Standard Drawings for Public Works Construction
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INTRODUCTION

This volume combines some of the San Diego Area Regional Standard Drawings, as developed by the San Diego Regional Standards Committee, with those additional standard drawings which are unique to public work construction in the City of San Diego. The additional drawings can easily be distinguished by their drawing numbers which contain the letters “SD” and are numbered beginning with 100. Drawings marked with (*) in the revision column are regional drawings that have been modified to City standards.

These drawings shall be used in conjunction with the latest edition of the Standard Specifications for Public work Construction (i.e., “The GREENBOOK”) and the accompanying City Supplement included in the City’s Standard Specifications for Public Works Construction (i.e., “The WHITEBOOK”).

The City of San Diego Standard Drawings is usually published every 3 years. However, updates approved for use are posted on the City Website as they become available.

Materials shown on these drawings shall be as specified in the Specifications or the City of San Diego Approved Materials List (AML). If not, a prior approval by the Engineer is required.

These drawings are not to scale and may have not been checked for conformance with the latest California Building Code (CBC) and other safety and environmental statutes. Therefore, they must be used with care and judgment.

COMMENTS

The City of San Diego is committed to the quality of this publication and desires to correct any errors, omissions or ambiguities. If you have any comments e.g., corrections or additions you would like to submit for consideration to be included in the next publication, you are encouraged to submit them to:

Standards & Specification Engineer
Engineering & Capital Projects Department
1010 Second Avenue, Suite 1200, M.S. 612
San Diego, CA 92101

or

specifications@sandiego.gov
The abbreviations herein, together with others in general use, are applicable to these Standard Drawings.

### Abbreviation Word or Words

<table>
<thead>
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<th>Abbreviation</th>
<th>Word or Words</th>
<th>Abbreviation</th>
<th>Word or Words</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Acrylonitrile - butadiene - styrene</td>
<td>HEX</td>
<td>Hexagonal</td>
</tr>
<tr>
<td>AC</td>
<td>Asphalt Concrete</td>
<td>HORIZ</td>
<td>Horizontal</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
<td>HT</td>
<td>Height</td>
</tr>
<tr>
<td>ACP</td>
<td>Asbestos cement pipe</td>
<td>ID</td>
<td>Inside diameter or Identification</td>
</tr>
<tr>
<td>ADA</td>
<td>Americans with Disabilities Act Standards</td>
<td>JT</td>
<td>Joint</td>
</tr>
<tr>
<td>ADAS</td>
<td>Americans with Disabilities Act</td>
<td>LAP</td>
<td>Overlap</td>
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<tr>
<td>AGG</td>
<td>Aggregates</td>
<td>LOL</td>
<td>Layout line</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
<td>MAX</td>
<td>Maximum</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil engineers</td>
<td>MJ</td>
<td>Mechanical Joint</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
<td>MIN</td>
<td>Minimum</td>
</tr>
<tr>
<td>AWWA</td>
<td>American Water Work Association</td>
<td>MVL</td>
<td>Mercury vapor light</td>
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<tr>
<td>CAL/OSHA</td>
<td>California Occupational Association</td>
<td>OC</td>
<td>On center</td>
</tr>
<tr>
<td>CalTrans</td>
<td>California Department of Transportation</td>
<td>OD</td>
<td>Outside diameter</td>
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<tr>
<td>CATV</td>
<td>Cable/TV</td>
<td>PC</td>
<td>Point of curvature</td>
</tr>
<tr>
<td>CC</td>
<td>Calcium Chloride</td>
<td>PCC</td>
<td>Portland cement concrete</td>
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<td>C/C</td>
<td>Center to center</td>
<td>PCC</td>
<td>Point of compound curvature</td>
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<tr>
<td>CF</td>
<td>Cubic foot</td>
<td>PCR</td>
<td>Point of curb return</td>
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<tr>
<td>CFS</td>
<td>Cubic foot per second</td>
<td>PL</td>
<td>Property line or Place</td>
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<td>CL</td>
<td>Center line</td>
<td>PO</td>
<td>Push on</td>
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<td>CL R</td>
<td>Clear</td>
<td>R/W</td>
<td>Right-of-way, Recycled water</td>
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<tr>
<td>CLSM</td>
<td>Controlled low strength material</td>
<td>REINF</td>
<td>Reinforced or reinforcement</td>
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<tr>
<td>CONC</td>
<td>Concrete</td>
<td>RWGV</td>
<td>Resilient wedge gate valve</td>
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<tr>
<td>CONST</td>
<td>Construct, Construction</td>
<td>RW</td>
<td>Recycled water</td>
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<td>CSP</td>
<td>Corrugated steel pipe</td>
<td>S</td>
<td>Slope or second</td>
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<td>Cement treated base</td>
<td>SCRW</td>
<td>Steel cylinder rod wrapped</td>
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<td>CV</td>
<td>Check valve</td>
<td>SD</td>
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<td>Cubic yard</td>
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<td>Sand Equivalent</td>
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<tr>
<td>D</td>
<td>Diameter or Load of pipe</td>
<td>SI</td>
<td>International System of Units (Metric)</td>
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<td>Sqft</td>
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<td>Fahrenheit or Flange</td>
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<td>Finished grade</td>
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<td>GFI</td>
<td>Ground Fault Interrupter</td>
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Symbols

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<td>′</td>
<td>Feet or minutes</td>
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<td>″</td>
<td>Inches or seconds</td>
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NOTE:
SUBGRADE SHALL BE LOWEST SUBGRADE AS DEFINED IN THE STANDARD SPECIFICATIONS.

TOP LIMIT OF STRUCTURE EXCAVATION AND BACKFILL IS ORIGINAL GROUND IF CHANNEL IN NOT EXCAVATED.

MONOLITHIC CONCRETE SLOPE PAVING: RIPRAP
EMBANKMENT IN PLACE BEFORE STRUCTURE EXCAVATION IS MADE

CONCRETE SLOPE PAVING

ELEVATION

SECTION A-A

SECTION B-B

GROUND SURFACE AT TIME STRUCTURE EXCAVATION IS MADE

SECTION C-C

SECTION D-D

BRIDGE ABUTMENTS & ADJOINING WING WALLS

LEGEND

STRUCTURE EXCAVATION
STRUCTURE BACKFILL
DITCH & CHANNEL EXCAVATION
ROADWAY BACKFILL
ROADWAY EMBANKMENT

NOTE:
SUBGRADE SHALL BE LOWEST SUBGRADE AS DEFINED IN THE STANDARD SPECIFICATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.G.E. 85271 DATE: 1/31/2012

DRAWING NUMBER: SDC-103

CITY OF SAN DIEGO - STANDARD DRAWING

STRUCTURE EXCAVATION & BACKFILL
FOR RETAINING WALL (6' MAXIMUM HEIGHT) / LEVEL BACKFILL, REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION BULLETIN NO. 221. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)

FOR RETAINING WALL (5' MAXIMUM HEIGHT) / SLOPING BACKFILL, REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION BULLETIN NO. 222. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)

FOR MASONRY FENCES (6' MAXIMUM HEIGHT), REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION BULLETIN NO. 223. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)
**TYPE-A WALL**
(Applicable for all types of backfill loadings)

- 1-1/2: 1 Slope Unlimited
- OR
- 610mm (2') Level Surcharge (Vehicle Traffic)

**TYPE-B WALL**

- There shall be no loadings extending above top of wall within a distance equal to height of the wall.

**TYPE-C WALL**

- Expansion joint @ 9.14m (30'-0") ± centers (max)
- and/or @ each step.

### ELEVATION

| WALL TYPE | HEIGHT | BASE | CONCRETE
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<td>457mm (1'-6&quot;)</td>
<td>305mm (1'-0&quot;)</td>
<td>.042 cu m (1.50 cu ft.)</td>
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<tr>
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<td>610mm (2'-0&quot;)</td>
<td>305mm (1'-0&quot;)</td>
<td>.057 cu m (2.00 cu ft.)</td>
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<td>914mm (3'-0&quot;)</td>
<td>711mm (2'-4&quot;)</td>
<td>1.41 cu m (4.99 cu ft.)</td>
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<td>1.22m (4'-0&quot;)</td>
<td>864mm (2'-10&quot;)</td>
<td>.217 cu m (7.66 cu ft.)</td>
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<td>1.52m (5'-0&quot;)</td>
<td>1.02m (3'-4&quot;)</td>
<td>.306 cu m (10.82 cu ft.)</td>
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<td>1.83m (6'-0&quot;)</td>
<td>1.17m (3'-10&quot;)</td>
<td>.410 cu m (14.49 cu ft.)</td>
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<td>B</td>
<td>914mm (3'-0&quot;)</td>
<td>457mm (1'-6&quot;)</td>
<td>.106 cu m (3.75 cu ft.)</td>
</tr>
<tr>
<td></td>
<td>1.22m (4'-0&quot;)</td>
<td>610mm (2'-0&quot;)</td>
<td>.170 cu m (6.00 cu ft.)</td>
</tr>
<tr>
<td></td>
<td>1.52m (5'-0&quot;)</td>
<td>762mm (2'-6&quot;)</td>
<td>.248 cu m (8.75 cu ft.)</td>
</tr>
<tr>
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<td>1.83m (6'-0&quot;)</td>
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<td>.340 cu m (12.00 cu ft.)</td>
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<td>C</td>
<td>1.22m (4'-0&quot;)</td>
<td>610mm (2'-0&quot;)</td>
<td>.170 cu m (6.00 cu ft.)</td>
</tr>
<tr>
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<td>1.52m (5'-0&quot;)</td>
<td>762mm (2'-6&quot;)</td>
<td>.248 cu m (8.75 cu ft.)</td>
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<td>914mm (3'-0&quot;)</td>
<td>.340 cu m (12.00 cu ft.)</td>
</tr>
</tbody>
</table>

**NOTE:**
See Standard Drawings C-10 for Section A-A, notes and details.
CONCRETE
Concrete shall be 332 kg/M^3 - C-22Mpa (560-C-3250)

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

DESIGN DATA
F_c = 8.3 Mpa (1200 psi)
F'_c = 20.7 Mpa (3000 psi)
Earth = 1922 kg/cu m (120 psi)
and equivalent fluid pressure is 176 kg/sq m (36 psf) per 305mm (foot) of height

Walls shown for 1-1/2:1 unlimited sloping surcharge are designed in accordance with Rankine’s Formula for unlimited sloping surcharge with θ = 33° 13’ (42°).

Note: Maximum toe pressure under wall footing = 143.6 Kpa (1-1/2 tons/sq. ft.). Special design required where footing material is incapable of supporting this pressure.

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

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

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

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

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

13mm (1/2”) chamfer

Water stop, use only when watertight joint is required, see water stop detail.

SECTION A—A

Embedment 60mm (2-3/8”) min.

9.53mm (3/8”) dia.

RUBBER WATERSTOP
Use only when watertight joint is required.
Number above bars indicates distance from top of footing to upper end of bars.

ELEVATION

NOTES:
1. For SPREAD FOOTING SECTION see C-11B
2. For TYPICAL LAYOUT EXAMPLE see C-11C
3. For 45T PILE FOOTING SECTION see C-11C
4. For TABLE OF REINFORCING STEEL DIMENSIONS AND DATA see C-11D
NOTES:
1. For details not shown and drainage notes see "Retaining Wall Details No.1."
2. Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".
TYPICAL LAYOUT EXAMPLE

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

45T PILE FOOTING SECTION

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

45T PILE FOOTING SECTION

H=1.22m (4') Thru H=6.71m (22')
<table>
<thead>
<tr>
<th>Design H</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
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</table>

**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>
<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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</thead>
<tbody>
<tr>
<td>Steel kg/ft²</td>
<td>Metric</td>
<td>7.7kq</td>
<td>9.1kq</td>
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<td>185kq</td>
<td>204kq</td>
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<td></td>
<td>U.S.</td>
<td>1.6kq/ft²</td>
<td>1.9kq/ft²</td>
<td>2.8kq/ft²</td>
<td>3.7kq/ft²</td>
<td>6.7kq/ft²</td>
<td>11.1kq/ft²</td>
<td>15.6kq/ft²</td>
<td>21.3kq/ft²</td>
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<td>35.8kq/ft²</td>
<td>44.9kq/ft²</td>
<td>50.7kq/ft²</td>
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</tbody>
</table>

Note: Reinforcement details 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 some footing dimensions as Design H=6'.
SPREAD FOOTING SECTION

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

NOTES:
Design H may be exceeded by 152mm (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:
\( f_c = 8.96 \text{ Mpa} \) (1300 psi) \( f'c=22.4 \text{ Mpa} \) (3250 psi) \( f_s=165 \text{ Mpa} \) (24,000 psi) \( n=10 \) earth \( 5.75 \text{ Kpa} \) (120 pct)

Case I – Equivalent fluid pressure= 1.7 Kpa (36 psi) max for determination of toe pressure. 1.3 Kpa (27 psi) min for determination of heel pressure.

