESS STEEL VANDAL RESISTANT ENCLOSURE, MOUNT ON POST MIN 30" ABOVE GRADE

FINISH GRADE

CONCRETE PAD TO SLOPE AWAY FROM CONTROLLER COLUMN

Sweep Conduit into Pull Box

24" Service Loop in Pull Box

NOTES:

1. PROVIDE SOLENOID ADAPTOR TO SUPPORT SOLAR CLOCK FUNCTION ON VALVE.

2. MAXIMUM RUN OF CONTROL WIRE TO REMOTE CONTROL VALVE (RCV) IS 1500' UNLESS OTHERWISE SPECIFIED.

3. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT.
NOTE:

STABILIZERS SHALL BE PLACED NO GREATER THAN 10' APART, AT EACH RISER AND AT ALL FITTINGS.
NOTE:
SWING JOINTS SHALL BE USED AT EACH CHANGE OF GRADE.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

ROTOR, SPRAY, OR BUBBLER
POP-UP HEAD

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Reviewed T. Stanton 06/04
UPDATED KA N. Batta 11/11

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
NOTES:
1. BACKFILL MATERIAL SHALL BE COMPACTED TO A RELATIVE COMPACTATION OF 90% MINIMUM.

2. PIPE SHALL LAY FREE IN THE TRENCH WITH NO INDUCED STRAIN AND WITH SUFFICIENT ALLOWANCE FOR EXPANSION AND CONTRACTION.

3. PVC PIPE UNDER PAVEMENT SHALL BE INSTALLED IN A SCH 40 PVC SLEEVE TWICE THE DIAMETER OF THE PIPE (2" MINIMUM SIZE) AND EXTEND 12" MINIMUM BEYOND THE EDGE OF PAVEMENT.

4. THE LETTER "W" SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB/ SIDEWALK) DIRECTLY ABOVE THE PRESSURE PIPELINE SLEEVE.

5. NO PVC PRESSURE PIPELINE SHALL BE INSTALLED WITHIN 3' OF ANY UTILITY, UNLESS OTHERWISE SPECIFIED.
NOTES:

1. PVC PIPE USED IN MANIFOLD ASSEMBLIES SHALL BE THE SAME CLASS AS SPECIFIED FOR THE MAINLINE.

2. VALVE BOXES SHALL BE HEAT BRANDED WITH CONTROLLER AND VALVE IDENTIFICATION.
NOTES:

1. ALL PIPES, NIPPLES, AND FITTINGS AFTER MALE ADAPTER SHALL BE RED BRASS.

2. VALVE AND CONTROLLER IDENTIFICATION SHALL BE LABELED OUTSIDE ON THE VALVE BOX LID AND TAGGED INSIDE THE BOX ON THE VALVE.

3. TEFLOM TAPE SHALL BE USED ON THREAD Connections.
NOTES:

1. WIRE SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICE / SOLDERING NOTES.

2. SPARE WRES TERMINATING IN VALVE BOXES SHALL HAVE THEIR ENDS INSULATED, THE SAME AS FOR A SPICE.

3. WHEN TWO OR MORE VALVES ARE INSTALLED IN THE SAME LOCATION, SEE REMOTE CONTROL VALVE MANIFOLD ASSEMBLY.

4. VALVE / CONTROLLER IDENTIFICATION SHALL BE PERMANENTLY LABELED EXTERNALLY ON THE VALVE BOX AND INTERNALLY, WITH A PERMANENT IDENTIFICATION TAG ATTACHED TO THE VALVE.

5. KNOCK OUTS SHALL NOT BE ENLARGED UNLESS APPROVED BY THE AGENCY.

6. INSTALL ONLY ONE VALVE ASSEMBLY PER BOX.

7. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, A MAXIMUM 12 INCHES FROM EDGE OF HARDSCAPE, 2" 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.

8. CLOSE NIPPLES SHALL NOT BE USED.

9. FILTER SHALL BE INSTALLED TO ALLOW FOR MAINTENANCE ACCESS.

10. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
NOTES:
1. INSTALL AIR / VACUUM RELIEF VALVE AT HIGH POINT(S) IN VALVE CIRCUIT.
2. HEAT-BRAND VALVE BOX LID "AR".
3. VALVE SHALL BE CENTERED IN BOX.
4. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
MULCH DEPTH PER PLAN

6" ROUND VALVE BOX W/ LOCKING LID
LINE FLUSHING VALVE PER LEGEND
1" MIN CLEAR BELOW

STANDARD BRICK SUPPORTS (3)
3/8" PEA GRAVEL SUMP, (1 CUBIC FOOT)
PLUMBED TO PVC

MULCH DEPTH PER PLAN

6" ROUND VALVE BOX W/ LOCKING LID
LINE FLUSHING VALVE PER LEGEND
1" MIN CLEAR BELOW

STANDARD BRICK SUPPORTS (3)
3/8" PEA GRAVEL SUMP, (1 CUBIC FOOT)
PLUMBED TO DRIPPER LINE

NOTES:
1. INSTALL FLUSH VALVE(S) AT THE LOWEST POINTS IN THE VALVE CIRCUIT
2. HEAT BRAND VALVE BOX LIDS "FV".
3. VALVE SHALL BE CENTERED IN BOX.

LEGEND ON PLANS

FV
RUBBER TREE TIES LOOPED IN A 'FIGURE 8' AROUND TRUNK AND STAKE.

Each tree tie shall be nailed to stake using galvanized nails.

2" DIA. LODGEPOLE STAKE, MIN 10' LENGTH.

Do not remove side growth along trunk, prune only as directed by the agency.

2-2" DIA 10' MIN LENGTH LODGEPOLE STAKES AND 4 TIES. TOP TREE TIES SHALL BE 3" BELOW TOP OF STAKE. TIES SHALL PROVIDE FLEXIBILITY OF TRUNK BUT NOT ALLOW RUBBING OF TRUNK OR BRANCHES AGAINST STAKE.

6" FROM LOWEST OR NEAREST BRANCH.

Chamfer as needed to eliminate soil sloughing. 1:1 max slope.

Top of root ball 1" above finished grade.

2"-3" mulch, 3" clear from trunk.

4" High berm firmly compacted

4" perforated pvc breather tube w/ black flat grate cap fastened stainless steel screw (2) wrapped in filter fabric & extending to the bottom of planting backfill.

Scarify bottom and edges of plant pit.

Undisturbed native soil

Plant tablets per specs., max 3" deep.

Tree bubblers on up hill side of trunk (1-4)

4" PVC rigid perforated breather tube

Tree stakes (Typ)

Planter hole

A - slopes

Tree trunk

4" PVC rigid perforated breather tube

Tree bubblers (Typ)

Planter hole

B - level ground

Notes:
1. Double stake 15 gal. and larger trees. Single stake trees smaller than 15 gal.
2. For single staked trees, place stake on windward side of tree.
3. Locate stakes outside of rootball.
4. Provide minimum distance from other objects as follows:
   20' traffic signals, 12' street lights, 10' fire hydrants, sewer lines and SDG&E for pad mounted equipment, and 5' underground SDG&E electric and gas lines.

San Diego regional standard drawing

Tree planting and staking

Recommended by the San Diego regional standards committee
SHRUB PLANTING - SLOPES

CHAMFER AS NEEDED TO ELIMINATE SOIL SLOUGHING. 1:1 MAX SLOPE.

TOP OF ROOT BALL 1" ABOVE FINISHED GRADE

2" MULCH, 3" CLEAR FROM TRUNK

4" HIGH BERM, FIRMLY COMPACTED

PLANT TABLETS BURIED, MAX 3" DEEP

SCARIFY BOTTOM AND EDGES OF PLANT PIT

BACKFILL

DEPTH OF HOLE

2 x BALL WIDTH MIN

SLOPE

DEPTH OF FOOTING

SHRUB PLANTING - LEVEL GROUND

EQUAL TRIANGULAR SPACING (EQ) REQUIRED BETWEEN PLANTS (REFER TO PLANT LEGEND FOR ON CENTER SPACING)

DISTANCE FROM EDGE OF PLANTER TO CENTER OF PLANT TO BE 1/2 THE SPECIFIED GROUND COVER SPACING (EQ)

GROUND COVER SPACING

EDGE OF PLANTING AREA

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER L-2
NOTES
1. REBAR SHALL BE CONTINUOUS WITH 12” OVERLAP WHERE SPLICED.
2. CONCRETE SHALL BE CLASS 520-C-2500 AND SAME COLOR AS ADJACENT CONCRETE
   AND HAVE A SMOOTH TROWEL FINISH.
3. INSTALL WEAKENED PLANE JOINTS AT EACH FENCE POST.
4. INSTALL EXPANSION JOINTS WHERE THE MOWING STRIP ABUTS CONCRETE IMPROVEMENT
   AND AT LOCATION APPROVED BY THE AGENCY.
NOTES:

1. CONCRETE TO BE REMOVED FOR EACH TREE PLANTING SHALL BE SAW CUT FULL DEPTH.

2. BOLTS, NUTS AND WASHERS SHALL BE GRADE 316 STAINLESS STEEL. GRADE FRAME SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL GRATES SHALL BE REMOVABLE & FASTENERS SHALL BE ACCESSIBLE TO MAINTENANCE.