Case II – Earth pressure determined from Rankine’s formula with \( \gamma = 33' - 12.8m \) (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. * For pile footing Design H=1.22m (4") use same footing dimensions as Design H=1.83m (6").
45T PILE FOOTING SECTION

**TYPICAL LAYOUT EXAMPLE**

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

---

**TABLE OF REINFORCING STEEL DIMENSIONS AND DATA**

<table>
<thead>
<tr>
<th>Design</th>
<th>@1.22mm (4&quot;)</th>
<th>1.83m (6&quot;)</th>
<th>2.44m (8&quot;)</th>
<th>3.0m (10&quot;)</th>
<th>3.66m (12&quot;)</th>
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<tr>
<td>W</td>
<td>965mm (3'-2&quot;)</td>
<td>1.27m (4'-2&quot;)</td>
<td>1.57m (5'-2&quot;)</td>
<td>1.88m (6'-2&quot;)</td>
<td>2.18m (7'-2&quot;)</td>
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<td>C</td>
<td>305mm (1'-0&quot;)</td>
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<td>508mm (1'-8&quot;)</td>
<td>610mm (2'-0&quot;)</td>
<td>711mm (2'-4&quot;)</td>
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<tr>
<td>B</td>
<td>356mm (1'-2&quot;)</td>
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<td>1.07m (3'-6&quot;)</td>
<td>1.27m (4'-2&quot;)</td>
<td>1.47m (4'-10&quot;)</td>
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</table>

@ bars

- #16(#5)@610mm(24")
- #16(#5)@559mm(22")
- #16(#5)@279mm(11")
- #19(#6)@229mm(9")
- #22(#7)@457mm(18")
- #25(#8)@191mm(7'-1/2")

# bars

- #16(#5)@610mm(24")
- #16(#5)@559mm(22")
- #16(#5)@279mm(11")
- #19(#6)@229mm(9")
- #22(#7)@457mm(18")
- #25(#8)@191mm(7'-1/2")

Total @ bars: 6-#19(#6)
Total # bars: 6-#19(#6)

**Case I - Toe Press.** 76.1 kg/m² (1590psf)
<table>
<thead>
<tr>
<th></th>
<th>Spread</th>
<th>Footing</th>
<th>Pile Flg</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>6.8kg (15lb)</td>
<td>9.52kg (21lb)</td>
<td>11.3kg (25lb)</td>
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<td>C</td>
<td>12.25kg (27lb)</td>
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<tr>
<td>B</td>
<td>21.3kg (46lb)</td>
<td>8.66kg (18.1lb)</td>
<td>14.51kg (32lb)</td>
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**Case II - Toe Press.** 50.8 kg/m² (1060psf)

- Spread 6.8kg (15lb)
- Footing 3.9kg (6.9lb)
- Pile Flg 11.3kg (25lb)

**Note:**
Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation."
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

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

STEM WIDTH AT BASE OF HAUNCH

FOOTING STEP

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

Where shown on the plans

Reinforced Concrete Retaining Wall Details No. 1

San Diego Regional Standard Drawing

Recommended by the San Diego Regional Standards Committee

Original

Add Metric

T. Stanton 03/03

August 2009
PLAN (For return wall Type "A")

PLAN (For return wall Type "B")

PLAN (For return wall Type "C")

*Omit when Bridge Detail 3-4 is not required.
RETURN WALL TYPE A
Use where H=2.44m (8') or less

RETURN WALL TYPE B
Use where H=3.0m (10') or more on offset walls

RETURN WALL TYPE C
Use where H=3.9m (13') or more on straight walls

RETURN WALL TYPE D
Use where H=1.83m (6') or less
PLAN OF WALL WITH BRIDGE DETAIL 3-4
(see Std Dwg C-15)

PLAN OF WALL WITH EXPANSION JOINT ONLY

Offset as follows:

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

**Design Data:**
- $f_c = 8.96$Mpa (1300 psi) $f'c = 22.4$Mpa (3250 psi) $fs = 166$Mpa (24,000 psi)
- $n = 10$ earth = 1922 kg/cu m (120 pcf)
- 610mm (2") Surcharge:
  - Equivalent fluid pressure =
    - 36 pcf maximum for determination of toe pressure.
    - 27 pcf minimum for determination of heel pressure.

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

**FACE OF WALL OUTLET**

**RETAINING WALL, GUTTER OUTLET**

**WALL DRAIN DETAIL**

**PLAN—OFFSET WALL**

**PLAN—CONTINUOUS WALL**

**DRAIN THROUGH RETURN WALL**

**SECTION A—A**

**WALL DRAINAGE**

WHERE GUTTER NOT REQUIRED

**RETURN WALL—FOOTING**

**TYPICAL GUTTER DETAIL**

**OUTLET DETAIL—SECTION B—B**

**RETAINING WALL UTILITY OPENING**

Max size of opening (A) = 1.22m (48") To be used in conjunction with Standard Drawing C-13.
152mm (6") min

#13 (#4) x 610mm (2'-0") tot. 2 ea. face

See Note A

See Note B

See Note C

See Note D

Cut or butt every other front face horizontal bar at Detail 3-2

Joint may be formed with 3.20mm (1/8") hardboard and cut back to the root of the chamfer on the exposed face.

38mm (1-1/2") Chamfer

3.20mm (1/8")

ELEVATION

SECTION

WEAKENED PLANES

DETAIL 3-2

NOTES

A. 102mm (4") diameter drain @ 7.62m (25') max. center to center (2.74m (9')) c-c for Type 3 and 2.82m (9'-3") c-c for Type 4 Retaining Walls. For walls adjacent to sidewalks or curbs, provide 102mm (4") cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 76mm (3") ± above finished grade.

B. 152mm (6") square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter .762mm (0.03") Anchor firmly to backface.

C. .028 Cubic Meter (One cubic foot) pervious backfill material in a burlap sack, securely tied. Waterstop to have 5 or more pairs of raised ribs to provide 64.5 sq mm (0.1 sq in) min. rib cross-section area on each half of the water stop. Height of ribs to be 2.38mm (3/32") min.

D. Pervious backfill material continuous behind retaining wall.

13mm (1/2") premolded expansion joint filler unless other thickness and/or material is shown elsewhere

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

Holes will be permitted in the outer 13mm (1/2") of the web for wire, rings etc. Tie web to #10 (#3) reinforcing bars @ 305mm (12") max intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.
CHAPTER 2
DRAINAGE SYSTEM
NOTE:
1. RIP RAP PER SDD-104 & STANDARD SPECIAL PROVISIONS
2. METAL BEAM GUARD RAIL SHALL HAVE 6 x 9 STEEL POST
3. SIDEWALK, CURB, PAVEMENT AND HEADWALL'S SHALL BE TIED WITH #4 BARS 18" OC HORIZONTAL AND VERTICAL
4. CONCRETE JOINTS PER SDG-109 AND G-10
NOTE:

1. HEADWALL LENGTH (L) PER D-30, D-31
NOTES:

1. FACE ANGLE SHALL BE CAST INTO STRUCTURE CONTINUOUS FOR THE FULL LENGTH "L".
2. EXPOSED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
3. WHEN CURB INLET OPENING HEIGHT (H) EXCEEDS 8" INSTALL 1" Ø STEEL PROTECTION BAR.
4. INSTALL ADDITIONAL BARS AT 3 1/2" CLEAR SPACING ABOVE FIRST BAR WHEN OPENING EXCEEDS 16".
5. WHEN CURB INLET OPENING LENGTH EXCEEDS 8' INSTALL 1" Ø STEEL SUPPORT BOLTS, SPACED AT NOT MORE THAN 5' OC.
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. SLOTTED DRAIN INSTALLATIONS SHALL BE ENCASED WITH 6 INCH PCC 520-C-2500 ALL AROUND AND SHALL BE Poured MONOLITHICALLY WITH THE CURB AND GUTTER.
**DESIGN VELOCITY (FT/SEC)**

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<td>OVER 18 fps</td>
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</table>

*OVER 18 fps REQUIRES SPECIAL DESIGN*

**SECTION OF RIP RAP**

- D = PIPE DIAMETER
- W = BOTTOM WIDTH OF CHANNEL

**NOTES:**

1. PLANS SHALL SPECIFY:
   A) ROCK CLASS AND THICKNESS (T).
   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 A GEOTEXTILE FILTER FABRIC FILTER BLANKET MATERIAL SHALL BE PLACED UNDER THE FABRIC WHEN SPECIFIED.
4. SEE CITY SUPPLEMENT FOR SELECTION OF FILTER MATERIAL.
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 psf  MAXIMUM OUTLET VELOCITY = 35 ft/s
2. CONCRETE SHALL BE 6620-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. 5' HIGH CHAIN LINK FENCING, EMBED POST 18" DEEP IN WALLS AND ENCASE WITH CLASS B MORTAR.
8. IN SANDY AND SILTY SOIL:
   A) RIP RAP 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" OVERLAPS AT JOINTS.
9. RIP RAP AND SUBBASE CLASSIFICATION SHALL BE AS SHOWN ON PLANS.
## DESIGN ROCK VELOCITY CLASSIFICATION

<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>
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<tr>
<td>Area (sq ft)</td>
<td>1.77</td>
<td>3.14</td>
<td>4.91</td>
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<td>Max Q (cfs)</td>
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<td>38</td>
<td>59</td>
<td>85</td>
<td>115</td>
<td>151</td>
<td>191</td>
<td>236</td>
<td>339</td>
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<tr>
<td>W</td>
<td>5'-6&quot;</td>
<td>6'-9&quot;</td>
<td>8'-0&quot;</td>
<td>9'-3&quot;</td>
<td>10'-6&quot;</td>
<td>11'-9&quot;</td>
<td>13'-0&quot;</td>
<td>14'-3&quot;</td>
<td>16'-6&quot;</td>
</tr>
<tr>
<td>H</td>
<td>4'-3&quot;</td>
<td>5'-3&quot;</td>
<td>6'-3&quot;</td>
<td>7'-3&quot;</td>
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<td>14'-0&quot;</td>
<td>15'-8&quot;</td>
<td>17'-4&quot;</td>
<td>19'-0&quot;</td>
<td>22'-0&quot;</td>
</tr>
<tr>
<td>a</td>
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<td>3'-11&quot;</td>
<td>4'-7&quot;</td>
<td>5'-3&quot;</td>
<td>6'-0&quot;</td>
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<td>8'-0&quot;</td>
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<tr>
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<td>3'-4&quot;</td>
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<td>4'-5&quot;</td>
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<td>1'-7&quot;</td>
<td>1'-9&quot;</td>
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<td>2'-5&quot;</td>
<td>2'-9&quot;</td>
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<tr>
<td>e</td>
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<td></td>
</tr>
<tr>
<td>Tb</td>
<td>7&quot;</td>
<td>9 1/2&quot;</td>
<td>10 1/2&quot;</td>
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### DESIGN VELOCITY (FT/SEC)*

<table>
<thead>
<tr>
<th>ROAD CLASSIFICATION</th>
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<tbody>
<tr>
<td>T (MIN)</td>
</tr>
<tr>
<td>6</td>
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<tr>
<td>10</td>
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<td>12</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

* OVER 16 fps REQUIRES SPECIAL DESIGN
SECTION OF RIP RAP

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CITY OF SAN DIEGO - STANDARD DRAWING

CONCRETE ENERGY DISSIPATOR

DRAWING NUMBER SDD-105
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.
3. STUCCO NETTING SHALL BE GALVANIZED AND SHALL HAVE 1 1/2" COVER.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING
DRAINAGE DITCHES

REVISION BY APPROVED DATE
ORIGINAL: KA NAGELVOORTE 09/12

DRAWING NUMBER SDD-106
NOTES:

1. 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.


4. FOR BOTTOM WIDTHS GREATER THAN 8' SEE SDD-108.

5. REINFORCEMENT SHOWN IS MINIMUM.

6. CHANNELING FENCING IS REQUIRED UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE PER SDM-112 AND SDM-114 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS, TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.
FENCE (SEE NOTE 5)

56D-C-3250 CONCRETE OR AIR
PLACED CONCRETE. REINFORCED WITH
6" X 6" - 10% GAGE w.w.

TYPICAL SECTION

4" DIA PLASTIC WEEP HOLES AT 10' OC

OPTIONAL CONSTRUCTION JOINT

EXPANSION JOINT

WEAKENED PLANE JOINT

ALTERNATE CONTINUOUS DRAIN

NOTES:

1. 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.
4. REINFORCEMENT SHOWN IS MINIMUM.
5. CHANNELING FENCING IS REQUIRED UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4 GATES.

LEGEND ON PLANS

MAJOR DRAINAGE CHANNEL

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E. 85271 DATE 1/31/2012

DRAWING NUMBER SDD-108

REVISION BY APPROVED DATE

ORIGINAL KA NAGELVOORT 09/22/12
NOTES:

1. THE FOLLOWING SHALL BE AS REQUIRED:
   A. LOW FLOW CHANNEL
   B. FILTER BLANKET
   C. CUTOFF WALL
   D. FENCE

2. CHANNELING FENCING IS REQUIRED UNLESS OTHERWISE SHOWN ON THE PLANS. A CHAIN LINK FENCE 6' HEIGHT, WITH A TOP RAIL SET AT 6" INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE. AT THE END OF THE CHANNEL, ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.
FOR TRENCH RESURFACING ON IMPROVED STREETS, SEE SDG-107 OR SDG-108.

NOTES:
1. (* ) INDICATES MINIMUM RELATIVE COMPACTION.
2. BEDDING MATERIAL SHALL BE SAND, CRUSHED AGGREGATE, OR NATIVE FREE-DRAINING GRANULAR MATERIAL. 100% SHALL PASS NO. 4 SIEVE AND HAVE A SAND EQUIVALENT OF NOT LESS THAN 30.
CHANNEL FENCING IS REQUIRED. UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6" INSIDE, EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MINIMUM OF 1000' INTERVALS AND SHALL BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

NOTE:
WHERE 1:12 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

NOTE:
ANGLE OF FLARE

EXTEND ALL LONGITUDINAL BARS IN BOX WALLS 2'-0" INTO WINGS, EXCEPT WHERE EXPANSION JOINT OCCURS.

MAY BE VARIED BY ENGINEER TO SUIT CONDITIONS IN THE FIELD.

NOTE:
WHERE DESIGN "H" EXCEEDS 9' OR LENGTH OF WING WALL EXCEEDS 1.5 "H" PLACE 12" EXP JT JOINT FILTER AT JUNCTION BOX WALL.

MATCH GROUND LINE

SLOPE VARIES 11/2:1 OR FLATTER

END ELEVATION

PLAN

TYPE "A"

TYPE "B"

NOTE:
WHERE 11:2:1 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

NOTE:
ANGLE OF FLARE

TOE OF SLOPE

ELEV "a"

EXTEND ALL LONGITUDINAL BARS IN BOX WALLS 2'-0" INTO WINGS, EXCEPT WHERE EXPANSION JOINT OCCURS.

MAY BE VARIED BY ENGINEER TO SUIT CONDITIONS IN THE FIELD.

NOTE:
WHERE DESIGN "H" EXCEEDS 9' OR LENGTH OF WING WALL EXCEEDS 1.5 "H" PLACE 12" EXP JT JOINT FILTER AT JUNCTION BOX WALL.

MATCH GROUND LINE

SLOPE VARIES 11/2:1 OR FLATTER

END ELEVATION

PLAN

TYPE "A"

TYPE "B"

NOTE:
WHERE 11:2:1 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

NOTE:
ANGLE OF FLARE

TOE OF SLOPE

ELEV "a"

EXTEND ALL LONGITUDINAL BARS IN BOX WALLS 2'-0" INTO WINGS, EXCEPT WHERE EXPANSION JOINT OCCURS.

MAY BE VARIED BY ENGINEER TO SUIT CONDITIONS IN THE FIELD.

NOTE:
WHERE DESIGN "H" EXCEEDS 9' OR LENGTH OF WING WALL EXCEEDS 1.5 "H" PLACE 12" EXP JT JOINT FILTER AT JUNCTION BOX WALL.

MATCH GROUND LINE

SLOPE VARIES 11/2:1 OR FLATTER

END ELEVATION

PLAN

TYPE "A"

TYPE "B"

NOTE:
WHERE 11:2:1 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

NOTE:
ANGLE OF FLARE

TOE OF SLOPE

ELEV "a"

EXTEND ALL LONGITUDINAL BARS IN BOX WALLS 2'-0" INTO WINGS, EXCEPT WHERE EXPANSION JOINT OCCURS.

MAY BE VARIED BY ENGINEER TO SUIT CONDITIONS IN THE FIELD.

NOTE:
WHERE DESIGN "H" EXCEEDS 9' OR LENGTH OF WING WALL EXCEEDS 1.5 "H" PLACE 12" EXP JT JOINT FILTER AT JUNCTION BOX WALL.

MATCH GROUND LINE

SLOPE VARIES 11/2:1 OR FLATTER

END ELEVATION

PLAN

TYPE "A"

TYPE "B"

NOTE:
WHERE 11:2:1 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

NOTE:
ANGLE OF FLARE

TOE OF SLOPE

ELEV "a"
MATCH PARAPET

#4 ALONG TOP OF WALL

1'-0"

FILL SLOPE

5' MAX FOR 1 1/2:1 FILL SLOPES, UNLIMITED FOR FLATTER THAN 1 1/2:1

GUTTER OR SHOULDER

VERTICAL

"c" BARS

#4 @ 18"

#4 @ 36"

2" CL

3" HOLE 15" OC 1' ABOVE OUTSIDE GROUND

VERTICAL UNLESS ADJACENT TO BATTERED SECTION, THEN MATCH

"d" BARS

35 DIA

2" CL

"c" SHORT BARS

3" HOLE 15" OC 1' ABOVE OUTSIDE GROUND

TYPICAL SECTION

H = 4'-0" THRU 12'-0"

CITY OF SAN DIEGO - STANDARD DRAWING

BOX CULVERT WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 65271

DATE: 1/31/2012

DRAWING NUMBER: SDD-111
TYPICAL SECTION
H = 13'-0" THRU 16'-0"

CITY OF SAN DIEGO - STANDARD DRAWING

COORDINATOR R.C.E. 65271 DATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

REVISION BY APPROVED DATE

ORIGINAL KA 3/12

DRAWING NUMBER SDD-111
FIGURES AT TOP OF "c" BARS INDICATE DISTANCE TO UPPER END OF "c" BARS.

TYPICAL LAYOUT EXAMPLE 1

BOX CULVERT WINGWALL
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'-0'' LIVE LOAD SURCHARGE, 1:12:1 SLOPING SURCHARGE
   NOT TO EXCEED 5'-0'' IN ELEVATION PLUS 2'-0'' LIVE LOAD 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.
TYPICAL WITH STIFFENING BEAM  TYPICAL WITHOUT STIFFENING BEAM

PART LONGITUDINAL SECTION

SLOPE APRON TO MATCH CHANNEL AND INVERT

SLOPE OF FILL OR CHANNEL

BOX CULVERT WARPED WINGWALL

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 95271 DATE

1/31/2012

SHEET 1 OF 3

DRAWING NUMBER SDD-112

REVISION BY APPROVED DATE

ORIGINAL KA J. NAGELVOORT 0V'12
ALTERNATIVE WARPED WINGWALL

USE WHERE ADDITIONAL PROTECTION TO TOE OF EMBANKMENT IS REQUIRED

NOTES:

1. WALLS DESIGNED FOR 2' SURFAGE
   EARTH DENSITY = 120 #/CU FT.
   EQUIVALENT FLUID PRESSURE = 36 #/CU FT.

2. VARY "D" OF WARPED WALL UNIFORMLY FROM THAT CUTOFF WALL TO THAT AT CULVERT,
   FOR MAXIMUM "H" = 12' (3.66)

3. WHERE ABRASION IS ANTICIPATED INCREASE APRON THICKNESS TO 7" MINIMUM TO
   PROVIDE 2" MINIMUM REINFORCEMENT COVERAGE.

4. DIMENSIONS "L", "W", "H", "N", ELEVATION "a", "ANGLE OF FLARE", AND END "SLOPE" (AS APPLY)
   ARE SHOWN ON THE PLANS.

5. CONCRETE SHALL BE 56G-C-3250.

6. CHANNEL FENCING IS REQUIRED UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE 6' IN HEIGHT WITH A TOP RAIL SET AT
   4' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE
   AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ON
   20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND BE PLACED ON EITHER SIDE. THE REMAINING
   ACCESS POINTS SHALL BE 4' GATES.
<table>
<thead>
<tr>
<th>Element Slope</th>
<th>&quot;H&quot;</th>
<th>8' or less</th>
<th>10'</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>
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<td>Rear face reinfor</td>
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<tr>
<td>Rear face reinfor</td>
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</tr>
<tr>
<td>&quot;D&quot; 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>
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<td>&quot;D&quot; at Culvert</td>
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<td></td>
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</tr>
</tbody>
</table>
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 DD OF SMALLER PIPE SHALL NOT BE MORE THAN 20 THE SIZE OF THE LARGER PIPE ID.

LEGEND ON PLANS

CONCRETE LUG
NOTES:

1. CONCRETE SHALL BE 560-C-3250 UNLESS OTHERWISE NOTED.
2. REINFORCING STEEL SHALL COMPLY WITH THIS DRAWING UNLESS OTHERWISE SPECIFIED.
3. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE DEFORMED BARS CONFORMING TO LATEST ASTM SPECIFICATIONS.
4. BENDS SHALL BE IN ACCORDANCE WITH LATEST ACI CODE.
5. MINIMUM SPICE LENGTH FOR REINFORCING SHALL BE 30 DIAMETERS.
6. FLOOR SHALL HAVE A WOOD TROWEL FINISH AND, EXCEPT WHERE USED AS JUNCTION BOXES, SHALL HAVE A MINIMUM SLOPE OF 1:12 TOWARD THE OUTLET.
7. DEPTH V IS MEASURED FROM THE TOP OF THE STRUCTURE TO THE FLOWLINE OF THE BOX.
8. WALL THICKNESS AND REINFORCING STEEL REQUIRED MAY BE DECREASED IN ACCORDANCE WITH TABLE ABOVE.
9. WALL THICKNESS SHALL BE STEPPED ON THE OUTSIDE OF THE BOX.
10. WHEN THE STRUCTURE DEPTH V EXCEEDS 4', STEPS SHALL BE CAST INTO THE WALL AT 15" INTERVALS FROM 15" ABOVE FLOOR TO WITHIN 12" OF TOP OF STRUCTURE PLACE STEPS IN WALL WITHOUT PIPE OPENING, OTHERWISE OPENING OF SMALLEST DIAMETER.
11. ALTERNATE STEP MAY BE AN APPROVED STEEL REINFORCED POLYPROPYLENE STEP.
12. UPON APPROVAL OF THE ENGINEER AS DEFINED BY SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, THE USE OF PRECAST STORM STRUCTURES IS ACCEPTABLE AS ALTERNATE TO CAST-IN-PLACE. PRECAST UNITS SHALL CONFORM TO ASTM STANDARDS AND BE MANUFACTURED IN A PERMANENT FACILITY DESIGNED FOR THAT PURPOSE.
13. TYPICAL REINFORCEMENT LAP SHALL BE 30 TIMES THE BAR DIAMETER MINIMUM. DIMENSION T SHALL BE 6" MINIMUM.
14. MARK EVERY STORM DRAIN INLET WITHIN THE PROJECT BOUNDARIES WITH ADHESIVE DECAL-DISC ON EXISTING INLETS OR AN IMBEDDED CONCRETE STAMP ON NEW INLETS.
15. ON CURB INLETS, PLACE MARKER ON TOP OF THE INLET ROOF. ON CATCH BASIN, IMPRINT STAMP NEXT TO INLET GRATE.
16. NO RECYCLED WATER SHALL ENTER INTO STORM DRAIN.
<table>
<thead>
<tr>
<th>Maximum Span X or Y</th>
<th>Depth V</th>
<th>Thickness T</th>
<th>Hor. &amp; Flr. Rein.</th>
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<td>7'-0&quot; TO 8'-0&quot;</td>
<td>12&quot;</td>
<td>#5 8&quot;</td>
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</table>

**HORIZONTAL REINFORCING**
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".
3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN.
6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.
7. SURFACE OF TOP SLAB BE SIDEWALK FINISHED TO DRAIN TOWARDS STREET AT A SLOPE OF 1/4" PER FOOT.
8. ELEVATION SHALL BE SHOWN ON THE PLANS WHERE INDICATED "O" SYMBOL.
9. INSTALL INLET MARKER.

SECTION C-C

SECTION A-A

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

CURB INLET - TYPE A
**NOTES**

1. TYPES ARE DESIGNATED AS FOLLOWS: (NO WING) B, (ONE WING) B-1, (TWO WINGS) B-2.
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 12".
3. WHEN \( v \) EXCEEDS 4', STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN.
6. PROVIDE 14" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.
7. SURFACE OF TOP SLAB BE SIDEWALK FINISHED TO DRAIN TOWARD STREET AT A SLOPE OF 1/4" PER FOOT.
8. ELEVATIONS SHALL BE SHOWN ON THE PLANS WHERE INDICATED BY "O" SYMBOL.

---

**LEGEND ON PLANS**

- **_** -- Recommended by the City of San Diego Standards Committee
- **COORDINATOR** -- R.C.E. 85171
- **DATE** -- 1/31/2012
Curb Inlet - Type C

Notes:
1. Types are designated as follows: (No Wing) C, (One Wing) C-1, (Two Wings) C-2.
2. Exposed edges of concrete shall be rounded with a radius of 1/2".
3. When V exceeds 4', steps shall be installed.
4. Concrete gutter to match adjacent gutters.
5. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
6. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
7. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
8. Where inlet is to be constructed on grade and D-3B concrete apron is required, lift down-grade end of grate.
9. Install inlet marker.
10. Elevation shall be shown on plans where indicated by "O" symbol.
11. Diameter D shall be 24" maximum. For larger diameter pipes this drawing must be modified.
NOTES
1. DIMENSION SHOWN BECOMES 2'-0" WHEN OPENING ON BOTH SIDES. ADJUST MANHOLE AS REQUIRED.
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2"
3. WHEN V EXCEEDS 4", STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB
   IS TO ADJOIN.
   PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.
7. MAINTAIN 1 1/2" CLEAR SPACING BETWEEN REINFORCING AND SURFACE UNLESS OTHERWISE NOTED.
8. INSTALL INLET MARKER.

LEGEND ON PLANS

SECTION B-B

SECTION A-A

REVISION BY APPROVED DATE
ORIGINAL BY AA 07/12
CITY OF SAN DIEGO - STANDARD DRAWING
MEDIAN CURB INLET - TYPE J
DRAWING NUMBER SDD-118

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR R.C.E. 85271 DATE 1/31/2012
SECTION A-A

SECTION B-B

PLAN

NOTES
1. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 12".
3. CONSTRUCT OPENINGS ON BOTH SIDES UNLESS OTHERWISE SHOWN ON PLANS.
4. MAINTAIN 1'-12" CLEAR SPACING BETWEEN REINFORCING AND SURFACE.
5. INSTALL 1" STEEL PROTECTION BAR.
6. DIAMETER "D" SHALL BE 18" MAX, FOR LARGER DIAMETER PIPES THIS DRAWING MUST BE MODIFIED.
7. INSTALL INLET MARKER.
OPTIONAL CONSTRUCTION
JOINT 6" MIN ABOVE INVERT
SLOPE FLOOR 12:1 TOWARDS OUTLET
30 D LAP (TYP)

ELEVATION

NOTES
1. SEE SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
2. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
3. MAINTAIN 1 1/2" CLEAR SPACING BETWEEN REINFORCING AND SURFACE.
4. INCREASE IN ALLOWABLE DEPTH SUBJECT TO APPROVAL BY ENGINEER.
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".
8. ONLY END BEARING GRATES SHALL BE USED.
9. INSTALL INLET MARKER.

SECTION A-A

FRAME AND GRATE

OPTIONAL CONSTRUCTION
JOINT 6" MIN ABOVE INVERT
Rounded Pipe Ends
Elev Shown On Plan

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

CATCH BASIN - TYPE G

SDD-120
Meet normal crown or existing pavement -

PLAN

3m (10"

Variable Curb Opening

305mm (12"

Type C-1 Curb Inlet

Curb Line

NORMAL CURB FACE

Normal Gutter Grade

Variable gutter Depression

Normal Curb face

3m (10"

Normal Curb face

254mm (10"

Curb face

SECTION A--A

NOTES

1. Curb and apron to be placed monolithically.
2. Use of false header at valleys and slope break line is optional.
3. Extend vertical steel from inlet structure into concrete apron as shown on Standard Drawing D-3, Section B--B.
4. Screed Direction
5. Concrete shall be 308kg/m³C-17 Mpa (520-C-2500)

SECTION B--B

Meet normal crown or existing pavement

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE APRON FOR TYPE C CURB INLET

Chairperson R.C.E. 19246  Date

Drawing Number D-3B

August 2009
#13 (#4) @ 203mm (8")
both ways

Bend Down
381mm (15") (typ.)

PLANS

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<tr>
<th>TYPE</th>
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<th>X</th>
<th>Y</th>
<th>Z</th>
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<td>1.22m (4&quot;)</td>
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<td>A 6</td>
<td>1.30m (51&quot;) to 1.50m (60&quot;)</td>
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<td>A 7</td>
<td>1.60m (63&quot;) to 1.80m (72&quot;)</td>
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<td>2.13m (7&quot;)</td>
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<tr>
<td>A 8</td>
<td>1.90m (75&quot;) to 2.13m (84&quot;)</td>
<td>2.44m (8&quot;)</td>
<td>1.22m (4&quot;)</td>
<td>2.44m (8&quot;)</td>
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NOTES

2. Concrete base shall be 332kg/M²-C-22Mpa (560-C-3250)
3. All precast components shall be reinforced with 6mm (1/4")
diameter steel, wound spirally on 102mm (4") centers.
4. All joints shall be set in Class C mortar.
5. Maintain 38mm (1-1/2") clear spacing between reinforcing and
surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
7. Manhole cover to be designated "Storm Drain".
8. Table applicable only to "in-line" designs. Modifications to "Y" dimension required
if pipe (D2) exceeds 991mm (39").