3. GRATES SHALL BE MINIMUM 40 SQUARE FEET IN SIZE, AND 2 SEPARATE PIECES, UNLESS OTHERWISE SPECIFIED ON THE PLANS. SLOT OPENINGS IN GRATE DESIGN SHALL HAVE 3/8" MAXIMUM WIDTH. GRADE DESIGNS AND INSTALLATION SHALL BE IN ACCORDANCE WITH CURRENT ADA STANDARDS AND THE LATEST EDITION OF THE CALIFORNIA BUILDING CODE, WITH A MINIMUM UNIFORM LIVE LOAD OF 250 POUNDS PER SQUARE FOOT IN SIDEWALKS.

4. IMMEDIATE NOTIFICATION SHALL BE GIVEN TO THE ENGINEER OF ANY BELOW GRADE IMPROVEMENTS ENCOUNTERED.

5. SET GRATE IN FRAME PRIOR TO PLACEMENT OF PAVEMENT. ANY WARPED OR NON-FITTING GRATES SHALL BE REPLACED.

6. TREE SHALL BE CENTERED IN GRATE OPENING. GRATES SHALL HAVE A PERMANENT SLIP RESISTANT FINISH.

7. ADJACENT SIDEWALK SHALL HAVE A MINIMUM CLEARANCE WIDTH OF 4' FROM THE EDGE OF GRATE.

8. GRADE SHALL BE UNIFORM WITH ADJACENT GRADE.

9. PROVIDE MINIMUM DISTANCE FROM OTHER OBJECTS AS FOLLOWS: 12' STREET LIGHTS, 10' FIRE HYDRANTS, 10' SEWER LINES, AND 20' TRAFFIC SIGNALS.

10. SUBMIT GRADE DESIGN FOR APPROVAL.
NOTES:

1. USE MONOLITHIC PLACEMENT FOR NEW CONSTRUCTION.
2. POLE PADS SHALL DRAIN AT 1.5% MINIMUM IN SAME DIRECTION AS SIDEWALK.
3. CONCRETE PAD SHALL BE THE SAME AS SPECIFIED FOR SIDEWALK.
4. LOCATE LIGHT POLES OUTSIDE OF TURF AREAS AND AWAY FROM TREES AS APPROVED BY THE ENGINEER UNLESS SPECIFIED OTHERWISE.
5. PULL BOX WITH BOLT-DOWN LID MINIMUM 6" FROM ALL EDGES (POLYMER EDGE BOX WITH BRICK FOUNDATION)
### Plan View

**Root Barrier Required Within 10' of Tree Trunk, See Note 2**

1. **Tree Trunk**
2. **10' Min**
3. **Root Barrier**

### Section

**Root Barrier Required Within 10' of Tree Trunk**

1. **Top of Root Barrier Above Finished Grade 1/2"**
2. **Finished Grade**
3. **Tree Trunk**
4. **24" Depth Root Barrier**

### Notes:

1. Root barrier shall be installed adjacent to the improvement and not around the rootball.
2. Root barrier required when tree trunk is within 10' of hardscape, walls, buildings, brow ditches, or other improvements.
3. For root barrier installation with the tree grates see L-4.
NOTES:

1. TIE PALM FRONDS TOGETHER WITH BIODEGRADABLE SISAL TWINE. TWINE SHALL BE REMOVED AFTER 90 DAYS OF TRANSPLANTING UNLESS OTHERWISE DIRECTED BY THE AGENCY.

2. PALM TRUNKS SHALL BE SKINNED, TRIMMED, AND VERTICAL.

3. STEM DIAMETER REQUIREMENT APPLIES ONLY TO PHOENIX SPECIES.
4" HIGH BERM FIRMLY COMPACTED
FINISH GRADE AT ROOTBALL

PLANT BACKFILL
PLANTING HOLE DEPTH

FLAT, BLACK SLOTTED GRADE (FASTEN TO PIPE WITH STAINLESS STEEL SCREWS (2)).
DUCT TAPE OVER HOLES WITHIN 6" OF FINISHED GRADE

4" PVC RIGID PERFORATED PIPE WRAPPED IN FILTER FABRIC FOR ENTIRE LENGTH

FILTER FABRIC
PIPE TO EXTEND INTO THE GRAVEL SUMP
3/4" GRAVEL SUMP AT BOTTOM OF PERFORATED DRAIN PIPE

DETAIL - A BREATHER TUBE
NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.
3/4" radius lug slot in both sides of rim

Open position mark, 1/8" deep groove in both sides of rim and cover.

1/6" 1/16" 1/8" 1/8" 1/16" 1/8" 3/16" 1/12" 1/2" 3/4" 1/8" 1/8" R 1/8" R 1/8" R

TOP OF FRAME & COVER

23 5/8" outside dia. of cover

7/8"

22" Dia. Clear Opening

SECTION THROUGH FRAME & COVER

SECTION THROUGH RIM

2 1/2" 2 1/2" 2 1/2" 3/8" 3/8" 3/8" 7/8" 1/4"

21 3/4" Dia.

Same angle throughout

Outline where rib joins rim

Outline where ribs join

SECTION THROUGH LUG

SECTION THROUGH RIB AT MID RADIUS

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.
   Cover 95 lbs. – 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

SAN DIEGO REGIONAL STANDARD DRAWING

24" MANHOLE FRAME AND COVER
LIGHT DUTY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson: R.C.E. 19246  Date

DRAWING NUMBER  M-2
NOTES
1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
   Outer Cover 285 lbs – 330 lbs.
   Inner Cover 147 lbs – 171 lbs.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

SAN DIEGO REGIONAL STANDARD DRAWING

36" MANHOLE FRAME AND TWO CONCENTRIC COVERS
HEAVY DUTY
NOTES
1. All footings shall be 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.

EXTENSION POST AND BARBED WIRE

SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK GATE

LEGEND ON PLANS

3/8" dia. tension rod & tighten for gates over 3'.

12" min. dia.

WALK GATE
NOTES
1. All footings shall be 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 Arm
   c. Top Horizontal Rail
3. Chain link fence shall conform to Section 206–6 of the Standard Specifications for Public Works Construction unless specifically noted on this drawing.

EXTENSION ARM AND BARBED WIRE

LEGEND ON PLANS
NOTES

1. Concrete encasement or sand cement slurry backfill shall have a minimum slump of 4".

2. Sand cement slurry backfill shall be thoroughly consolidated to encase conduits. Tamper 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 rockwheels 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.

NOTES

1. Cement Slurry Backfill:
   a. Cement slurry backfill shall have a maximum slump of 4".
   b. Cement slurry backfill shall be thoroughly consolidated to encase conduits.
   c. Tampers or vibrators shall be used.
   c. Cement slurry backfill shall be as follows:
      Alleys and local residential streets ...... Class 190-E-400
      All other streets .................................. Class 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.
NOTES

1. Concrete encasement or backfill shall have a minimum slump of 4".

2. Concrete encasement and/or sand cement slurry backfill shall be thoroughly consolidated to encase conduits. Tamperers 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. 12B, 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.
NOTES
1. Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 2"x8" select grade Douglas Fir, surfaced four sides.
2. All exposed portions of barricades shall be painted with two coats of white exterior enamel over prime coat.
3. Connections shall be made with 3/8" x 6" galvanized lag screws with one (1) washer each.
4. Reflector sign fasteners to be 3/8" x 1 1/2" galvanized lag screws.
5. Reflector signs - California Type N. Size 18" x 18" - Yellow with nine (9) 3 1/4" reflectors (center mount).
   a. Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow.
   b. Reflectors shall be plastic or other approved reflectorized material.
6. 6" long hat section metal post per Caltrans Std. Plan A74-A optional for guard post.
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 6" of cast-in-place base to a top
diameter of 5". (Precast base shall be sand backfilled).
4. Monument marker shall be a domed brass, 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 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 10’
diameter circle, whose center is the point.
   b) Set on centerline at intervals not exceeding 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 300’ from the point on which the deleted monument
      would have been placed.
NOTES
1. Material—Brass A.S.T.M. B-16. All machine tolerances ±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.
<table>
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**Legend**
- Mean High Water = Mean of all high water in San Diego Bay.
- Mean Higher Water = Mean of all higher water in San Diego Bay.

**Source**
Data based on U.S.C. & G. "Sea level Datum of 1929".
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 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 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, 18” long, set flush with the surface.