LEGEND ON PLANS

==[O]==

SAN DIEGO REGIONAL STANDARD DRAWING

STORM DRAIN CLEANOUT - TYPE A

REVISED

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<th>By</th>
<th>Approved</th>
<th>Date</th>
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Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09

August 2009
### Pipes Diameter (D1) Table

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<th>Y</th>
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<td>up to 1.30m (51&quot;)</td>
<td>1.53m (5')</td>
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<td>1.83m (6')</td>
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<td>B 7</td>
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<td>2.13m (7')</td>
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<td>2.74m (9')</td>
<td>1.22m (4')</td>
<td>2.74m (9')</td>
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</table>

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

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**Revision History**

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**SAN DIEGO REGIONAL STANDARD DRAWING**

**STORM DRAIN CLEANOUT - TYPE B**

---

**August 2009**
NOTE
Hot dip galvanize all parts after fabrication.

SECTION A–A

102mm x 76mm x 6mm
(4" x 3" x 1/4")

5mm
(3/16")

5mm
(3/16")

51mm
(2")

102mm
(4")

152mm
(6")

13mm
(1/2")
Dia. Anchors

SAN DIEGO REGIONAL STANDARD DRAWING

WELDED STEEL GRATE FRAME

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

August 2009
Round Bars:
- 10mm Ø (3/8") Round Bars
- 10mm Ø (3/8") Round Bars

End Bars:
- 64mm (2 1/2") x 10mm (3/8") End Bars

Dimensions:
- 600mm (1' - 11 5/8")
- 48mm (1 7/8")
- 14mm (9/16")

89mm (3-1/2") x 10mm (3/8") bars

NOTES:
1. Hot dip galvanize all parts after fabrication.
2. Dimensions to centerline of bars unless otherwise noted.
3. Not to be used in pedestrian areas.
4. Weight: 90.7kg (200lbs) +/-
Punch 25mm (1") hole in CSP
Place pipe so bars of grate will be parallel with main surface flow.

SECTION A-A

TYPE A

SECTION C-C

TYPE B

NOTES
1. All components shall be galvanized.
2. Inlet and outlet pipes shall be set at factory and positioned as shown on plans.
3. Ladders and Steps: None required where "H" is 1.10m (3'-6") or less. Where "H" is between 1.10m (3'-6") and 1.50m (4'-11") place one step + 406mm (16") above the floor. If "H" is 1.52m (5') or more install a ladder placing lowest rung 406mm (16") above the floor and the highest rung not more than 356mm (14") below top of inlet. Place single step or ladder in wall with wall opening.
5. Grate to be provided when specified.
6. Grate detail shall be as shown on Standard Drawing D-17 unless otherwise approved by Agency.
The page contains a detailed technical drawing of a grate with annotations and labels. The text includes descriptions of grate details, dimensions, and specifications for cross bars, lug details, and optional splices. A table is provided for grate bar spacing with columns for type, number of bars, clear bar spacing, X, 102mm (4") spacing, and 152mm (6") spacing. The page is part of a larger document titled "SAN DIEGO REGIONAL STANDARD DRAWING" and includes a table with data for "CORRUGATED STEEL PIPE INLETS, DETAILS."
Grind all exposed corners 6mm (1/4") radius

152mm (6") x 6mm (1/4") x 152mm (6") PL with 22mmØ (7/8"ø) hole

Brackets Ø 3m (10") Ctrs Max 114mm (4-1/2") x 6mm (1/4") Bent Plate
16mm (5/8") holes in bracket and rail for 13mmØ (1/2") bolts

2-Holes slotted 6mm (5/16") x 25mm (1") for 13mmØ (1/2") bolts
2-Holes 8mm (5/16") for 13mmØ (1/2") bolts

Splice Plate
64mm (2-1/2") x 10mm (3/8") x 254mm (10")

25mmØ (1") holes in pipe

19mmØ (3/4") Bolt
51mm (2") x 5mm (3/16") x 51mm (2")
R. washer

Ladder Detail

SAN DIEGO REGIONAL STANDARD DRAWING
CORRUGATED STEEL PIPE INLETS, DETAILS

August 2009
ELBOW

OVERSIDE DRAIN

~E

cross bar spacer
see note 3
5mm (3/16") x 38mm (1-1/2") fillet weld

TEE

152mm (6") P.C.C. plug or Metal Cap
305mm (12") min

TEE-SAG CONDITION

Standard Band

BAND PLUG

Elbow or Tee

see note 8

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

Elbow or Tee

RISER

1.63mm (0.064")
19mm (3/4") galv. pipe
2mm (0.079") Square sheet

Section E-E

GRATE SLOT DETAIL

Min. weld length 38mm (1-1/2");
5mm (3/16") fillet weld

NOTE:

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

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

LEGEND ON PLANS

sag cond.

SAN DIEGO REGIONAL STANDARD DRAWING

ASPHALT CONCRETE SPILLWAY

August 2009
NOTES

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

FLUPE

Gutter line
Road Surface
Base
76mm (3") A.C.
Slope 3-1/2:1
Anchor
Flume Section
Flume
Drill and tap for 13mm (1/2") x 38mm (1-1/2") bolt
19mm (3/4")
19mm (3/4")
25mm (1")
Clip bracket
Weld
38mm (1-1/2")
Weld
51mm (2") Dia hole
38mm (1-1/2")
Pipe stake 1.83m (6') long each side of flume.
Flatten or point
ANCHOR-DETAIL

ANCHOR-DETAIL

LEGEND ON PLANS

sag cond.

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

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

---

**PLAN**

- **#13(#) @ 76mm (3") O.C.**
- **#13(#) @ 152mm (6") O.C. both ways continuous**
- **Elev. shown on plans**
- **Dimensions shown on plans**
- **May be open channel**
- **See Anchor Detail**
- **Elev. shown on plans**
- **76mm (3") X 76mm (3") Construction Joint**
- **76mm (3") **
- **102mm (4")**
- **51mm (2")**
- **152mm (6")**
- **38mm (1-1/2")**
- **254mm (10")**
- **64mm (2-1/2")**
- **51mm (2") x 6mm (1/4") x 1.44m (4")**
- **Galvanized Steel Angle**

**SECTION A–A**

- **#13(#) @ 76mm (3") O.C.**
- **102mm (4") min.**
- **#13(#) @ 76mm (3") O.C. total 4 ways continuous**
- **#13(#) @ 152mm (6") O.C. both ways continuous**
- **Elev. shown on plans**
- **1/4:1" Slope**
- **76mm (3") D.C.**
- **102mm (4")**
- **76mm (3")**
- **76mm (3")**
- **152mm (6")**
- **152mm (6")**
- **Remove existing curb and gutter and construct gutter monolithic with curb outlet**

**SECTION B–B**

- **#13(#) @ 152mm (6") O.C. both ways**
- **Vanes to 76mm (3") min.**
- **25mm (1")**
- **3-#13(#)**
- **152mm (6")**
- **919mm (3")**
- **152mm (6")**

**ANCHOR DETAIL**

- **76mm (3") leg @90°**
- **38mm (1-1/2")**
- **16(#5) Bar**
- **64mm (2-1/2")**
- **51mm (2") x 6mm (1/4") x 1.44m (4")**

---

**LEGEND ON PLANS**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**CURB OUTLET — TYPE A**

---

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

---

**ORIGINAL**

- **Kercheval 12/75**

---

**Add Metric**

- **T.Stanton 03/03**

---

**Reformatted**

- **T.Stanton 04/06**

---

**Revised**

- **T.Stanton 11/08**

---

**DRAWING NUMBER**

- **D–25**

---

**DRAWING**

- **August 2009**
Sidewalk cuts per Std. Dwg. 6-11

**PLAN**

Pipe to be finished flush with curb.

**SECTION**

Optional break line for cuts in existing curb and gutter.

**SECTION B-B**

**SECTION A-A**

**APPROVED DRAIN PIPE SIZES**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CURB HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>75mm (3&quot;)</td>
<td>150mm (6&quot;) to 200mm (8&quot;) CURB FACE</td>
</tr>
<tr>
<td>100mm (4&quot;)</td>
<td>200mm (8&quot;) CURB FACE</td>
</tr>
<tr>
<td>150mm (6&quot;)</td>
<td>250mm (10&quot;) CURB FACE</td>
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</tbody>
</table>

**NOTES**

1. Pipe shall be one continuous length from property line to curb line.
2. Multiple pipes to be set a minimum distance of D/2 apart.
3. Concrete shall be 308kg/M³-C-17 Mpa (520-C-2500)
4. Pipe shall be circular rigid plastic, or approved equal.
5. Coring of existing curb may be used as an alternative.

Drain shall not occupy the hatched area. BLOCK CORNER

**SAN DIEGO REGIONAL STANDARD DRAWING**

**SIDEWALK UNDERDRAIN PIPE**

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

August 2009
NOTES
2. When V exceeds 1.2m (4''), steps shall be installed.

SECTION A-A
- Finish Grade
- 4-#13(#4) around pipe opening
- L (10'')
- 2500mm (10'') shown on culvert profile

SECTION B-B
- #13(#4) total 4
- #13(#4) Ø305mm(12'')
- #13(#4) Ø305mm(12'')
- #22(#7) bend down 200mm(8'') into wall
- 19mm (3/4'') typ.
- 267mm (10 1/2'')
- 267mm (10 1/2'')
- 38mm (1 1/2'' typ.)
- 75mm (3'')
- Fillet
- Rounded Pipe Ends, see Drawing D-61
- Elevation shown on plan
- 12:1
- 1.0m (3' - 3 1/2'')
- T
- T

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
CATCH BASIN - TYPE I

Chairperson R.C.E. 19246 Date

August 2009
### Front Elevation

- **Single Headwall**
  - Chamfer: 19mm (3/4")
  - Width: 203mm (6")

- **Double Headwall**
  - Chamfer: 19mm (3/4")
  - Width: 203mm (6")

### Section, Single & Double Headwalls

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>H (mm)</th>
<th>SINGLE</th>
<th>DOUBLE</th>
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<td>3.51</td>
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<tr>
<td>1450mm</td>
<td>191mm</td>
<td>6.38</td>
<td>7.17</td>
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</table>

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

---

**Legend on Plans**

- **Straight Headwall - Type A**
- **[Circular Pipe]**

---

**San Diego Regional Standard Drawing**

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

**D-30**

August 2009
### TABLE 1

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>H (m)</th>
<th>SINGLE Concrete</th>
<th>DOUBLE Concrete</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>kg/m³</td>
<td>C.Y.</td>
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<tr>
<td>300 (12&quot;)</td>
<td>610 (2' 0&quot;)</td>
<td>355 (1' 0&quot;)</td>
<td>1.22 (4' 0&quot;)</td>
<td>1.22 (4' 0&quot;)</td>
<td>.345 (0.45)</td>
</tr>
<tr>
<td>375 (15&quot;)</td>
<td>610 (2' 0&quot;)</td>
<td>350 (1' 1&quot;)</td>
<td>1.30 (4' 5&quot;)</td>
<td>1.52 (5' 0&quot;)</td>
<td>.482 (0.63)</td>
</tr>
<tr>
<td>450 (18&quot;)</td>
<td>610 (2' 0&quot;)</td>
<td>356 (1' 2&quot;)</td>
<td>1.40 (4' 6&quot;)</td>
<td>1.83 (5' 6&quot;)</td>
<td>.635 (0.83)</td>
</tr>
<tr>
<td>600 (24&quot;)</td>
<td>762 (2' 6&quot;)</td>
<td>432 (1' 5&quot;)</td>
<td>1.66 (5' 6&quot;)</td>
<td>2.44 (8' 0&quot;)</td>
<td>1.16 (1.4)</td>
</tr>
<tr>
<td>750 (30&quot;)</td>
<td>762 (2' 6&quot;)</td>
<td>533 (1' 9&quot;)</td>
<td>1.83 (6' 0&quot;)</td>
<td>3.05 (10' 0&quot;)</td>
<td>1.85 (2.41)</td>
</tr>
<tr>
<td>900 (36&quot;)</td>
<td>914 (3' 0&quot;)</td>
<td>610 (2' 0&quot;)</td>
<td>2.13 (7' 0&quot;)</td>
<td>3.46 (12' 0&quot;)</td>
<td>2.86 (3.74)</td>
</tr>
</tbody>
</table>

### NOTES

1. Concrete shall be 332 kg/m³ – C-22Mpa (560-C-3250).
2. Exposed corners shall be chamfered 19mm (3/4").
### C.S.P. Arch Size

<table>
<thead>
<tr>
<th>Metric (inches)</th>
<th>A</th>
<th>B</th>
<th>H</th>
<th>Single</th>
<th>Double</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>mm ft./in.</td>
<td>mm ft./in.</td>
<td>m ft./in.</td>
<td>Concrete cu m C.Y.</td>
<td>L ft./in.</td>
</tr>
<tr>
<td>450mmx275mm (18x11)</td>
<td>610 (2'-0&quot;)</td>
<td>356 (1'-2&quot;)</td>
<td>1.19 (3'-11&quot;)</td>
<td>1.83 (6')</td>
<td>0.64 (0.83)</td>
</tr>
<tr>
<td>525mmx375mm (21x15)</td>
<td>610 (2'-0&quot;)</td>
<td>406 (1'-4&quot;)</td>
<td>1.24 (4'-3&quot;)</td>
<td>2.13 (7')</td>
<td>0.63 (1.08)</td>
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<tr>
<td>600mmx450mm (24x18)</td>
<td>610 (2'-0&quot;)</td>
<td>457 (1'-6&quot;)</td>
<td>1.32 (4'-6&quot;)</td>
<td>2.44 (8')</td>
<td>1.08 (1.41)</td>
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<tr>
<td>700mmx500mm (28x20)</td>
<td>762 (2'-6&quot;)</td>
<td>508 (1'-6&quot;)</td>
<td>1.52 (5'-2&quot;)</td>
<td>2.74 (9')</td>
<td>1.51 (1.97)</td>
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<tr>
<td>875mmx600mm (35x24)</td>
<td>762 (2'-6&quot;)</td>
<td>610 (2'-0&quot;)</td>
<td>1.63 (5'-6&quot;)</td>
<td>3.05 (10')</td>
<td>1.96 (2.56)</td>
</tr>
</tbody>
</table>

### NOTES

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

### LEGEND ON PLANS

---
NOTES:
1. Concrete shall be 332kg/M³ - C-22Mpa (560-C-3250)
2. Exposed corners to be chamfered 19mm (3/4").
3. Multiple pipes to be set a distance of D/2, with a 305mm (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 76mm (3") use alternate Detail-C.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

WING AND U TYPE HEADWALLS
FOR 450mm (18") TO 900mm (36") PIPES

DRAWING NUMBER D-34

August 2009
NOTE:
For Dimension Table and General Notes, see D-35B

WING AND U TYPE HEADWALLS
FOR 1.0m (42") TO 2.0m (84") PIPE

SAN DIEGO REGIONAL STANDARD DRAWING

August 2009
### TABLE OF DIMENSIONS AND QUANTITIES FOR DRAWING D–35A

<table>
<thead>
<tr>
<th>DIAL.</th>
<th>DIMENSIONS</th>
<th>SINGLE PIPE</th>
<th>DOUBLE PIPE</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>U TYPE</td>
<td>WING TYPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W</td>
<td>CONC.</td>
</tr>
<tr>
<td>Metric</td>
<td>1050mm</td>
<td>1.18m</td>
<td>1.22m</td>
</tr>
<tr>
<td>U.S.</td>
<td>42&quot;</td>
<td>3'–7 1/4&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>Metric</td>
<td>1200mm</td>
<td>1.37m</td>
<td>1.37m</td>
</tr>
<tr>
<td>U.S.</td>
<td>48&quot;</td>
<td>4'–6&quot;</td>
<td>3'–9&quot;</td>
</tr>
<tr>
<td>Metric</td>
<td>1350mm</td>
<td>1.65m</td>
<td>1.85m</td>
</tr>
<tr>
<td>U.S.</td>
<td>54&quot;</td>
<td>5'–4 7/8&quot;</td>
<td>4'–6&quot;</td>
</tr>
<tr>
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<td>1.92m</td>
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<tr>
<td>U.S.</td>
<td>60&quot;</td>
<td>6'–3 3/4&quot;</td>
<td>5'–3&quot;</td>
</tr>
<tr>
<td>Metric</td>
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<td>2.20m</td>
<td>2.59m</td>
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<tr>
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<td>7'–2 1/2&quot;</td>
<td>6'–0&quot;</td>
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<tr>
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<td>8'–1 3/8&quot;</td>
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<td>3.45m</td>
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<td>78&quot;</td>
<td>9'–0&quot;</td>
<td>7'–6&quot;</td>
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<tr>
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<td>3.99m</td>
</tr>
<tr>
<td>U.S.</td>
<td>84&quot;</td>
<td>9'–6 3/4&quot;</td>
<td>8'–3&quot;</td>
</tr>
</tbody>
</table>

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

**NOTES:**

1. Skewd Pipes: Dimension W to be increased to take care of increased width or length due to skew of multiple pipes.
2. Tops of headwalls, on grade curlers, shall be placed parallel to profile grade when the grades are 3% or more.
3. Concrete shall be 332 kg/m³–C–22Mpa (560–C–3250).
4. Exposed corners shall be chamfered 19mm(3/4)
5. Multiple pipes shall be set a distance of D/2, with a 25mm(1") minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 76mm(3") use Alternate Detail C.

**LEGEND ON PLANS**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS FOR 1.0 m (42") TO 2.0 m (84") PIPE**

**DRAWING NUMBER D–35B**

August 2009
### ELEVATION

<table>
<thead>
<tr>
<th>L/2</th>
<th>955mm (3'-4&quot;)</th>
<th>1.47m (4'-10&quot;)</th>
<th>1.93m (6'-4&quot;)</th>
<th>2.39m (7'-10&quot;)</th>
<th>2.85m (9'-4&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300mm 12&quot;</td>
<td>813mm 2'-8&quot;</td>
<td>762mm 2'-6&quot;</td>
<td>22.7kg 0.61cu m</td>
<td>27.3kg 0.75cu m</td>
<td>--</td>
</tr>
<tr>
<td>375mm 15&quot;</td>
<td>889mm 2'-11&quot;</td>
<td>914mm 3'-0&quot;</td>
<td>25.0kg 0.70cu m</td>
<td>30.0kg 0.85cu m</td>
<td>--</td>
</tr>
<tr>
<td>450mm 18&quot;</td>
<td>965mm 3'-2&quot;</td>
<td>1.07m 3'-6&quot;</td>
<td>30.0kg 0.91cu m</td>
<td>34.0kg 0.96cu m</td>
<td>--</td>
</tr>
<tr>
<td>525mm 21&quot;</td>
<td>1.04m 3'-9&quot;</td>
<td>1.14m 4'-0&quot;</td>
<td>34.0kg 1.04cu m</td>
<td>38.0kg 1.10cu m</td>
<td>--</td>
</tr>
<tr>
<td>600mm 24&quot;</td>
<td>1.12m 4'-3&quot;</td>
<td>1.30m 4'-6&quot;</td>
<td>38.0kg 1.16cu m</td>
<td>42.0kg 1.22cu m</td>
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<tr>
<td>675mm 27&quot;</td>
<td>1.14m 4'-9&quot;</td>
<td>1.45m 5'-0&quot;</td>
<td>40.0kg 1.28cu m</td>
<td>45.0kg 1.34cu m</td>
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<tr>
<td>750mm 30&quot;</td>
<td>1.27m 5'-2&quot;</td>
<td>1.52m 5'-6&quot;</td>
<td>43.0kg 1.37cu m</td>
<td>48.0kg 1.43cu m</td>
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</tr>
<tr>
<td>825mm 33&quot;</td>
<td>1.35m 5'-10&quot;</td>
<td>1.68m 6'-0&quot;</td>
<td>47.5kg 1.51cu m</td>
<td>53.0kg 1.56cu m</td>
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<tr>
<td>900mm 36&quot;</td>
<td>1.42m 6'-0&quot;</td>
<td>1.83m 6'-3&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
</tr>
<tr>
<td>975mm 39&quot;</td>
<td>1.25m 6'-0&quot;</td>
<td>1.90m 6'-3&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
</tr>
<tr>
<td>1050mm 42&quot;</td>
<td>1.58m 6'-9&quot;</td>
<td>2.06m 7'-0&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
</tr>
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<td>1125mm 45&quot;</td>
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<td>2.21m 7'-6&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
</tr>
<tr>
<td>1200mm 48&quot;</td>
<td>1.73m 7'-9&quot;</td>
<td>2.29m 8'-0&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
</tr>
<tr>
<td>1275mm 51&quot;</td>
<td>1.80m 8'-0&quot;</td>
<td>2.44m 8'-3&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
<td>--</td>
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<tr>
<td>1350mm 54&quot;</td>
<td>1.88m 8'-6&quot;</td>
<td>2.59m 9'-0&quot;</td>
<td>50.0kg 1.62cu m</td>
<td>56.0kg 1.71cu m</td>
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### SECTION

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<tr>
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<th>955mm (3'-4&quot;)</th>
<th>1.47m (4'-10&quot;)</th>
<th>1.93m (6'-4&quot;)</th>
<th>2.39m (7'-10&quot;)</th>
<th>2.85m (9'-4&quot;)</th>
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<td>Conc</td>
<td>Steel</td>
<td>Conc</td>
<td>Steel</td>
<td>Conc</td>
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</table>

### NOTES

1. Concrete shall be 332 kg/m³ - C-22Mpa (560-3250).
2. All reinforcing steel #13(#4) bars. All vertical and horizontal tie bars 457mm(18") maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be D/2 (305mm(1") min.). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.

### LEGEND ON PLANS

---
### NOTES

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

### LEGEND ON PLANS

- [ ]

### SAN DIEGO REGIONAL STANDARD DRAWING

**L TYPE HEADWALLS**  
**C.S.P. ARCH PIPE**

### RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

**Chapman R.C.E. 19246**  
**Date:** 31/01/2003

<table>
<thead>
<tr>
<th>Revision</th>
<th>By Approved</th>
<th>Date</th>
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<tr>
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<td>Kercheval 12/75</td>
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<td>T. Stanton 03/03</td>
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<td>T. Stanton 04/06</td>
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**SAN DIEGO REGIONAL STANDARD DRAWING**

**L TYPE HEADWALLS**  
**C.S.P. ARCH PIPE**

---

**DRAWING NUMBER** D-37  
**Date:** August 2009
### NOTES

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

### LEGEND ON PLANS

---

### PIPE DIAMETER

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
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</thead>
<tbody>
<tr>
<td>300mm (12&quot;) TO 600mm (24&quot;)</td>
<td>310mm (1&quot;-0&quot;)</td>
<td>610mm (2&quot;-0&quot;)</td>
<td>254mm (10&quot;)</td>
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<tr>
<td>525mm (21&quot;) TO 900mm (36&quot;)</td>
<td>457mm (1&quot;-6&quot;)</td>
<td>762mm (2&quot;-6&quot;)</td>
<td>305mm (12&quot;)</td>
</tr>
<tr>
<td>975mm (39&quot;) TO 1200mm (48&quot;)</td>
<td>610mm (2'-0&quot;)</td>
<td>914mm (3'-0&quot;)</td>
<td>305mm (12&quot;)</td>
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<tr>
<td>1275mm (51&quot;) TO 1500mm (60&quot;)</td>
<td>762mm (2'-6&quot;)</td>
<td>914mm (3'-0&quot;)</td>
<td>356mm (14&quot;)</td>
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<tr>
<td>1575mm (63&quot;) &amp; Larger</td>
<td>914mm (3'-0&quot;)</td>
<td>914mm (3'-0&quot;)</td>
<td>356mm (14&quot;)</td>
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### LEGEND ON PLANS

---

### CURTAIN WALL

---

### Revisions

- **ORIGINAL** Kercheval 12/75
- **Add Metric** T. Stanton 03/03
- **Reformatted** T. Stanton 04/06

---

### Recommended by the San Diego Regional Standards Committee

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### Drawing Number

D-38

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August 2009
NOTES
1. When more than one pipe is used the profile view shown shall hold for the distance across 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. (305mm (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 1050mm (42") DIAMETER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

August 2009
NOTES
1. Place reinforcing, as noted, at center wall (or slab).
2. Match location of reinforcing with that in headwall, end sill and foundation slab.
3. All reinforcing shall be placed with 51mm (2") concrete cover, unless noted otherwise.
Symmetrical about centerline

- See Sec. A-A

- 18 (#5) @ 305mm (12") (outside face)
- 13 (#4) @ 305mm (12") (inside face)

- 4 @ 245mm (10") (outside face only)
- 4 @ 245mm (10") (inside face)

- See Sec. D-D and
- Note 1.

HEADWALL ELEVATION

End Sill Elevation

Symmetrical about centerline

51mm (2") typ.

76mm (""")

76mm (4")

657mm (18")

51mm (2")

Symmetrical about centerline

- See Sec. D-D.

- 18 (#5) @ 305mm (12") ea. face
- 18 (#5) @ 305mm (12") ea. face

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

CONCRETE ENERGY DISSIPATER

REINFORCEMENT

900mm (36") TO 1800mm (72") DIAMETER PIPE

DRAWING NUMBER D-43A

August 2009
SECTION A–A

Symmetrical about centerline

SECTION D–D

CONCRETE ENERGY DISSIPATER

900mm (36") TO 1800mm (72") DIAMETER PIPE

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

August 2009
1. Add #13 (4) @ 254mm (10") vertical spacing to reinforcing shown (ea. face).

2. Between baffle wall and end sill, #16 (5) @ 254mm (10")

3. 4 - G bars (full ht.)

**SECTION D-D**

<table>
<thead>
<tr>
<th>Pipe dia. (in.)</th>
<th>914mm (36&quot;)</th>
<th>1077mm (42&quot;)</th>
<th>1222mm (48&quot;)</th>
<th>1372mm (54&quot;)</th>
<th>1524mm (60&quot;)</th>
<th>1831mm (72&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A bar</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td>#19 (#6) @ 305mm (12&quot;)</td>
<td>#22 (#7) @ 305mm (12&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B bar</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td>#19 (#6) @ 305mm (12&quot;)</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C bar</td>
<td>#13 (#4) @ 305mm (12&quot;)</td>
<td>#19 (#6) @ 305mm (12&quot;)</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D bar</td>
<td>#13 (#4) @ 305mm (12&quot;)</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td>#19 (#6) @ 305mm (12&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E bar</td>
<td>#13 (#4) @ 305mm (12&quot;)</td>
<td>#16 (#5) @ 305mm (12&quot;)</td>
<td>#19 (#6) @ 305mm (12&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F bar</td>
<td>#13 (#4) @ 229mm (9&quot;)</td>
<td>#16 (#5) @ 229mm (9&quot;)</td>
<td>#19 (#6) @ 229mm (9&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G bar</td>
<td>#22 (#7)</td>
<td>#36 (#11)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</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.
Match back face of warped wingwall or 229mm (9") min.

Plan

5-#13 (#4) @ 305mm (12")
3-#25 (#8), Str
2-#13 (#4), Str @ 305mm (12")
2-#13 (#4) @ 457mm (18")
13mm (1/2") Exp jt filler
Slope apron to match channel

13 (#4) @ 305mm (12")
3-#13 (#4)
2-#13 (#4) @ 305mm (12")
3-#29 (#9)
3-#29 (#9)
2-#13 (#4)

2-#13 (#4) if alternative bottom is used
Alternative bottom of cutoff wall.