LEGEND

- Fd 2” Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted
- Fd Street Survey Monument Stamped RCE XXXX or LS XXXX
- Set 2” x 24” Iron Pipe Marked RCE XXXX or LS XXXX
- Set Lead and Disc Stamped RCE XXXX or LS XXXX
- Set ½” x 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 ½” by 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
| 1 Gram  | = 15.4324 grams | 1 Grain | = 0.0648 g. |
| 1 Gram  | = 0.0353 oz.  | 1 Ounce | = 28.3495 g. |
| 1 Kg.   | = 2.2046 lb.  | 1 Pound | = 0.4536 kg. |
| 1 Kg.   | = 0.0011 ton  | 1 Ton   | = 907.1848 kg. |
| 1 Ton (met) | = 1.1023 ton | 1 Ton   | = 0.9072 ton (met) |

| 1 Sq. cm. | = 0.1550 sq. in. | 1 Sq. in. | = 6.4516 sq. cm. |
| 1 Sq. m.  | = 10.7639 sq. ft. | 1 Sq. ft. | = 0.0929 sq. m. |
| 1 Sq. m.  | = 1.1960 sq. yd.  | 1 Sq. yd. | = 0.8361 sq. m. |
| 1 Hectare | = 2.4710 acres    | 1 Acre   | = 0.4047 hectare |
| 1 Sq. km. | = 0.3861 sq. mile | 1 Sq. mile | = 2.5890 sq. km. |
| 1 Sq. km. | = 247.10 acres   | 1 Acre   | = 0.0040 sq. km. |

| 1 Cu. cm. | = 0.0610 cu. in. | 1 Cu. in. | = 16.3872 cu. cm. |
| 1 Cu. m.  | = 35.3134 cu. ft. | 1 Cu. ft. | = 0.0283 cu. m. |
| 1 Cu. m.  | = 1.3079 cu. yd.  | 1 Cu. yd.| = 0.7646 cu. m. |

| 1 Liter  | = 61.0250 cu. in. | 1 Cu. in. | = 0.0164 liter |
| 1 Liter  | = 0.0353 cu. ft.  | 1 Cu. ft. | = 28.3162 liters |
| 1 Liter  | = 0.2642 gal. (U.S) | 1 Gal.   | = 3.7853 liters |
| 1 Liter  | = 0.0284 Bu.      | 1 Bu.    | = 35.2383 liters |

| 1 MM.    | = 0.0394 in.      | 1 In.    | = 25.4000 mm. |
| 1 CM.    | = 0.3937 in.      | 1 In.    | = 2.5400 cm.  |
| 1 Meter  | = 3.2808 ft.      | 1 Ft.    | = 0.3048 m.   |
| 1 Meter  | = 1.0936 yd.      | 1 Yd.    | = 0.9144 m.   |
| 1 Km.    | = 0.6214 mile      | 1 Mile   | = 1.6093 km.  |

**TEMPERATURE**

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

Degrees Centigrade = 5/9 (Degrees Fahrenheit - 32)
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 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 1,000' in length which may be served by feeder lines only.
8. CATV 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 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.
1/4" Steel Plate welded to top (burrs removed).

1/2" Expansion Joint

Back of curb or joint in walk

Concrete to be same as walk

4" Diameter Steel Pipe

5" Diameter Steel Pipe Sleeve

1/8"

9" 9"

18" Diameter

4" Pipe

1/8"

3"

Three Links

Make bowl shaped recess in concrete to accommodate three links of chain

5" Diameter Steel Pipe Sleeve

HASP DETAIL

NOTES

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

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

SAN DIEGO REGIONAL STANDARD DRAWING

DEMOUNTABLE POST

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-16

Revision By Approved Date

ORIGINAL Solomon 7/79
Add Metric T. Stanton 05/03
Reviewed T. Stanton 04/06
Delete Metric D. Genschoten 05/12
* For Edge Beam, Slab, and Select Fill details, see plans.

### ELEVATION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>MIN. SIZE IN INCHES</th>
<th>MIN. WEIGHT PER LIN FT IN LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Post</td>
<td>2.375 O.D.</td>
<td>3.65</td>
</tr>
<tr>
<td>Terminal Post</td>
<td>2.875 O.D.</td>
<td>5.79</td>
</tr>
<tr>
<td>Top Rail</td>
<td>1.660 O.D.</td>
<td>2.27</td>
</tr>
<tr>
<td>Bracing</td>
<td>1.660 O.D.</td>
<td>2.27</td>
</tr>
<tr>
<td>Gate Frame</td>
<td>1.660 O.D.</td>
<td>2.27</td>
</tr>
</tbody>
</table>

### 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.
1. Drinking Fountain – Haws model 3376 or approved equal.
2. 3/8” dia. Expansion anchors with flat (recessed heads) screws 4 places.
3. 1 ¼” P.V.C. pipe with sweep 90° ell connection to fountain drain.
4. 9 ½” x 16” concrete yard box with hinged locking top (Brooks No. 3HL or equal) set on red brick foundation.
5. 4” x 40” perforated plastic underdrain pipe, encased in 3/4” crushed rock.
6. 1” gate valve with red brass cross handle and union. Install as per Std. Dwg. I–12
7. 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.

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 1” gate valve. Use red brass bushing reducers to adapt to feed pipe.
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 6” from centerline or existing markers.

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 2” from lane lines toward fire hydrant.

**FIRE HYDRANT MARKERS**

**LEGEND ON PLANS**
- Marker □
- Fire Hydrant □

**SAN DIEGO REGIONAL STANDARD DRAWING**

<table>
<thead>
<tr>
<th>Revision</th>
<th>By</th>
<th>Approved</th>
<th>Date</th>
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<tr>
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<td>H. Hecht</td>
<td>10/82</td>
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<td>Add Metric</td>
<td>T. Stanton</td>
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<td>Reviewed</td>
<td>T. Stanton</td>
<td>04/06</td>
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<tr>
<td>Delete Metric</td>
<td>D. Gershoffer</td>
<td>05/12</td>
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**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

Chairperson: R.E. 19246 Date 7/26/2012

**DRAWING NUMBER**

M-19
Horizontal brace with truss rod may be used as an alternate to a diagonal brace.

Line posts at 1000' max. intervals braced and trussed in both directions.

Horizontal brace with 3/8" steel truss rods.

Gate post

Length as specified

Gate panel

Vertical stay

Diagonal brace or horizontal brace with truss rods

Latch post

Portland cement concrete

2" Clr.

10'
NOTES

1. Sidewalk shall have a minimum of 4' clear area (path, not including curb) passing pedestals, pullboxes and other structures.

NOTES
1. At catch basin locations, joint trench shall be 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 12".
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 12".
4. Sewer and reclaimed water mains shall maintain a 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 24” in diameter, only Agency approval is required.
NOTES
1. At catch basin locations, joint trench shall be 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 12”.
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 12”.
4. Sewer and reclaimed water mains shall maintain a 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 24” in diameter, only Agency approval is required.
Notes:
1. 1/4" Expansion joints @ 16'+ centers.
2. Weld and grind smooth all connections.
3. All railing to be hot dip galvanized after fabrication.
4. Pipe shall be seamless steel ASTM A53 Grade B.
5. Maximum Δ = 4". Guardrails and handrails for stairs and ramps more than 30" above
have intermediate rails equally spaced such that a sphere 4" in diameter cannot pass through.
6. Handrail extension for stairs, at all bottom risers, shall be 12" plus one tread width.
NOTES

1. Post type guardrails, and handrails for stairs or landings 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 30" above grade or floor below shall have intermediate rails equally spaced such that a sphere 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.

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SAN DIEGO REGIONAL STANDARD DRAWING

PEDESTRIAN PROTECTIVE RAILING

DETAILS No. 2

REVISED 2/95
ADD METRIC 03/03
REVIEVED 04/06
DELETE METRIC 05/12

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-25
**NOTES**

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

**SECTION A-A**

1/2" R
Provide curb on each side when specified

#4 @ 24" O.C.

#4 @ 12" O.C.

5' Without Curb
NOTES:
1. Provide for adequate drainage.
2. For appropriate ramp alternate to conform to topographical conditions, see standard drawings G-27 through G-32B.
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 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.
NOTES:

1. Provide for adequate drainage.

2. For appropriate ramp alternate to conform to topographical conditions, see standard drawings G-27 through G-328.

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 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.
NOTES:
1. Sign shall be constructed of a minimum 0.062" thick aluminum.
2. Lettering, symbol and border shall be reflectorized white, on a blue background.
3. Lettering shall be 1" and 2" high.
4. Where space is designed for van accessibility, a sign "VAN ACCESSIBLE" shall be installed.
5. Minimum van accessible vertical clearance is 8'-2".

Veh. Code 22511.8(d)

DISABLED PARKING SIGN

SAN DIEGO REGIONAL STANDARD DRAWING

Recommended by the San Diego Regional Standards Committee

Chairperson: R.C.E., 19246 Date

Drawing Number: M-28A

Revision By Approved Date

ORIGINAL G. Parkinson 2/95
Add Metric T. Stanton 03/03
Reviewed T. Stanton 04/06
Delete Metric D. Gershoffer 05/12
NOTES
1. Sign shall be constructed of aluminum, 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.
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.
FOR GUARDRAIL STANDARDS USE: Caltrans "Standard Plans for Construction of Local Streets and Roads"
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 7/16" dia. holes spaced 1" o.c. ±1/8" & shall have no more variation in straightness than 1/16" in 3'. Posts shall be square within ±0.014", have twist no greater than 0.062" in 3' and have corner radii of 5/32" ±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.
SEWERAGE SYSTEMS
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 8"
4) BACKFILL TO TOP OF 45° BEND WITH 3/4" CRUSHED ROCK
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>12&quot; CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED</td>
<td>5</td>
<td>45° ELBOW</td>
</tr>
<tr>
<td>2</td>
<td>CONCRETE RING</td>
<td>6</td>
<td>3/4&quot; CRUSHED ROCK PIPE BEDDING</td>
</tr>
<tr>
<td>3</td>
<td>12&quot; PVC, C-900 x 15&quot; LONG (CLEANOUT BOX)</td>
<td>7</td>
<td>SEWER MAIN</td>
</tr>
<tr>
<td>4</td>
<td>SIZE x REQUIRED LENGTH PVC PIPE</td>
<td>8</td>
<td>3/4&quot; CRUSHED ROCK SEE NOTE 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>STANDARD WYE BRANCH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>INSTALL PLUG AND CONCRETE LUG</td>
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SAN DIEGO REGIONAL STANDARD DRAWING

SEWER CLEANOUT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER  SC-01

Revision By Approved Date

ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Replaced S-03 J. Tomasulo 03/05
Delete Metric B. KNOLL 03/11
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 18" AND LARGER SHALL BE COATED AND LINED PER SM-07
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36&quot; MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3</td>
<td>7</td>
<td>MANHOLE PIPE CONNECTOR SEE SM-04</td>
</tr>
<tr>
<td>2</td>
<td>36&quot; DIA GRADE RING(S) 6&quot; TO 18&quot; HIGH ECCENTRIC CONE SEE NOTE 2</td>
<td>8</td>
<td>FIELD INSTALLED INVERT SEE SM-04</td>
</tr>
<tr>
<td>3</td>
<td>48&quot; DIA RING(S) VARIABLE HEIGHT</td>
<td>9</td>
<td>CONCRETE BASE, PRECAST OR CAST IN PLACE</td>
</tr>
<tr>
<td>4</td>
<td>WATER TIGHT JOINTS SEE SM-05</td>
<td>10</td>
<td>6&quot; OF 3/4&quot; CRUSHED ROCK</td>
</tr>
<tr>
<td>5</td>
<td>SEWER MAIN</td>
<td>11</td>
<td>MANHOLE DETAIL SEE SM-05</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

48" DIAMETER PRECAST MANHOLE INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER SM-01

Revision  By  Approved  Date
ORIGINAL  Kercheval  12/75
Add Metric  T. Stanton  03/03
Replace S-02  J. Tomassuk  03/05
Delete Metric  B. KNOLL  03/11
### 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 18" and larger shall be coated and lined per SM-07.
5) Materials shall be selected from the agency's approved materials list.

### Item No. | Size and Description
--- | ---
1 | 36" Manhole frame and two concentric covers see S.D.R.S.D. M-3
2 | 36" dia grade ring(s) 6" to 18" high
3 | Eccentric cone see note 2
4 | 60° dia ring(s) variable height
5 | Water tight joints see SM-05
6 | Sewer main
7 | Manhole pipe connector see SM-04
8 | Field installed invert see SM-04
9 | Concrete base, precast or cast in place
10 | 6" of 3/4" crushed rock
11 | Manhole detail see SM-05

---

**San Diego Regional Standard Drawing**

**60" Diameter Precast Manhole Installation**

---

**Revision** | **By** | **Approved By** | **Date**
--- | --- | --- | ---
ORIGINAL | Kercheval | | 12/75
Add Metric | T. Stanton | | 03/03
Replaced S-02 | J. Tomasulo | | 03/05
Delete Metric | B. Knoll | | 03/11

---

**Recommended by the San Diego Regional Standards Committee**

Chairperson R.C.E. 19246 Date

**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 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
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
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM 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
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) MANHOLES FOR SEWER MAINS 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
NOTES:
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

SAN DIEGO REGIONAL STANDARD DRAWING

EXISTING MANHOLE ABANDONMENT

DEVELOPED BY:

Kerceval 12/75
T. Stonen 03/03
J. Tomasulo 03/05
B. Knoll 03/11
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED AS SPECIFIED BY AGENCY
3) STAMP OR CHISEL A 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
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 FILTER FABRIC AS REQUIRED BY AGENCY OF JURISDICTION (WITH A MINIMUM 12" OVERLAP).
4) PAVE ZONE 3/4" MAX CRUSHED ROCK UNLESS OTHERWISE SPECIFIED.
TRENCH SECTION
CONCRETE PIPE CRADLE

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

SAN DIEGO REGIONAL STANDARD DRAWING
CONCRETE PROTECTION FOR SEWER PIPE

LEGEND ON PLANS
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 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 IN THE ENGINEER’S DISCRETION
5) 4” GUNITE BLANKET WITH 6” SQUARE X 10 GAGE WIRE FABRIC AT THE TRENCH BOTTOM

LEGEND ON PLANS
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

SAN DIEGO REGIONAL STANDARD DRAWING
SLOPE PROTECTION INSTALLATIONS

DRAWING NUMBER SP-05

CHAIRPERSON R.C.E. 19246 Date

Original J. Tomasulo 03/05
Delete Metric MR. B. KNOLL 03/11
CUT-OFF WALL INSTALLATION IN TRAVELED AREAS

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 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
NOTES:
1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH (24" MIN, 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

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER SP-09
FOR SEWER LATERAL NOTES SEE DETAIL SS–03

<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>SEWER MAIN</td>
<td>5</td>
<td>PLUG OR CAP</td>
</tr>
<tr>
<td>2</td>
<td>45° WYE</td>
<td>6</td>
<td>3/4” MAXIMUM CRUSHED ROCK</td>
</tr>
<tr>
<td>3</td>
<td>45° ELBOW</td>
<td>7</td>
<td>#9 WIRE ATTACHED TO A BRICK</td>
</tr>
<tr>
<td>4</td>
<td>PIPE LATERAL SEE NOTE 3 &amp; 5</td>
<td>8</td>
<td>4” PVC PIPE WITH GLUED CAP</td>
</tr>
</tbody>
</table>

FINISH GRADE

FOR TRENCH BACKFILL SEE SP–02

MAX ANGLE 45°
PREFERRED MIN 10'
2% MIN SLOPE

FLOW

CURB SEE NOTE 8

ELEVATION

PLAN

CLEAN-OUTS PER AGENCY OF JURISDICTION SEE NOTE 12

LEGEND ON PLANS

(SINDICATE SIZE)

S

4" AND 6" SEWER LATERAL INSTALLATION

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER SS–01
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 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 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 3' SECTION OF PIPE IS REQUIRED BETWEEN FITTINGS
12) SEWER CLEAN-OUT SEE SC-01 TYPE B AS REQUIRED BY AGENCY OF JURISDICTION

LEGEND ON PLANS

S (INDICATE SIZE)
CUT IN WYE CONNECTION

TYPE A

45°

ELEVATION

CUT IN WYE CONNECTION

TYPE B

ELEVATION

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

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45° SADDLE WYE WITH GASKET</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>STAINLESS STEEL HOSE CLAMPS (2–EACH)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>EXISTING SEWER MAIN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CONCRETE ENCASEMENT</td>
<td></td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

4" AND 6" SEWER CUT-IN WYE CONNECTIONS
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

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

2” MANUAL AIR VALVE

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

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
--- | ---
1 | 2" PVC SCH 80 CLOSE NIPPLE & 2—SCH 80 STREET ELLS & INSECT SCREEN
2 | VALVE ENCLOSURE
3 | 2" MIPT x COMPRESSION ADAPTER
4 | 2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE
5 | TRACER WIRE (AS REQUIRED), SEE WP-01
6 | 1/2" x 3" STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)
7 | 4" SDR 35 SEWER PIPE GATE WELL WITH CAP
8 | COLD JOINT STRIP
9 | 3"—6" x 2"—6" x 6" THICK CONCRETE SLAB
10 | 1" PVC CONDUIT FOR TRACER WIRE INSTALLED 2" ABOVE SLAB
11 | 2" x 1/2" BLACK FOAM SLEEVE
12 | 2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
13 | 2" 90° BRONZE COMPRESSION ELL
14 | 2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
15 | 2" COMP BALL VALVE W/ TEE HEAD
16 | 2" 90° BRONZE FIPT x COMP ELL
17 | 2" BRONZE MIPT x MIPT CORPORATION STOP
18 | SIZE x 2" SERVICE SADDLE
19 | WATER MAIN
20 | VALVE STEM EXTENSION, SEE WV-05

SAN DIEGO REGIONAL STANDARD DRAWING

2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
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 5/8” x 3” WITH 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

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4” OR 6” AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE ASSEMBLY</td>
<td>10</td>
<td>CONCRETE THRUST/ANCHOR BLOCK SEE WT–01</td>
</tr>
<tr>
<td>2</td>
<td>BREAK–AWAY BOLTS, SEE NOTE 5</td>
<td>11</td>
<td>4” OR 6” FLG × MJ/PO 90° BEND</td>
</tr>
<tr>
<td>3</td>
<td>4” OR 6” FLANGED 8–BOLT DUCTILE IRON PIPE × REQ’D LENGTH (MAX OF 2 SPOOLs)</td>
<td>12</td>
<td>4” OR 6” C–900 PVC PIPE</td>
</tr>
<tr>
<td>4</td>
<td>5/8” x 3” STAINLESS STEEL DROP–IN ANCHORS (3 EA @ 120° APART)</td>
<td>13</td>
<td>GATE WELL WITH CAP SEE WV–01 OR WV–02</td>
</tr>
<tr>
<td>5</td>
<td>VALVE ENCLOSURE</td>
<td>14</td>
<td>4” OR 6” FLG × MJ/PO/FLG RWGV</td>
</tr>
<tr>
<td>6</td>
<td>TRACER WIRE (AS REQUIRED), SEE WP–01</td>
<td>15</td>
<td>4” OR 6” FLG × MJ/PO ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>7</td>
<td>42” × 42” × 6” THICK CONCRETE SLAB</td>
<td>16</td>
<td>4” OR 6” FLANGE 90° BEND</td>
</tr>
<tr>
<td>8</td>
<td>COLD JOINT STRIP</td>
<td>17</td>
<td>SIZE × 4” OR 6” MJ/PO/FLG × FLG TEE</td>
</tr>
<tr>
<td>9</td>
<td>1” PVC CONDUIT FOR TRACER WIRE INSTALLED 2” ABOVE SLAB</td>
<td>18</td>
<td>WATER MAIN</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