TYPICAL FOR MAXIMUM H >3.05m (10')
TYPICAL FOR MAXIMUM H <3.05m (10')

End Elevation

If at upstream end, fillet is not shown

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

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

August 2009
PART LONGITUDINAL SECTION

TYPICAL FOR MAXIMUM

H > 3.05m (10')

305mm (1'-0") Cutoff wall

TYPICAL FOR MAXIMUM

H < 3.05m (10')

305mm (1'-0") Cutoff wall

NOTE

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

SECTION C-C

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

SAN DIEGO REGIONAL STANDARD DRAWING

PIECE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

August 2009
Slope varies, 1:1 @ headwall to flat @ L/2

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

ALTERNATIVE WARPED WINGWALL

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

#13 (#4) Exp jt filler, where H max > 3m (10')

Extend wall spacers 610mm± (2") into headwall or endwall.
### WARPED WINGWALLS – US (All measurements in Feet and/or Inches unless otherwise noted)

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>H 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>#4@12</td>
<td>#4@7</td>
<td>#4@7</td>
<td>#5@5</td>
<td>#6@6</td>
<td>#7@7</td>
<td>#7@6</td>
</tr>
<tr>
<td>Front face reinf</td>
<td>Rear face reinf</td>
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<tr>
<td>3/4:1</td>
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</table>

<table>
<thead>
<tr>
<th>H</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>
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<tbody>
<tr>
<td>6'</td>
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</tr>
<tr>
<td>10'</td>
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<td>A= 1'-0&quot;</td>
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<td>14'</td>
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<td>16'</td>
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<td>18'</td>
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<td>20'</td>
<td>Total 8-#6</td>
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</table>

D at Cutoff Wall: 5" 6" 6" 7-1/2" 8" 9-1/2" 11" 1-1/2"

D at Culvert: 6" 6" 6" 8" 9-1/2" 11" 1-1/2"

### WARPED WINGWALLS – METRIC (All measurements in Millimeters unless otherwise noted)

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>H 2.44m</th>
<th>3.05m</th>
<th>3.66m</th>
<th>4.27</th>
<th>4.88m</th>
<th>5.59m</th>
<th>6.10m</th>
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<tr>
<td>1/4:1</td>
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<td>1-1/4:1</td>
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<table>
<thead>
<tr>
<th>H</th>
<th>3.66m</th>
<th>3.27m</th>
<th>4.88m</th>
<th>5.49m</th>
<th>6.10m</th>
<th>7.62m</th>
<th>8.14m</th>
<th>9.70m</th>
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<tbody>
<tr>
<td>6.10m</td>
<td>No beam. Place 2-#13 in each face along top of wall.</td>
<td></td>
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<tr>
<td>3.35m</td>
<td>B= 229</td>
<td>A= 305</td>
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<td>3.66m</td>
<td>Total 6-#19</td>
<td>B= 305</td>
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</tr>
<tr>
<td>4.27m</td>
<td>Total 6-#22</td>
<td>B= 305</td>
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<tr>
<td>4.88m</td>
<td>Total 6-#25</td>
<td>B= 305</td>
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<tr>
<td>5.48m</td>
<td>Total 8-#29</td>
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<td></td>
</tr>
</tbody>
</table>

D at Cutoff Wall: 152 152 152 191 203 241 279

D at Culvert: 152 152 152 203 241 279 330

### NOTES:

Walls designed for 610mm (2') surcharge; earth density = 55kg / 0.029 cu m (120 # / cu. ft.); equivalent fluid pressure = 16.4kg / cu m (36 #/cu. ft.) Vary D of warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 3.65m (12'). Dimensions L, W, H, M.
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 332 kg/m³ – C-22Mpa (560-0-3250)
3. Where gap exceeds 76mm (3") but is not more than 152mm (6") an internal form shall be used.
NOTES
1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cut off wall shall be the same as that required in channel.
3. Concrete shall be 332 kg/M³ -C-22Mpa (560-C-3250).
NOTES:
1. Concrete shall be 332 kg/M³ - C-22Mpa (560-C-3250).
2. Pipe shall connect to channel as high as possible.
3. The maximum angle of connection is 60° downstream.
   In no case shall a pipe angle upstream.

PLAN

ELEVATION

Ground line

1:1 Bevel

Rounded pipe ends, See drawing D-61

305mm (12") min

1:1 Bevel

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>610</th>
<th>914</th>
<th>1.22m</th>
<th>1.52m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>457</td>
<td>610</td>
<td>610</td>
<td>914</td>
</tr>
</tbody>
</table>

#### STRENGTH CLASSIFICATION
- A
- A
- A
- B
- C
- D

#### MAX FILL OVER TOP
- T1 1.68m
- T2 1.68m
- T3 1.68m

#### Top Slab
- Size Bar "a"
- Spacing
- Length

#### Bottom Slab
- Size Bar "a"
- Spacing
- Length

#### Sidewalls
- Size Bar "a"
- Spacing
- Length

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>1'-6&quot;</td>
<td>2'</td>
<td>3'</td>
<td>4'</td>
</tr>
</tbody>
</table>

#### STRENGTH CLASSIFICATION
- A
- A
- A
- B
- A
- B
- A
- B
- C
- D

#### MAX FILL OVER TOP
- T1 66 38 66 66 38 28 28 28 28 37 50 12 27 12 27 11 26 35 46 11 25 35 46

#### Top Slab
- Size Bar "a"
- Spacing
- Length

#### Bottom Slab
- Size Bar "a"
- Spacing
- Length

#### Sidewalls
- Size Bar "a"
- Spacing
- Length

**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.

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**San Diego Regional Standard Drawing Details No. 1**

**Single Box Culvert**

**San Diego Regional Standard Drawing**

**Reinforcing Steel**

**Concrete: cubic meter per lin. ft.**

**Reinf. kg per lin. ft.**
### METRIC TABLE - SPAN 1.88m (all measurements in millimeters unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>1.88m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>2'</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>254</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>&quot;a&quot; Size Bar</td>
<td>16</td>
</tr>
<tr>
<td>&quot;g&quot; Bars Bottom Slab-No. of</td>
<td>4</td>
</tr>
<tr>
<td>&quot;e&quot; Bars Spacing</td>
<td>457</td>
</tr>
<tr>
<td>Spacers</td>
<td>12</td>
</tr>
<tr>
<td>Concrete: Cubic Meter per lin. ft.</td>
<td>30.6</td>
</tr>
<tr>
<td>Reinf. kg per lin. ft.</td>
<td>29.0</td>
</tr>
<tr>
<td>&quot;d&quot; Dist. Top Slab-No. of</td>
<td>7</td>
</tr>
</tbody>
</table>

### US TABLE - SPANS 6' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>2'</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>10</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>&quot;a&quot; Size Bar</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>4</td>
</tr>
<tr>
<td>&quot;d&quot; Dist. Top Slab-No. of</td>
<td>7</td>
</tr>
<tr>
<td>&quot;g&quot; Bars Bottom Slab-No. of</td>
<td>4</td>
</tr>
<tr>
<td>&quot;e&quot; Bars Spacing</td>
<td>18</td>
</tr>
<tr>
<td>Spacers</td>
<td>12</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>40</td>
</tr>
<tr>
<td>Reinf. lbs per lin. ft.</td>
<td>64</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.
METRIC TABLE – SPAN 2.13m (all measurements in millimeters unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2.13m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>914</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRENGTH CLASSIFICATION</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>

| Top Slab | T1 | 184 | 210 | 184 | 210 | 184 | 210 | 184 | 210 | 184 | 210 | 184 | 210 |
| Bottom Slab | T2 | 191 | 222 | 191 | 222 | 191 | 222 | 191 | 222 | 191 | 222 | 191 | 222 |
| Sidewalls | T3 | 152 | 178 | 152 | 178 | 152 | 178 | 152 | 178 | 152 | 178 | 152 | 178 |

| "a" | Size Bar " | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Spacing | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 |
| Length | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m | 2.03m |

| "b" | Size Bar " | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Spacing | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 |
| Dimension "X" | 381 | 406 | 381 | 406 | 381 | 406 | 381 | 406 | 381 | 406 | 381 | 406 | 381 |
| Length | 940 | 965 | 940 | 965 | 940 | 965 | 940 | 965 | 940 | 965 | 940 | 965 | 940 |

| "c" | Size Bar " | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Spacing | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 |
| Dimension "Y" | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 |
| Length | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m | 1.30m |

| "d" | Size Bar " | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Spacing | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 | 178 | 229 |
| Dimension "Y" | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 | 584 | 559 |
| Length | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m | 1.12m |

| "e" | Top Slab- No. of Bars | 7 | 4 | 7 | 4 | 7 | 4 | 7 | 4 | 7 | 4 | 7 | 4 | 7 | 4 |
| Bottom Slab- No. of Bars | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Spacing | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 | 457 |
| Spacers Total Number | 24 | 28 | 28 | 32 | 36 | 32 | 36 | 32 | 36 | 32 | 36 | 32 | 36 | 32 |

| CONCRETE | cu meters per lin. ft. | 36.0 | 42.9 | 39.0 | 45.9 | 42.1 | 49.0 | 59.7 | 44.4 | 52.0 | 64.3 | 47.4 | 55.9 | 63.0 |

Note: For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
US TABLE — SPAN 7' (all measurements in feet and/or inches unless otherwise noted).

For Metric Table (2.13m Span) — see drawing D76C

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>16</td>
<td>26</td>
<td>16</td>
<td>26</td>
<td>16</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
<td>1/2</td>
<td>3/4</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</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.
### METRIC TABLE - SPAN 2.44m (all measurements in millimeters unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2.44m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>910mm</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>4m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>&quot;c&quot; Size Bar *</td>
<td>16</td>
</tr>
<tr>
<td>Spacing</td>
<td>229</td>
</tr>
<tr>
<td>&quot;b&quot; Size Bar *</td>
<td>16</td>
</tr>
<tr>
<td>Spacing</td>
<td>229</td>
</tr>
<tr>
<td>Dimension &quot;x&quot;</td>
<td>457</td>
</tr>
<tr>
<td>Length</td>
<td>2.31m</td>
</tr>
<tr>
<td>&quot;c&quot; Size Bar *</td>
<td>16</td>
</tr>
<tr>
<td>Spacing</td>
<td>229</td>
</tr>
<tr>
<td>Dimension &quot;y&quot;</td>
<td>610</td>
</tr>
<tr>
<td>Length</td>
<td>1.02m</td>
</tr>
<tr>
<td>&quot;c&quot; Size Bar *</td>
<td>16</td>
</tr>
<tr>
<td>Spacing</td>
<td>9</td>
</tr>
<tr>
<td>Dimension &quot;z&quot;</td>
<td>610</td>
</tr>
<tr>
<td>Length</td>
<td>1.14m</td>
</tr>
</tbody>
</table>

**Reinforcing Steel**

| Top Slab - No. of Bars | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 5 | 7 | 5 | 5 |
| Bottom Slab - No. of Bars | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacers Total Number | 28 | 32 | 32 | 32 | 36 | 40 | 40 |

**Concrete:** Cubic Meter per lin. ft. | 39.8 | 50.0 | 42.9 | 53.6 | 46.9 | 56.6 | 50.0 | 60.4 | 76.5 | 52.8 | 63.5 | 81.1 | 55.9 | 67.3 | 85.7 |
| Reinf kg per lin. ft. | 53.5 | 65.8 | 56.7 | 69.5 | 58.6 | 63.1 | 61.7 | 75.6 | 85.8 | 64.9 | 79.0 | 99.8 | 66.7 | 81.2 | 102.1 |

**NOTE:**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
US TABLE – SPAN 8’ (all measurements in feet and/or inches unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3’</th>
<th>4’</th>
<th>5’</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| MAX FILL OVER TOP | 13 | 21 | 13 | 21 | 13 | 21 | 13 | 21 | 13 | 21 | 13 | 21 | 13 | 21 | 13 | 21 |

| CONG. |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| Top Slab | T1 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Bottom Slab | T2 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Sidewalls | T3 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| “a” | Size Bar | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 |
| Length | 7 | 7 | 8 | 7 | 7 | 8 | 7 | 7 | 8 | 7 | 7 | 8 | 7 | 7 | 8 | 7 | 7 |

| “b” | Size Bar | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 |
| Dimension “X” | 1 | 6 | 1 | 7 | 1 | 6 | 1 | 7 | 1 | 6 | 1 | 7 | 1 | 6 | 1 | 7 | 1 | 6 |
| Length | 3 | 4 | 3 | 5 | 3 | 4 | 3 | 5 | 3 | 4 | 3 | 5 | 3 | 4 | 3 | 5 | 3 | 4 |

| “c” | Size Bar | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 |
| Dimension “Y” | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 |
| Length | 3 | 4 | 3 | 10 | 6 | 4 | 10 | 7 | 4 | 7 | 10 | 8 | 4 | 8 | 10 | 9 | 3 |

| “d” | Size Bar | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 |
| Dimension “Y” | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 | 2 | 5 | 2 | 0 |
| Length | 3 | 4 | 4 | 5 | 3 | 9 | 4 | 5 | 3 | 9 | 4 | 5 | 3 | 9 | 4 | 5 | 3 | 9 |

| “e” | Top Slab-No. of Bars | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 |
| Bottom Slab-No. of Bars | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |

**NOTE:**
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
**METRIC TABLE — SPAN 3.05m** (all measurements in millimeters unless otherwise noted).

For Imperial table (10’ Span) — see drawing D76H

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3.05m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>1.22m</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2.7m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>&quot;a&quot;</td>
<td>Size Bar *</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Length</td>
<td>2.87m</td>
</tr>
<tr>
<td>&quot;b&quot;</td>
<td>Size Bar *</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Dimension &quot;x&quot;</td>
<td>610</td>
</tr>
<tr>
<td>Length</td>
<td>1.17m</td>
</tr>
<tr>
<td>&quot;c&quot;</td>
<td>Size Bar *</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Dimension &quot;Y&quot;</td>
<td>813</td>
</tr>
<tr>
<td>Length</td>
<td>2.11m</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.
US TABLE – SPAN 10' (all measurements in feet and/or inches unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>9</td>
<td>18</td>
<td>9</td>
<td>18</td>
<td>9</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>8</td>
<td>9</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>3/4</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>7</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
</tbody>
</table>

Reinforcing Steel:

- "c" Size Bar
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6

- "b" Size Bar
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6
  - 6

- "a" Size Bar
  - 11
  - 8
  - 11
  - 8
  - 11
  - 8
  - 11
  - 8
  - 11
  - 8
  - 11
  - 8

Length:

- "c" Dimension "X"
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0
  - 2-0

- "a" Dimension "Y"
  - 3-10
  - 4-2
  - 3-10
  - 4-2
  - 3-10
  - 4-2
  - 3-10
  - 4-2
  - 3-10
  - 4-2
  - 3-10

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
METRIC TABLE – SPAN 3.66m (all measurements in millimeters unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN 3.66m</th>
<th>1.83m</th>
<th>2.13m</th>
<th>2.44m</th>
<th>2.74m</th>
<th>3.05m</th>
<th>3.66m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>1.5m</td>
<td>4.9m</td>
<td>1.5m</td>
<td>4.9m</td>
<td>1.5m</td>
<td>4.9m</td>
</tr>
<tr>
<td><strong>Top Slab</strong></td>
<td>T₁</td>
<td>T₁</td>
<td>T₁</td>
<td>T₁</td>
<td>T₁</td>
<td>T₁</td>
</tr>
<tr>
<td>Size Bar “a”</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
</tr>
<tr>
<td>Length</td>
<td>3.36m</td>
<td>4.27m</td>
<td>3.36m</td>
<td>4.27m</td>
<td>3.36m</td>
<td>4.27m</td>
</tr>
<tr>
<td><strong>Bottom Slab</strong></td>
<td>T₂</td>
<td>T₂</td>
<td>T₂</td>
<td>T₂</td>
<td>T₂</td>
<td>T₂</td>
</tr>
<tr>
<td>Size Bar “b”</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
</tr>
<tr>
<td>Dimension “Z”</td>
<td>813</td>
<td>914</td>
<td>813</td>
<td>914</td>
<td>813</td>
<td>914</td>
</tr>
<tr>
<td><strong>Sidewalls</strong></td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
</tr>
<tr>
<td>Size Bar “c”</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
</tr>
<tr>
<td>Dimension “Y”</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
</tr>
<tr>
<td><strong>Reinforcing Steel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Bar “d”</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
<td>279</td>
<td>254</td>
</tr>
<tr>
<td>Dimension “X”</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
<td>1.14m</td>
</tr>
<tr>
<td><strong>Top Slab – No. of Bars</strong></td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
<td>T₃</td>
</tr>
<tr>
<td>Size Bar “e”</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>457</td>
</tr>
</tbody>
</table>

**Concrete:** cu m per lin. ft. | 76.7 | 105.5 | 78.8 | 110.1 | 110.1 | 110.1 |
**Reinf kg per lin. ft.** | 92.1 | 133.0 | 96.7 | 137.9 | 98.9 | 141.1 |

**NOTE:**
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
US TABLE – SPAN 12’ (all measurements in feet and/or inches unless otherwise noted).