4” & 6” AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E 19246 Date
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 & APPURTTENANCES 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
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

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

SAN DIEGO REGIONAL STANDARD DRAWING

2" BLOW-OFF INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson: R.C.E 19246 Date: 7/26/2012

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 30". 90° BEND SHALL BE USED FOR MAINS IN EXCESS OF 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 17" x 30", SEE NOTE 3         | 9       | 4" OR 6" FLG x MJ/PO 90° BEND                             |
2        | 4" OR 6" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 8 | 10      | 4" OR 6" C–900 PVC PIPE                                   |
3        | 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      | 4" OR 6" FLG x MJ/PO/FLG RWGV                             |
5        | 4" OR 6" FLANGED COMPANION x FIPT                         | 13      | 4" OR 6" FLG x MJ/PO ADAPTER (IF REQUIRED)                |
6        | 3/8" ROCK 4" TO 6" DEEP                                   | 14      | WATER MAIN                                               |
7        | 4" OR 6" FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOL) | 15      | SIZE x 4" OR 6" MJ/PO/FLG x FLG TEE                       |
8        | CONCRETE THRUST BLOCK SEE WT–01                          | 16      | 4" OR 6" FLANGED 45° BEND                                |
         |                                                            | 17      | 4" OR 6" x 24" FLG DI SPOOL                               |

---

SAN DIEGO REGIONAL STANDARD DRAWING

4" & 6" BLOW-OFF INSTALLATION TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

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 30”. 90° BEND
   SHALL BE USED FOR MAINS IN EXCESS OF 30” AS DIRECTED BY
   THE ENGINEER
6) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS
   LIST

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

SAN DIEGO REGIONAL STANDARD DRAWING
4” & 6” BLOW-OFF ASSEMBLIES IN STREET TYPE B

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

SHEET NUMBER WB-03
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

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

SAN DIEGO REGIONAL STANDARD DRAWING

BLOW-OFF INSTALLATION FROM END OF MAINS AND FROM STEEL MAINS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WB-04
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) SET TOP OF METER BOX 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

ITEM | SIZE AND DESCRIPTION                                       | ITEM | SIZE AND DESCRIPTION
-----|-----------------------------------------------------------|-----|-----------------------------------------------------------
1    | POLYMER METER BOX WITH LID 17” x 30”                      | 6    | 2” 90° BRONZE IRON PIPE THREAD BY COMPRESSION ELL
2    | 2” CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 5 |
3    | 1/4” PRESSURE PET COCK                                    | 7    | 2” CLOSE NIPPLE IPT
4    | 2” x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT   | 8    | 2” COMPRESSION x FIPT BALL VALVE WITH HANDLE
5    | CONCRETE THRUST BLOCK SEE WT-01                          | 9    | 3/8” ROCK 6” DEEP
6    |                                                            | 10   | DI END CAP WITH 2.5” FIPT OUTLET
7    |                                                            | 11   | WATER MAIN
8    |                                                            | 12   | NYLON DIELECTRIC BUSHING (2.5” x 2”)

SAN DIEGO REGIONAL STANDARD DRAWING

TEMPORARY 2” BLOW-OFF INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Original   By Approved  Date
-------------   --------  -------
ORIGINAL       Kercheval  12/75
Add Metric     T. Stanton  03/03
Replace W-07   J. Tomason  10/04
Delete Metric  B. Knoll    03/11

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 6” ± 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

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6” FIRE HYDRANT SEE NOTE 2</td>
</tr>
<tr>
<td>2</td>
<td>BREAK-AWAY BOLTS, SEE NOTE 6</td>
</tr>
<tr>
<td>3</td>
<td>4’ x 4’ x 6” THICK CONCRETE SPLASH PAD</td>
</tr>
<tr>
<td>4</td>
<td>6” FLANGE DI HYDRANT EXTENSION SPOOL(S) WITH BREAK OFF GROOVES (MAXIMUM OF 2 SPOOL(S))</td>
</tr>
<tr>
<td>5</td>
<td>6” x 16” LONG RADIUS FLG x MJ/PO BURY ELL</td>
</tr>
<tr>
<td>6</td>
<td>TRACER WIRE ACCESS PORT, 4” x 8” LONG SDR 35 SEWER PIPE W/ CAP (AS-REQUIRED)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>8</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>9</td>
<td>TRACER WIRE (AS REQUIRED) PER WP-01</td>
</tr>
<tr>
<td>10</td>
<td>6” C-900 PVC PIPE</td>
</tr>
<tr>
<td>11</td>
<td>GATE WELL WITH CAP SEE WV-01 OR WV-02</td>
</tr>
<tr>
<td>12</td>
<td>6” FLG x MJ/PO/FLG RWGV</td>
</tr>
<tr>
<td>13</td>
<td>6” FLG x MJ/PO ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>14</td>
<td>SIZE x 6” MJ/PO/FLG x FLG TEE</td>
</tr>
<tr>
<td>15</td>
<td>WATER MAIN</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

6” FIRE HYDRANT INSTALLATION
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) THE NUMBER OF OUTLETS SHALL BE AS SHOWN ON PLANS
3) TOP FLANGE OF BREAK-OFF CHECK VALVE SHALL BE SET WITHIN THE CONCRETE PAD. BREAK OFF GROOVE, MINIMUM OF ONE, SHALL BE PLACED ABOVE THE PAD
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 A307 ZINC-PLATED BOLTS INSTALLED WITH NUTS ON TOP OF THE FLANGE. BREAK AWAY BOLTS SHALL NOT BE USED
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

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>6&quot; FIRE HYDRANT SEE NOTE 2</td>
<td>9</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>2</td>
<td>BOLTS, SEE NOTE 6</td>
<td>10</td>
<td>TRACER WIRE (AS REQUIRED) PER WP-01</td>
</tr>
<tr>
<td>3</td>
<td>4' x 4' x 8&quot; THICK CONCRETE SPLASH PAD</td>
<td>11</td>
<td>6&quot; C-900 PVC PIPE</td>
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<tr>
<td>4</td>
<td>6&quot; BREAK-OFF CHECK VALVE</td>
<td>12</td>
<td>GATE WELL WITH CAP SEE WV-01 OR WV-02</td>
</tr>
<tr>
<td>5</td>
<td>6&quot; FLANGE DI SPOOL(S) (MAXIMUM OF 2 SPOOLS) NO GROOVES</td>
<td>13</td>
<td>6&quot; FLG x MJ/PO/FLG RWGV</td>
</tr>
<tr>
<td>6</td>
<td>6&quot; x 16&quot; LONG RADIUS FLG x MJ/PO BURY ELL</td>
<td>14</td>
<td>6&quot; FLG x MJ/PO ADAPTER (IF REQUIRED)</td>
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<tr>
<td>7</td>
<td>CONCRETE THRUST BLOCK SEE WT-01</td>
<td>15</td>
<td>SIZE x 6&quot; MJ/PO/FLG x FLG TEE</td>
</tr>
<tr>
<td>8</td>
<td>TRACER WIRE ACCESS PORT, 4&quot; x 8&quot; LONG SDR 35 SEWER PIPE W/ CAP (AS-REQUIRED)</td>
<td>16</td>
<td>WATER MAIN</td>
</tr>
</tbody>
</table>

Revision:  By: Approved: Date:  
ORIGINAL: Kercheval 12/75  
Add Metric: T. Stanton 03/03  
Replaced W-10: J. Tornasulu 10/04  
Delete Metric: B. Knoll 03/11  

SAN DIEGO REGIONAL STANDARD DRAWING  
6" FIRE HYDRANT INSTALLATION WITH BREAK-OFF CHECK VALVE  
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  
Chairperson R.C.E. 19246 Date: 
DRAWING NUMBER: WF-02
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
FOR NOTES REGARDING THE INSTALLATION OF
FIRE SERVICES SEE WF-05 SHEET 2 OF 2

LEGEND ON PLANS

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

4" AND LARGER FIRE SERVICE INSTALLATION

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

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 DIAPHRAGM AND THE CONCRETE SLAB OR FINISH GRADE IS 12" MINIMUM AND 24" MAXIMUM
7) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° BEND WHEN SYSTEM STATIC PRESSURE EXCEEDS 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 RESPONSIBILITY 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
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 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.
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 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 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)
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:

<table>
<thead>
<tr>
<th>NOMINAL PIPE INSIDE DIAMETER</th>
<th>MINIMUM DISTANCE</th>
<th>MAXIMUM DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; &amp; SMALLER</td>
<td>18&quot;</td>
<td>28&quot;</td>
</tr>
<tr>
<td>6&quot; &amp; 8&quot;</td>
<td>24&quot;</td>
<td>32&quot;</td>
</tr>
<tr>
<td>10&quot; &amp; 12&quot;</td>
<td>28&quot;</td>
<td>36&quot;</td>
</tr>
<tr>
<td>16&quot; THRU 36&quot;</td>
<td>OD PLUS 24&quot;</td>
<td>OD PLUS 36&quot;</td>
</tr>
</tbody>
</table>
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) WATER AND RECYCLED WATER MAINS AND SEWER LATERALS 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 200’ OR AS DIRECTED BY THE ENGINEER
4) EXISTING MAINS 16” AND LARGER REQUIRE THE ENTIRE LENGTH OF THE PIPE TO BE FILLED WITH 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
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 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) 4” GUNITE BLANKET WITH 6” SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION

LEGEND ON PLANS

SLOPE PROTECTION INSTALLATIONS

SAN DIEGO REGIONAL STANDARD DRAWING

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 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

SAN DIEGO REGIONAL STANDARD DRAWING

CUT-OFF WALL INSTALLATION IN TRAVELED AREAS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WP-07
NOTES:
1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
2) ENCASEMEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH
   (24" MIN, 48" MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH).
3) CONCRETE ENCASEMEMENT 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.
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 18"
7) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90°
   ELL WHEN SYSTEM PRESSURE EXCEEDS 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

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</thead>
<tbody>
<tr>
<td>1</td>
<td>METER BOX &amp; METER ASSEMBLY SEE WS-01 &amp; WS-02</td>
<td>6</td>
<td>BRASS OR COPPER PIPE SEE NOTE 5</td>
</tr>
<tr>
<td>2</td>
<td>SCH 80 PVC, BRASS OR COPPER PIPE</td>
<td>7</td>
<td>3&quot; LONG NIPPLE SEE NOTE 5</td>
</tr>
<tr>
<td>3</td>
<td>CONCRETE THRUST BLOCK SEE WT-01</td>
<td>8</td>
<td>BALL VALVE &quot;SHUT-OFF&quot;</td>
</tr>
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<td>4</td>
<td>90° ELL SEE NOTES 5 &amp; 7</td>
<td>9</td>
<td>REDUCED PRESSURE BACKFLOW DEVICE</td>
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<tr>
<td>5</td>
<td>CONCRETE SLAB, MINIMUM 4&quot; THICK x 18&quot; WIDE</td>
<td>10</td>
<td>ENCLOSURE (OPTIONAL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>UNION SEE NOTE 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>ANGLE PRV SEE NOTES 5 &amp; 7</td>
</tr>
</tbody>
</table>

SAnt AND Diego REGIONAL STANDARDS DRAWING

3/4" THRU 2" REDUCED PRESSURE
BACKFLOW PREVENTION DEVICE

REVISED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WR-01
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) INSTALL A CASING ENCAsted IN CONCRETE WHEN the DISTANCE BETWEEN THE METER BOX and THE RISER TO THE BPD EXCEEDS 18"
6) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI PER AGENCY SPECIFICATIONS
7) TESTING shall BE CONDUCTED IN ACCORDANCE WITH AGENCY SPECIFICATIONS PRIOR TO ACCEPTANCE
8) BPD & APPURtenances INSTALLED FOR THE USE OF RECYCLED WATER shall BE IDENTIFIED as DESCRIBED IN AGENCY SPECIFICATIONS
9) MATERIALS shall BE SELECTED FROM the AGENCY'S APPROVED MATERIALS LIST

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<tbody>
<tr>
<td>1</td>
<td>METER VAULT &amp; METER ASSEMBLY SEE WS-04</td>
<td>7</td>
<td>FLANGED RESILIENT WEDGE GATE VALVE</td>
</tr>
<tr>
<td>2</td>
<td>PVC OR DUCTILE IRON PIPE</td>
<td>8</td>
<td>REDUCED PRESSURE BACKFLOW DEVICE</td>
</tr>
<tr>
<td>3</td>
<td>FLG x FLG OR MJ/PO x FLG 90° BEND</td>
<td>9</td>
<td>ENCLOSURE (OPTIONAL)</td>
</tr>
<tr>
<td>4</td>
<td>CONCRETE THRUST BLOCK SEE WT-01</td>
<td>10</td>
<td>ADJUSTABLE VALVE SUPPORT</td>
</tr>
<tr>
<td>5</td>
<td>FLANGED DUCTILE IRON PIPE</td>
<td>11</td>
<td>CONCRETE SLAB, MINIMUM 4” THICK x 36” WIDE</td>
</tr>
<tr>
<td>6</td>
<td>FLANGED 90° BEND, SEE NOTE 6</td>
<td>12</td>
<td>FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 6</td>
</tr>
</tbody>
</table>

SANDIego REGIONAL STANDARD DRAWING

3" AND LARGER REDUCED PRESSURE BACKFLOW PREVENTION DEVICE

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WR-02
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

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
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<td>1</td>
<td>WATER MAIN</td>
<td>7</td>
<td>WATER METER FURNISHED &amp; INSTALLED BY THE WATER AGENCY OF JURISDICTION</td>
</tr>
<tr>
<td>2</td>
<td>1&quot; BRONZE CORPORATION STOP</td>
<td>8</td>
<td>METER BOX WITH LID, 10&quot; x 20&quot;</td>
</tr>
<tr>
<td>3</td>
<td>SIZE x 1&quot; SERVICE SADDLE</td>
<td>9</td>
<td>CUSTOMER SHUT–OFF VALVE (LOCKABLE) FURNISHED AND INSTALLED BY THE WATER AGENCY OF JURISDICTION</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; SOFT</td>
<td>10</td>
<td>3/8&quot; ROCK, 4&quot; TO 6&quot; DEEP</td>
</tr>
<tr>
<td>5</td>
<td>1&quot; BRONZE ANGLE METER STOP WITH LOCKWING</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>TRACER WIRE (AS REQUIRED), SEE WP–01</td>
<td></td>
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</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING
1" WATER SERVICE INSTALLATION

Chairperson R.C.E. 19246 Date
DEPTH OF MAIN
SEE WP-02

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

ITEM
NO
1
2
3
4
5
6
7
8
9
10
11
12

SIZE AND DESCRIPTION
SIZE x 2" SERVICE SADDLE
WATER MAIN
2" BRONZE CORPORATION STOP
2" x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT/RIGID OR UNLESS OTHERWISE
SPECIFIED BY AGENCY OF JURISDICTION
2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
2" BRONZE COMPRESSION ELL
3/8" ROCK, 4" TO 6" DEEP
2" BRONZE ANGLE METER STOP WITH
LOCKWING
TRACER WIRE (AS REQUIRED), SEE WP-01
WATER METER FURNISHED AND INSTALLED
BY THE WATER AGENCY OF JURISDICTION
METER BOX WITH LID, 17"x 30"
CUSTOMER SHUT-OFF VALVE (LOCKABLE)

SAN DIEGO REGIONAL STANDARD DRAWING

2" WATER SERVICE INSTALLATION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E 19246 Date

DRAWING NUMBER WS-02

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Replace W-02 J. Tornaudo 10/04
Delete Metric B. KNOLL 05/11
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) STAMP OR CHISEL A 2" HIGH 'W' IN CURB FACE TO IDENTIFY POTABLE WATER SERVICE LOCATION
3) STAMP OR CHISEL A 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 9" BETWEEN BOXES
6) METER BOX SHALL BE INSTALLED 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
JOINT RESTRAINT REQUIRED TO THE MAIN LINE SEE NOTE 5

PLAN VIEW

4" TYP ALL AROUND

JOINT RESTRAINT REQUIRED TO THE RP DEVICE SEE NOTE 5

SECTION

4" OR 6" FIRELINE/MASTER METER INSTALLATION

FOR MATERIAL DESCRIPTIONS AND NOTES SEE WS-04 (2 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) 8" OR 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) 4" METER REQUIRE A 48" x 60" VAULT 6" METER REQUIRE A 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

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tr>
<td>1</td>
<td>2&quot; x REQUIRED LENGTH TYPE &quot;K&quot; COPPER PIPE</td>
<td>11</td>
<td>FRP VAULT WITH HINGED ACCESS DOOR, SEE NOTE 7</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; BRONZE CORPORATION STOP</td>
<td>12</td>
<td>12&quot; DIAMETER x 6&quot; LONG PVC PIPE</td>
</tr>
<tr>
<td>3</td>
<td>LINE SIZE x 2&quot; SERVICE SADDLE</td>
<td>13</td>
<td>2&quot; 90° COMPRESSION ELL (TYPICAL)</td>
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<tr>
<td>4</td>
<td>4&quot; OR 6&quot; PVC PIPE</td>
<td>14</td>
<td>LINE SIZE x 24&quot; LONG FLANGED DUCTILE-IRON SPOOL</td>
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<td>5</td>
<td>4&quot; OR 6&quot; FLG x MJ RWGV MECHANICALLY RESTRAINED, SEE NOTE 5</td>
<td>15</td>
<td>8&quot; GATE WELL, SEE WV-01 &amp; WV-02</td>
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<tr>
<td>6</td>
<td>LINE SIZE x 6&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
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<td>HINGED VAULT ACCESS DOOR</td>
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<td>7</td>
<td>2&quot; COMPRESSION, LOCKABLE BALL VALVE</td>
<td>17</td>
<td>ADJUSTABLE PIPE SUPPORT (TYPICAL)</td>
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<tr>
<td>8</td>
<td>4&quot; OR 6&quot; FLEXIBLE COUPLING</td>
<td>18</td>
<td>6&quot; CLASS &quot;B&quot; CONCRETE FLOOR WITH #3 BARS @ 12&quot; C.C.</td>
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<td>9</td>
<td>LINE SIZE x 30&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>19</td>
<td>6&quot; DG BASE COMPACTED TO 90%</td>
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<td>10</td>
<td>4&quot; OR 6&quot; FIRELINE METER SEE NOTE 6</td>
<td>20</td>
<td>12&quot; DIAMETER x 12&quot; DEEP, 2&quot; GRAVEL SUMP, SEE NOTE 8</td>
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Revision By Approved Date
ORIGINAL J. Tamasula 10/04
Delete Metric M 3 B. KNOLL 03/11