For Metric table (3.66m Span) – see drawing D761

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
<th>9’</th>
<th>10’</th>
<th>12’</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>6’</td>
<td>7’</td>
<td>8’</td>
<td>9’</td>
<td>10’</td>
<td>12’</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>5</td>
<td>16</td>
<td>5</td>
<td>16</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>8 3/4</td>
<td>11 1/4</td>
<td>8 3/4</td>
<td>11 1/4</td>
<td>8 3/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>7 1/2</td>
<td>10 1/2</td>
<td>7 1/2</td>
<td>10 1/2</td>
<td>7 1/2</td>
</tr>
</tbody>
</table>

| Size Bar "a" | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 |
| Length | 11 | 311 | -611 | 11 | 311 | -611 | 11 | 311 | -611 | 11 | 311 | -611 |

| Size Bar "b" | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 |
| Dimension "x" | 2 | 8 | 3 | 0 | 2 | 8 | 3 | 0 | 2 | 8 | 3 | 0 |
| Length | 4 | 10 | 5 | 7 | 4 | 10 | 5 | 7 | 4 | 10 | 5 | 7 |

| Size Bar "c" | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 |
| Dimension "y" | 3 | 9 | 3 | 9 | 3 | 9 | 3 | 9 | 3 | 9 | 3 | 9 |
| Length | 10 | 210 | 4 | 11 | 2 | 12 | 4 | 13 | 4 | 14 | 4 | 16 |

| Size Bar "d" | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| Spacing | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 |
| Dimension "y" | 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 |

| Top Slab No. of Bars | 10 | 5 | 10 | 6 | 10 | 6 | 10 | 6 | 10 | 6 | 10 | 6 |
| Bottom Slab No. of Bars | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Spacers Total Number | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |

| Concrete: C.Y. per lin. ft. | 99 | 138 | 103 | 144 | 109 | 152 | 118 | 158 | 190 | 130 | 165 | 198 |
| Rein. lbs per lin. ft. | 203 | 293 | 213 | 304 | 218 | 311 | 223 | 317 | 387 | 231 | 326 | 397 |

NOTES:
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
For cover less than 610mm (2') provide 13 (#4) @ 457mm (18") ea. way & adjust quantities.

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

19mm (3/4") min. fillets

#13 (#4) Spacer Bars @ 457mm (18") max.

Optional const. jt.

#13 (#4) spacers

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

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

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

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

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

For Imperial table (4' Span) – see drawing D77B

<table>
<thead>
<tr>
<th>SPAN</th>
<th>1.22m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>610mm</td>
</tr>
<tr>
<td>STRENGTH</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>3.35m</td>
</tr>
<tr>
<td>Top Slab</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom Slab</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalls</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Bar #</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Bar #</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Bar #</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></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.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>2'</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>11</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
</tbody>
</table>

| Size Bar # | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 11 | 11 | 9 | 11 | 10 | 1/2 | 11 | 10 | 1/2 | 11 | 10 | 1/2 |
| Length | 10-5 | 10-2-10-2 | 10-3-10-2 | 10-2-10-2 | 10-5-10-2 | 10-2-10-2 |

| Size Bar # | 9-4 | 9-4 | 9-6 | 9-4 | 9-4 | 9-9 | 9-9 | 9-9 | 9-9 | 9-9 | 9-9 |
| Spacing | 11 | 11 | 9 | 11 | 10 | 1/2 | 11 | 10 | 1/2 | 11 | 10 | 1/2 |

| Size Bar # | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Spacing | 11 | 11 | 9 | 11 | 10 | 1/2 | 11 | 10 | 1/2 | 11 | 10 | 1/2 |
| Length | 4-6 | 4-6 | 5-6 | 4-6 | 4-6 | 5-6 | 4-6 | 4-6 | 5-6 | 4-6 | 4-6 |

| "a" Dist Top Slab-Tot. No. | 10 | 6 | 6 | 10 | 6 | 6 | 10 | 6 | 6 | 6 | 6 |
| Bars Bottom Slab-Tot. No. | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| "b" Dist | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Bars Spacing | 18 | 18 | 18 | 18 | 18 | 16 | 12 | 18 | 12 | 9 | 10 |

Concrete: C.Y. per lin. ft. | 0.47 | 0.51 | 0.57 | 0.57 | 0.63 | 0.69 | 0.59 | 0.63 | 0.69 | 0.75 |
Reinf.:lb per lin. ft. | 81 | 74 | 84 | 79 | 91 | 101 | 87 | 85 | 99 | 111 |

**NOTE:**
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.
### METRIC TABLE - SPAN 1.52m (all measurements in millimeters unless otherwise noted).

For Imperial table (5' Span) - see drawing D77D

<table>
<thead>
<tr>
<th>CONC.</th>
<th>610mm</th>
<th>914mm</th>
<th>1.22m</th>
<th>1.62m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Slab</td>
<td>T_1</td>
<td>171</td>
<td>197</td>
<td>235</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T_2</td>
<td>165</td>
<td>222</td>
<td>260</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T_3</td>
<td>152</td>
<td>152</td>
<td>152</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
<th>1.83m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>254</td>
<td>216</td>
<td>254</td>
<td>216</td>
<td>254</td>
<td>216</td>
<td>254</td>
<td>216</td>
<td>254</td>
<td>216</td>
<td>254</td>
<td>216</td>
</tr>
<tr>
<td>Length</td>
<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
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<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
<td>7.31m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATERIALS</th>
<th>610mm</th>
<th>914mm</th>
<th>1.22m</th>
<th>1.62m</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVER TOP</td>
<td>0.83m</td>
<td>0.83m</td>
<td>0.83m</td>
<td>0.83m</td>
</tr>
<tr>
<td>Spacing</td>
<td>165</td>
<td>222</td>
<td>260</td>
<td>165</td>
</tr>
<tr>
<td>Length</td>
<td>1.68m</td>
<td>1.68m</td>
<td>1.68m</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STRENGTH CLASSIFICATION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX FILL OVER TOP</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</td>
<td>1.83m</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.
US TABLE - SPAN 5' (all measurements in feet and/or inches unless otherwise noted).

For Metric Table (1.52m Span) - see drawing D77C

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>MAX FILL OVER TOP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>36</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Top Slab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Bottom Slab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
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</tr>
<tr>
<td></td>
<td>Length</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Sidewalls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Height</td>
<td>5/4</td>
<td>5/4</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</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.
**METRIC TABLE** - SPAN 1.83m (all measurements in millimeters unless otherwise noted).
For Imperial table (6' Span) - see drawing D77E

<table>
<thead>
<tr>
<th>SPAN</th>
<th>914mm</th>
<th>1.22m</th>
<th>1.52m</th>
<th>1.83m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>914mm</td>
<td>1.22m</td>
<td>1.83m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Fill Over Top</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>184</td>
<td>210</td>
<td>267</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>184</td>
<td>241</td>
<td>292</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>152</td>
<td>152</td>
<td>152</td>
</tr>
<tr>
<td>Size Bar</td>
<td></td>
<td>16</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
<td>241</td>
<td>279</td>
<td>216</td>
</tr>
<tr>
<td><strong>Reinforcing Steel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Bar #</td>
<td></td>
<td>16</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
<td>241</td>
<td>279</td>
<td>216</td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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.

**QUAN.**
- Concrete: cu m per lin. ft. 0.59 0.89 0.83 0.63 0.73 0.86 0.67 0.77 0.91 0.99 0.71 0.82 0.96 1.12
- Reinf: kgs per lin. ft. 55 54 67 57 56 70 58 59 74 79 59 62 80 91
US TABLE – SPAN 6’ (all measurements in feet and/or inches unless otherwise noted).

For Metric Table (1.83m Span) – see drawing D77E

<table>
<thead>
<tr>
<th>SPAN</th>
<th>HEIGHT</th>
<th>3’</th>
<th>4’</th>
<th>5’</th>
<th>6’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>4</td>
<td>20</td>
<td>34</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>7</td>
<td>1/4</td>
<td>8</td>
<td>1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>7</td>
<td>1/4</td>
<td>9</td>
<td>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>

**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.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>1.22m</th>
<th>1.52m</th>
<th>1.83m</th>
<th>2.13m</th>
<th>2.44m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<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>914mm</td>
<td>4.27m</td>
<td>7.62m</td>
<td>914mm</td>
<td>4.27m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T</td>
<td>216</td>
<td>241</td>
<td>305</td>
<td>216</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>191</td>
<td>267</td>
<td>324</td>
<td>191</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>152</td>
<td>152</td>
<td>152</td>
<td>152</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 "a" bars in table is slab total for both cells.
**US TABLE - SPAN 8’** (all measurements in feet and/or inches unless otherwise noted).

For Metric Table (2.44m Span) - see drawing D77G

<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><strong>HEIGHT</strong></td>
<td><strong>STRENGTH CLASSIFICATION</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>C</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>MAX FILL OVER TOP</strong></td>
<td>3</td>
<td>14</td>
<td>25</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td><strong>Top Slab</strong></td>
<td>1</td>
<td>6</td>
<td>2/9</td>
<td>1/2</td>
<td>12</td>
</tr>
<tr>
<td><strong>Bottom Slab</strong></td>
<td>2</td>
<td>7</td>
<td>1/10</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td><strong>Sidewalls</strong></td>
<td>3</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 both cells.
**METRIC TABLE — SPAN 3.05m** (all measurements in millimeters unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3.05m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>1.52m</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>610mm</td>
</tr>
<tr>
<td>Over Top</td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>T</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>Size Bar #</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td></td>
</tr>
<tr>
<td>concrete: cu m per lin. ft.</td>
<td></td>
</tr>
<tr>
<td>Reinf: kg per lin. ft.</td>
<td></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.
US TABLE - SPAN 10' (all measurements in feet and/or inches unless otherwise noted).

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

<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>STRENGTH CLASSIFICATION</td>
<td>MAX FILL OVER TOP</td>
<td>Top Slab</td>
<td>T₁</td>
<td>8'</td>
<td>3'/4 12'/4</td>
</tr>
<tr>
<td>Conc.</td>
<td>Bottom Slab</td>
<td>T₂</td>
<td>8'</td>
<td>3'/4 12'/4 16</td>
<td>8'</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reinforcing Steel</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
<th>Size Bar**</th>
<th>Spacing</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td>11 10 10 10 9 1/2 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| d" Dist | Bars | Top Slab-Tot. No. | 18 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
|         | Bottom Slab-Tot. No. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| e"     | Bars | Spacing | 48 | 54 | 64 | 68 | 48 | 54 | 64 | 68 | 48 | 54 | 64 | 68 | 48 | 54 | 64 | 68 | 48 | 54 | 64 | 68 |

Concrete: C.Y. per lin. ft. 1.40 | 2.05 | 2.46 | 1.45 | 2.07 | 2.48 | 1.51 | 2.18 | 2.64 | 1.68 | 2.27 | 2.74 | 3.04 | 1.92 | 2.51 | 3.05 | 3.41
Reinf: lbs per lin. ft. 2.36 | 2.54 | 3.10 | 2.38 | 2.74 | 3.24 | 2.43 | 2.80 | 3.39 | 2.52 | 2.78 | 3.55 | 4.30 | 2.79 | 3.27 | 4.00 | 4.76

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.
**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.
### US TABLE - SPAN 12'

(all measurements in feet and/or inches unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>12'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>6'</td>
</tr>
<tr>
<td></td>
<td>7'</td>
</tr>
<tr>
<td></td>
<td>8'</td>
</tr>
<tr>
<td></td>
<td>9'</td>
</tr>
<tr>
<td></td>
<td>10'</td>
</tr>
<tr>
<td></td>
<td>12'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRENGTH CLASSIFICATION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>26</td>
<td>2</td>
<td>26</td>
<td>2</td>
<td>26</td>
<td>2</td>
<td>26</td>
<td>2</td>
<td>36</td>
<td>2</td>
<td>26</td>
<td>2</td>
<td>36</td>
</tr>
</tbody>
</table>

| Top Slab | T1 | 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2| 10| 14| 11/2|
| Bottom Slab | T2 | 9/1| 4/3| 4/3| 18| 9/1| 4/3| 4/3| 15| 18| 1/2| 10| 15| 1/2| 8/3| 4/1| 21| 1/2| 10| 17/2| 1/4| 18| 22|
| Sidewalls | T3 | 6| 6| 6/1/2| 7| 7| 7| 8| 8| 8| 1/2| 9| 9| 9| 10| 9| 9| 10| 11| 9| 10| 11| 12| 9| 10| 11| 12|

<table>
<thead>
<tr>
<th>Size Bar #</th>
<th>Spacing</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9/1</td>
<td>4/3</td>
<td>4/3</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9/1</td>
<td>4/3</td>
<td>4/3</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9/1</td>
<td>4/3</td>
<td>4/3</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>12</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.
For cover less than 610mm (2'), provide #13 (#4) @ 457mm (18") ea. way & adjust quantities.