SAN DIEGO REGIONAL STANDARD DRAWING

4" OR 6" FIRELINE/MASTER METER INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WS-04 (2 OF 2)
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
**NOTES:**

1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE

2) BEARING AREA BASED ON SOIL BEARING VALUE OF 1500 PSF AND 225 PSI LINE PRESSURE AND A MINIMUM OF 36" COVER
   FOR BEARING = 1000 PSF, 1.5 x AREA SHOWN
   FOR BEARING = 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 ACCESSIBLE 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)
TEE WITH GATE VALVES

24" MIN. TYPICAL

TEE WITH BUTTERFLY VALVES ON MAIN

GATE WELL TYPICAL
SEE WV-01 & WV-02

EDGE OF TRENCH
TYPICAL

MASONRY SUPPORT
BLOCKS, TYPICAL
WITH REDWOOD
WEDGES AS REQ'D

TEE WITH BUTTERFLY VALVES

BUTTERFLY
VALVE (TYP)

ACTUATOR
TYPICAL

SAND BAGS
TYPICAL

BEARING
AREA "A" (TYP)

BEARING
AREA "B"
TYPICAL

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

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE THRUST AND ANCHOR BLOCK
INSTALLATIONS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19245 Date
DRAWING NUMBER WT-01 (3 OF 3)
GATE WELL (GATE VALVES)

GATE WELL (BUTTERFLY VALVES)

WATER MAIN
STREET CL
BFV TYPICAL
SEE NOTE 4 & 5
BFV OPERATOR POSITION

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) VALVES DEEPER THAN 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 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
---|---
1 | GATE WELL WITH CAP SEE NOTE 7
2 | 6" HIGH x 6" WIDE COMPACTED ASPHALT—CONCRETE RING
3 | VALVE STEM EXTENSION SEE NOTES 2 & 3

ITEM NO | SIZE AND DESCRIPTION
---|---
4 | 8" PVC CL 200, C-900 PIPE x REQUIRED LENGTH GATE WELL SEE NOTE 7
5 | BUTTERFLY VALVE
6 | RESILIENT WEDGE GATE VALVE
7 | WATER MAIN

SAN DIEGO REGIONAL STANDARD DRAWING

GATE WELL CAP INSTALLATION, FOR VALVES 4" AND LARGER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WV-01
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) VALVES DEEPER THAN 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 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) GATE WELL TYPE AS APPROVED BY AGENCY
10) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS
     LIST

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<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
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<td>GATE WELL WITH CAP SEE NOTE 7</td>
<td>4</td>
<td>VALVE STEM EXTENSION SEE NOTES 2 &amp; 3</td>
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<tr>
<td>2</td>
<td>6” HIGH x 6” WIDE COMPACTED ASPHALT—CONCRETE RING</td>
<td>5</td>
<td>8” PVC CL 200, C=900 PIPE x REQUIRED</td>
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<tr>
<td>3</td>
<td>CAULDER COUPLING</td>
<td>6</td>
<td>LENGTH GATE WELL SEE NOTE 7</td>
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<td>6” PVC CL 200, C=900 PIPE x REQUIRED</td>
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<td></td>
<td></td>
<td>LENGTH GATE WELL SEE NOTE 7</td>
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SAN DIEGO REGIONAL STANDARD DRAWING

GATE WELL CAP & CAN INSTALLATION, FOR VALVES 4” AND LARGER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WV-02

Chairperson R.C.E 19246 Date
GATE WELL LIDS
SEE NOTE 2 BELOW

GATE WELL LID COLORS
SEE NOTE 5 BELOW

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<th>COLOR</th>
<th>GATE WELL LIDS USED FOR:</th>
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<tr>
<td>RED</td>
<td>NORMALLY CLOSED SYSTEM VALVES (NCV)</td>
</tr>
<tr>
<td>PURPLE</td>
<td>RECYCLED WATER VALVES: LINE VALVES &amp; AIR VALVES</td>
</tr>
<tr>
<td>YELLOW</td>
<td>POTABLE WATER VALVES: LINE VALVES, FIRE SERVICES, &amp; AIR VALVES</td>
</tr>
<tr>
<td>WHITE</td>
<td>FIRE HYDRANTS</td>
</tr>
</tbody>
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<tr>
<th>COLOR</th>
<th>GATE WELL AND LIDS USED FOR:</th>
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<tr>
<td>RED</td>
<td>NORMALLY CLOSED SYSTEM VALVES (NCV)</td>
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<tr>
<td>WHITE</td>
<td>RESILIENT WEDGE GATE VALVES</td>
</tr>
<tr>
<td>GREEN</td>
<td>BUTTERFLY VALVES</td>
</tr>
</tbody>
</table>

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 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
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 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 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
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 5’ AND 2” AIR VALVES REQUIRE A VALVE STEM EXTENSION OR ASREQUIRED 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

STEEL VALVE STEM EXTENSION FOR VALVES 2” AND SMALLER

SANDIEGO REGIONAL STANDARD DRAWING

DRAWING NUMBER WV-05

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
APPENDIX "A"

TRAFFIC CONTROL PLANS
San Diego Regional Standards traffic control plans are compiled by utilizing previously developed and State approved Traffic Control Plans created by both the 2010 California Manual on Uniform Traffic Control Devices (CA MUTCD) and the 2010 California Joint Utilities Traffic Control Manual (CJUTCM). Their consistent commitment to safe and effective temporary traffic control are reflected in the Traffic Control Plans contained in this section.

Part 6 of the CA MUTCD manual "Temporary Traffic Control" is published by the Federal Highway Administration. The CJUTCM is prepared by a panel representing California utilities, whose work routinely impacts the Public Right of Way. Both manuals have been approved by the California Department of Transportation (Caltrans). These manuals in combination are issued to provide the basic standard for the uniform types of warning devices, lights, and other temporary traffic control devices. Various city and county codes may need to be approved by the public agency or authority having jurisdiction over the roadway. The text and typical drawings contained in this chapter are meant to guide the reader in understanding the typical application drawings found in this chapter.

The purpose of this chapter is to be a resource for municipalities and jurisdictions to refer others as well as their own crews who need to erect temporary traffic control. The typical application drawings found in this chapter can be used by any individual, utility, or contractor who needs to provide temporary traffic control to complete their work. Before work begins, traffic control plans addressing vehicle, bike, and pedestrian traffic through a construction zone may need to be approved by the public agency or authority having jurisdiction over the roadway. Nothing contained in this chapter shall prevent local jurisdictions from modifying, changing, or adopting new specifications they deem necessary. The text and typical drawings in this chapter are not legal standards. Criteria for position, location, and use of traffic control devices for the protection of the traveling public and workers. It is the responsibility of the Contractor or Organization performing work on or adjacent to a roadway to install and maintain the proper temporary control devices which are necessary to provide safety for both the traveling public and the workers.

Reference of the California Vehicle Code.

Upon a street or highway must do so safely in accordance with sections 21367 and 21400 of the California Vehicle Code. The text of the California Vehicle Code is published by the Federal Highway Administration. The CJUTCM is prepared by a panel representing California utilities, whose work routinely impacts the Public Right of Way. Both manuals have been approved by the California Department of Transportation (Caltrans), The MUTCD Manual of Uniform Traffic Control Devices (MUTCD) and the 2010 California Joint Utilities Traffic Control Manual (CJUTCM) are referenced in this section.

The text and typical drawings found in this chapter can be used by any individual, utility, or contractor who needs to provide temporary traffic control to complete their work. Before work begins, traffic control plans addressing vehicle, bike, and pedestrian traffic through a construction zone may need to be approved by the public agency or authority having jurisdiction over the roadway. Nothing contained in this chapter shall prevent local jurisdictions from modifying, changing, or adopting new specifications they deem necessary. The text and typical drawings contained in this chapter are not legal standards. Criteria for position, location, and use of traffic control devices are furnished solely for the purpose of guidance and information to assist in the preparation of temporary traffic control plans.
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<td>TCP-53</td>
<td>Sidewalk - Sidewalk closed &amp; shift to parking area</td>
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<tr>
<td>TCP-52</td>
<td>Sidewalk - Sidewalk closed 1/2 block w/mid block crossing</td>
</tr>
<tr>
<td>TCP-51</td>
<td>Center of Road - Full Street Closure - 2 directions</td>
</tr>
<tr>
<td>TCP-50</td>
<td>Center of Road - Full Street Closure - 1 way</td>
</tr>
<tr>
<td>TCP-49</td>
<td>Side of Road - Half Street Closed (2 of 2)</td>
</tr>
<tr>
<td>TCP-48A</td>
<td>Side of Road - Half Street Closed (1 of 2)</td>
</tr>
<tr>
<td>TCP-47A</td>
<td>Intersection - Multi-lane Right Turn Lanes closed</td>
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<td>TCP-47B</td>
<td>Center of Road - Multi-lane Right/Left Lanes closed</td>
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<tr>
<td>TCP-46</td>
<td>Center of Road - Multi-lane Right/Left Lanes closed</td>
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<td>TCP-45</td>
<td>Center of Road - Multi-lane Left and Center Lanes closed</td>
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<td>Center of Road - Multi-lane Right/Left Lanes closed One Way</td>
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<td>Center of Road - Multi-lane Left Turn Lanes closed</td>
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<td>Center of Road - Multi-lane Right/Left Turn Lanes</td>
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<td>Center of Road - Right/Left Turn</td>
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<td>Side of Road - Multi-lane Reduced Right Turn Lanes</td>
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<td>Side of Road - Multi-lane 1 Right Lane closed</td>
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<td>TCP-2</td>
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<tr>
<td>TCP-1</td>
<td>TCP-0</td>
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</tbody>
</table>

**Table of Contents**

**Traffic Control Plans**
### TAPER LENGTH AND CONE SPACING TABLE

#### NOTES:
- **A** = Buffered Approach Distance (ft) = Table 1 (Min. Distance) + Approach Speed (MPH) x Table 1 (Min. Speed) – Table 1 (Min. Cone Spacing)
- **B** = Table 2 (Min. Cone Spacing) + 20 ft
- **C** = Table 2 (Min. Cone Spacing) + 60 ft

### TABLE 2

<table>
<thead>
<tr>
<th>Taper Length (ft)</th>
<th>Approach Speed (MPH)</th>
<th>L, Taper Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3L for Shoulder Taper</td>
<td>1/2L for Shoulder Taper</td>
<td>1L for Merge Taper</td>
</tr>
<tr>
<td>220</td>
<td>660</td>
<td>30</td>
</tr>
<tr>
<td>300</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>410</td>
<td>720</td>
<td>45</td>
</tr>
<tr>
<td>320</td>
<td>760</td>
<td>50</td>
</tr>
<tr>
<td>280</td>
<td>820</td>
<td>45</td>
</tr>
<tr>
<td>245</td>
<td>900</td>
<td>35</td>
</tr>
<tr>
<td>192</td>
<td>960</td>
<td>30</td>
</tr>
<tr>
<td>142</td>
<td>1000</td>
<td>25</td>
</tr>
</tbody>
</table>

#### TABLE 1

<table>
<thead>
<tr>
<th>Taper Length (ft)</th>
<th>Max. Cone Spacing (ft)</th>
<th>Approach Speed (MPH)</th>
<th>L, Taper Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>55+</td>
<td>49</td>
<td>660</td>
<td>30</td>
</tr>
<tr>
<td>55</td>
<td>44</td>
<td>400</td>
<td>50</td>
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<td>300</td>
<td>45</td>
</tr>
<tr>
<td>50</td>
<td>40</td>
<td>200</td>
<td>40</td>
</tr>
<tr>
<td>45</td>
<td>40</td>
<td>100</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>35</td>
<td>40</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

**NAME**

**DATE**

**DRAWING NUMBER**

**REQUESTED BY**

**APPROVED DATE**

**PREPARED BY**

**COORDINATION**

**DATE**

**DRAWING REVISION**

**DRAWING NUMBER**

**DATE**

**DRAWING REVISION**

**DRAWING NUMBER**

**DATE**

**DRAWING REVISION**
RAISED OR PAINTED MEDIAN

W20-1 h W20-5 (LT) W4-2 L h
MERGING TAPER L
SEE TABLE 1-B

W4-2 L h
BUFFER
SEE TABLE 1-C
SEE TABLE 2-B
INSTALL TEMP NO PARKING SIGNS
POST PRIOR TO START OF WORK
(AS REQUIRED)

ROAD WORK AHEAD

LEFT LANE CLOSED AHEAD

NO. OF LANES

LANE CLOSED

END ROAD WORK

W1-8 (RT)
G20-2

LEGEND

• CONE ↔ BARRICADE □ FLAGGER □ SIGN □ FLASHING ARROW SIGN □ WORK AREA → TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

__________________________________________________________

__________________________________________________________

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. The plan MAY NOT apply to signalized or multi-way stop intersections. Consult the local jurisdiction when preparing Traffic Control Plans near these intersections. The plan MAY NOT apply when the work area affects bike lanes, sidewalks pedestrian access and curved or narrow roadways. Consult the approving agency when preparing the Traffic Control Plan for 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.

TCP is required for all Traffic Control Plans.

SUBMITTED BY:
NAME ________________________________
COMPANY ________________________________
ADDRESS ________________________________
PHONE ________________________________
### SAN DIEGO REGIONAL STANDARD DRAWING

**MULTILANE LEFT TRAFFIC LANE CLOSURE - THREE LANES**

**CENTER OF ROAD WORK AREA**

---

**LEGEND**

- **CONE**
- **BARRICADE**
- **FLAGGER**
- **SIGN**
- **FLASHING ARROW SIGN**
- **WORK AREA**
- **TRAFFIC DIRECTION**

---

**AGENCY ENGINEER’S COMMENTS**

---

**SUBMITTED BY:**
- **NAME**
- **COMPANY**
- **ADDRESS**
- **PHONE**

---

**APPLICANT USE**
- **AGENCY USE**

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT</th>
<th>APPROACH SPEED</th>
<th>TAPER LENGTH</th>
<th>SPACING OF CONES</th>
<th>SIGN SPACING</th>
</tr>
</thead>
</table>

---

**GENERAL NOTES**

For hours of darkness, change cones to vertical barricades with steady burn lights. This plan MAY 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 curbed or narrow roadways. Consult the approving agency when preparing the Traffic Control Plans for these areas.

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TCP is required for all Traffic Control Plans.
LEGEND

- CONE  - BARRICADE  - FLAGGER  - SIGN  - FLASHING ARROW SIGN  - WORK AREA  - TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

GENERAL NOTES

For hours of darkness, change cones to vertical barricades with steady burn lights.  This plan MAY 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 Plans or these areas.

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TCP is required for all Traffic Control Plans.

SUBMITTED BY:
NAME__________________________
COMPANY______________________
ADDRESS______________________
PHONE________________________
MULTILANE MIDDLE INTERSECTION WEATHERING 

SAN DIEGO REGIONAL STANDARD DRAWING 

CENTER OF ROAD WORK AREA 

LEGEND 
- CONE 
- BARRICADE 
- FLAGGER 
- SIGN 
- FLASHING ARROW SIGN 
- WORK AREA 
- TRAFFIC DIRECTION 

AGENCY ENGINEER'S COMMENTS 

APPLICANT USE 

POSTED SPEED LIMIT APPROACH SPEED TAPER LENGTH SPACING CONES SIGN SPACING 

GENERAL NOTES 
For hours of darkness, change cones to vertical barricades with steady burn lights. 
This plan MAY 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 curbed or narrow roadways. Consult the approving agency 
when preparing the Traffic Control Plans 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. 
TCP is required for all Traffic Control Plans. 

SUBMITTED BY: 
NAME 
COMPANY 
ADDRESS 
PHONE 

APPLICANT USE 

AGENCY USE 

GENERAL NOTES 

Revision 
Revised by: 
Date: 

2/11
RIGHT TURN MOVES MAY BE RESTRICTED

LEGEND

- CONE  + BARRICADE  - FLAGGER  - SHINE  - FLASHING ARROW SIGN  - WORK AREA  - TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

SUBMITTED BY:
NAME
COMPANY
ADDRESS
PHONE

APPLICANT USE

GENERAL NOTES

For hours of darkness, change cones to vertical barricades with steady burn lights. This plan MAY 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 curbed or narrow roadways. Consult the approving agency when preparing the Traffic Control Plans or these areas.

NOTHING CONTAINED IN THIS DRAWING SHALL PREVENT LOCAL JURISDICATION 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.

TCP IS REQUIRED FOR ALL TRAFFIC CONTROL PLANS.
USE TCP-10A FOR TRAFFIC CONTROL ON THIS LEG

*T RIGHT TURN MOVES MAY BE RESTRICTED

TAPER CONE ARRANGEMENT AS MUCH AS SPACE ALLOWS

LEGEND
- Cone
- Barricade
- Flagger
- Sign
- Flashing Arrow Sign
- Work Area
- Traffic Direction

AGENCY ENGINEER'S COMMENTS

GENERAL NOTES
For hours of darkness, change cones to vertical barricades with steady burn lights. This plan MAY 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, and pedestrian access and curbed or narrow roadways. Consult the approving agency when preparing the Traffic Control Plans for these areas.

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TCP is required for all Traffic Control Plans.
LEGEND

- CONE
- BARRICADE
- FLAGGER
- SIGN
- FLASHING ARROW SIGN
- WORK AREA
- TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

GENERAL NOTES

For hours of darkness, change cones to vertical barricades with steady burn lights. This plan may 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, sidewalk pedestrian access and curved or narrow roadways. Consult the approving agency when preparing the Traffic Control Plans in 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 the implementation of Traffic Control Plans.

TCP is required for all Traffic Control Plans.
RAMP TO BE USED FOR ADA ACCESS WHERE REQUIRED

LEGEND
- CONE  ↔ BARRICADE  🟣 FLAGGER  □ SIGN  🟢 FLASHING ARROW SIGN  🟦 WORK AREA  → TRAFFIC DIRECTION

AGENCY ENGINEER'S COMMENTS

SUBMITTED BY:
NAME
COMPANY
ADDRESS
PHONE

APPLICANT USE
AGENCY USE

POSTED SPEED LIMIT  APPROACH SPEED  TAPER LENGTH  SPACING OF CONES  SIGN SPACING

GENERAL NOTES
For hours of darkness, change comes to vertical barricades with steady burn lights. This plan MAY 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, sidewalk pedestrian access and curbed or narrow roadways. Consult the approving agency when preparing the Traffic Control Plans in these areas.

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TCP-53 is required for all Traffic Control Plans.
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