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

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

"FLAT INVERT" ALTERNATIVE
(When shown)
### METRIC TABLE - SPAN 1.22m (all measurements in millimeters unless otherwise noted).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>1.22m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>610mm</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAY FILL OVER TOP</td>
<td>3m/7.6m/11.6m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
</tr>
<tr>
<td>&quot;a&quot;</td>
<td>Size Bar#</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Length</td>
<td>4.20m</td>
</tr>
<tr>
<td>&quot;b&quot;</td>
<td>Size Bar#</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Length</td>
<td>4.20m</td>
</tr>
<tr>
<td>&quot;c&quot;</td>
<td>Size Bar#</td>
</tr>
<tr>
<td>Spacing</td>
<td>279</td>
</tr>
<tr>
<td>Length</td>
<td>2.74m</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 "a" bars in table is slab total for both cells.
US TABLE - SPAN 4' (all measurements in feet and/or inches).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONC.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>$T_1$</td>
<td>6</td>
<td>1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>$T_2$</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>$T_3$</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>SIZE BAR</td>
<td>#</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>SPACING</td>
<td>11</td>
<td>11</td>
<td>1/2</td>
</tr>
<tr>
<td>SIZE BAR</td>
<td>#</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>SPACING</td>
<td>11</td>
<td>11</td>
<td>1/2</td>
</tr>
<tr>
<td>SIZE BAR</td>
<td>#</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>SPACING</td>
<td>11</td>
<td>11</td>
<td>1/2</td>
</tr>
<tr>
<td>LENGTH</td>
<td>5-9</td>
<td>0</td>
<td>9-0</td>
</tr>
<tr>
<td>DIST BAR</td>
<td>TOP SLAB</td>
<td>TOTAL NO.</td>
<td>15</td>
</tr>
<tr>
<td>BOTTOM SLAB</td>
<td>TOTAL NO.</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>SIZE BAR</td>
<td>#</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>SPACING</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>NUMBER</td>
<td>34</td>
<td>38</td>
<td>22</td>
</tr>
</tbody>
</table>

Concrete: C.Y. per lin. ft. 0.69 | 0.74 | 0.79 | 0.83 | 0.88 | 0.93 | 0.98 | 1.03 | 1.08 | 1.13 |
Reinf.: lbs per lin. ft. 222 | 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 both cells.
METRIC TABLE – SPAN 1.52m (all measurements in millimeters unless otherwise noted).

For Imperial table (5' Span) – see drawing D78B

<table>
<thead>
<tr>
<th>SPAN</th>
<th>610mm</th>
<th>914mm</th>
<th>1.22m</th>
<th>1.52m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2.4m</td>
<td>5.2m</td>
<td>7.9m</td>
<td>2.4m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>152</td>
<td>152</td>
<td>152</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>159</td>
<td>159</td>
<td>159</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>152</td>
<td>152</td>
<td>152</td>
</tr>
<tr>
<td>Size Bar #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;a&quot; Spacing</td>
<td>5.1m</td>
<td>5.3m</td>
<td>5.1m</td>
<td>5.3m</td>
</tr>
<tr>
<td>&quot;b&quot; Spacing</td>
<td>5.3m</td>
<td>5.2m</td>
<td>5.1m</td>
<td>5.3m</td>
</tr>
<tr>
<td>&quot;c&quot; Spacing</td>
<td>5.5m</td>
<td>5.3m</td>
<td>5.2m</td>
<td>5.5m</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;a&quot; Dia.</td>
<td>5.1mm</td>
<td>5.3mm</td>
<td>5.1mm</td>
<td>5.3mm</td>
</tr>
<tr>
<td>Top Slab-Tot. No.</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Bottom Slab-Tot. No.</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Size Bar #2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;b&quot; Spacing</td>
<td>5.3m</td>
<td>5.2m</td>
<td>5.1m</td>
<td>5.3m</td>
</tr>
<tr>
<td>&quot;c&quot; Spacing</td>
<td>5.5m</td>
<td>5.3m</td>
<td>5.2m</td>
<td>5.5m</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>34</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Concrete: cu m per lin. ft.</td>
<td>0.63</td>
<td>0.66</td>
<td>0.75</td>
<td>0.69</td>
</tr>
<tr>
<td>Reinf: kg per lin. ft.</td>
<td>68</td>
<td>57</td>
<td>69</td>
<td>70</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.
US TABLE - SPAN 5' (all measurements in feet and/or inches).

For Metric table (1.52m Span) - see drawing D78C

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>8 17 26</td>
<td>8 17 26</td>
<td>8 17 26</td>
<td>8 17 26 35</td>
</tr>
<tr>
<td>Conc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab T1</td>
<td>6 1/4 6 1/4 7 1/2</td>
<td>6 1/4 6 1/4 7 1/2</td>
<td>6 1/4 6 1/4 7 1/2</td>
<td>6 1/4 6 1/4 7 1/2</td>
</tr>
<tr>
<td>Bottom Slab T2</td>
<td>6 1/4 7 1/4 8 1/8</td>
<td>6 1/4 7 1/4 8 1/8</td>
<td>6 1/4 7 1/4 8 1/8</td>
<td>6 1/4 7 1/4 8 1/8</td>
</tr>
<tr>
<td>Sidewalls T3</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
</tr>
<tr>
<td>Size Bar#</td>
<td>5 4 5 5</td>
<td>5 4 5 5</td>
<td>5 4 5 5</td>
<td>5 4 5 5</td>
</tr>
<tr>
<td>Spacing</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
</tr>
<tr>
<td>Size Bar#</td>
<td>5 5 6 5</td>
<td>5 5 6 5</td>
<td>5 5 6 5</td>
<td>5 5 6 5</td>
</tr>
<tr>
<td>Spacing</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
</tr>
<tr>
<td>Length</td>
<td>17-3 17-3 17-3</td>
<td>17-3 17-3 17-3</td>
<td>17-3 17-3 17-3</td>
<td>17-3 17-3 17-3</td>
</tr>
<tr>
<td>Size Bar#</td>
<td>4 5 5 4</td>
<td>4 5 5 4</td>
<td>4 5 5 4</td>
<td>4 5 5 4</td>
</tr>
<tr>
<td>Spacing</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
<td>10 11 1/2 11</td>
</tr>
<tr>
<td>Length</td>
<td>17-0 17-0 17-0</td>
<td>17-0 17-0 17-0</td>
<td>17-0 17-0 17-0</td>
<td>17-0 17-0 17-0</td>
</tr>
<tr>
<td>&quot;d&quot; Dist Top Slab-Tot. No. Bars</td>
<td>18 9 9</td>
<td>18 9 9</td>
<td>18 9 9</td>
<td>18 9 9</td>
</tr>
<tr>
<td>&quot;d&quot; Bars Spacing</td>
<td>17 17 17</td>
<td>17 17 17</td>
<td>17 17 17</td>
<td>17 17 17</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>0.82 0.87 0.93</td>
<td>0.90 0.95 1.05</td>
<td>0.97 1.02 1.13</td>
<td>1.23 1.31 1.43</td>
</tr>
<tr>
<td>Reinf :lbs per lin. ft.</td>
<td>150 126 153</td>
<td>155 130 157</td>
<td>157 136 161</td>
<td>181 161 143</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.
### METRIC TABLE — SPAN 1.83m (all measurements in millimeters unless otherwise noted).

For Imperial table (6' Span) – see drawing D78F

<table>
<thead>
<tr>
<th>SPAN</th>
<th>914mm</th>
<th>1.22m</th>
<th>1.52m</th>
<th>1.83m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab T₁</td>
<td>191</td>
<td>210</td>
<td>191</td>
<td>210</td>
</tr>
<tr>
<td>Bottom Slab T₂</td>
<td>152</td>
<td>235</td>
<td>152</td>
<td>235</td>
</tr>
<tr>
<td>sidewalls T₃</td>
<td>152</td>
<td>152</td>
<td>152</td>
<td>152</td>
</tr>
<tr>
<td>Size Bar # D₁</td>
<td>16</td>
<td>13</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>Size Bar # B₂</td>
<td>16</td>
<td>19</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>&quot;d&quot; Dist. Bars</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Top Slab Tots. No.</td>
<td>12</td>
<td>6</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Bottom Slab Tots. No.</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>&quot;e&quot; Size Bar #</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Spacing</td>
<td>457</td>
<td>292</td>
<td>457</td>
<td>292</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Concrete: cu m per lin. ft.</td>
<td>0.80</td>
<td>0.88</td>
<td>0.99</td>
<td>0.86</td>
</tr>
<tr>
<td>Reinfl: kgs per lin. ft.</td>
<td>82</td>
<td>76</td>
<td>89</td>
<td>83</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.
US TABLE - SPAN 6' (all measurements in feet and/or inches).

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>3'</td>
<td>4'</td>
<td>5'</td>
<td>6'</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>3</td>
<td>13</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>23</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>30</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>2</td>
<td>3/4</td>
<td>9</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td></td>
<td>6</td>
<td>7/4</td>
<td>9</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T1</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 both cells.
METRIC TABLE – SPAN 2.44m (all measurements in millimeters unless otherwise noted).

For Imperial table (8' Span) – see drawing D78BH

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2.44m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1.22m</td>
</tr>
<tr>
<td>Strength Classification</td>
<td>A B C A B C A B C D A B C D</td>
</tr>
<tr>
<td>MAX Fill Over Top</td>
<td>610 3.4m 6.1m 610 3.4m 6.1m 610 3.4m 6.1m 610 3.4m 6.1m 8.5m</td>
</tr>
<tr>
<td>Top Slab T1</td>
<td>210 210 280 210 210 280 210 210 280 210 210 280</td>
</tr>
<tr>
<td>Bottom Slab T2</td>
<td>165 229 279 165 229 279 165 229 279 171 235 279</td>
</tr>
<tr>
<td>Sidewalls T3</td>
<td>152 152 152 152 152 152 152 152 152 152 152 152</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>19 19 19 19 19 19 19 19 19 19 19 19</td>
</tr>
<tr>
<td>Spacing</td>
<td>286 305 305 286 305 305 286 305 305 286 305 305</td>
</tr>
<tr>
<td>Length</td>
<td>8.18m 8.15m 8.15m 8.18m 8.15m 8.15m 8.18m 8.15m 8.15m 8.18m 8.15m 8.15m</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>19 19 19 19 19 19 19 19 19 19 19 19</td>
</tr>
<tr>
<td>Spacing</td>
<td>286 305 305 286 305 305 286 305 305 286 305 305</td>
</tr>
<tr>
<td>Length</td>
<td>8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m 8.05m</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>12.19m 8.05m 12.19m 8.05m 12.19m 8.05m 12.19m 8.05m 12.19m 8.05m 12.19m 8.05m</td>
</tr>
<tr>
<td>Spacing</td>
<td>305 305 305 305 305 305 305 305 305 305 305 305</td>
</tr>
<tr>
<td>Length</td>
<td>5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m 5.10m</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>13 13 13 13 13 13 13 13 13 13 13 13</td>
</tr>
<tr>
<td>Spacing</td>
<td>457 457 457 457 457 457 457 457 457 457 457 457</td>
</tr>
<tr>
<td>Concrete: cu m per lin. ft</td>
<td>1.12 1.26 1.52 1.18 1.35 1.57 1.24 1.41 1.64 1.31 1.46 1.73 1.96 1.45 1.61 1.88 2.13</td>
</tr>
<tr>
<td>Reinft: kg per lin. ft</td>
<td>118 113 137 121 117 141 121 120 145 125 126 152 186 128 134 157 200</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.
US TABLE – SPAN 8’ (all measurements in feet and/or inches).
For Metric table (2.44m Span) – see drawing D78G

<table>
<thead>
<tr>
<th>SPAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>8’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>4’</th>
<th>5’</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
</tr>
</thead>
<tbody>
<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>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Top Slab T1</td>
<td>8/14</td>
<td>8</td>
<td>1/4</td>
<td>10</td>
<td>1/4</td>
</tr>
<tr>
<td>Bottom Slab T2</td>
<td>6</td>
<td>1/2</td>
<td>9</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Sidewalls T3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3.05m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td></td>
</tr>
<tr>
<td>1.52m</td>
<td></td>
</tr>
<tr>
<td>1.83m</td>
<td></td>
</tr>
<tr>
<td>2.13m</td>
<td></td>
</tr>
<tr>
<td>2.44m</td>
<td></td>
</tr>
<tr>
<td>3.05m</td>
<td></td>
</tr>
</tbody>
</table>

#### Table - 10' Span

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size Bar #</td>
<td>16</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>Spacing</td>
<td>267, 330, 254</td>
<td>267, 330, 254</td>
<td>267, 330, 254</td>
</tr>
<tr>
<td>Length #1</td>
<td>6.4m, 6.4m, 6.4m</td>
<td>6.4m, 6.4m, 6.4m</td>
<td>6.4m, 6.4m, 6.4m</td>
</tr>
<tr>
<td>Size Bar #2</td>
<td>16</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>Spacing</td>
<td>267, 330, 254</td>
<td>267, 330, 254</td>
<td>267, 330, 254</td>
</tr>
<tr>
<td>Length #1</td>
<td>6.4m, 6.4m, 6.4m</td>
<td>6.4m, 6.4m, 6.4m</td>
<td>6.4m, 6.4m, 6.4m</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.
Tips for 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.

<table>
<thead>
<tr>
<th>SPAN</th>
<th>MAX FILL OVER TOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10’</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>5’</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
<th>10’</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</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>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>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing</td>
<td>10</td>
<td>1/2</td>
<td>13</td>
<td>10</td>
</tr>
</tbody>
</table>

** Notes:**

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

**Concrete:** C.Y. per lin. ft. 1.98 2.40 2.82 2.06 2.48 2.90 2.13 2.55 3.03 2.34 2.77 3.25 3.78 2.68 3.18 3.73 4.22

**Rein.:** lbs per lin. ft. 358 372 470 359 379 482 367 391 502 377 402 514 540 421 453 577 632
**METRIC TABLE – SPAN 3.66m** (all measurements in millimeters unless otherwise noted).

For Imperial table (12' Span) – see drawing D788J

<table>
<thead>
<tr>
<th>SPAN</th>
<th>1.83m</th>
<th>2.13m</th>
<th>2.44m</th>
<th>3.05m</th>
<th>3.66m</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>1.83m</td>
<td>2.13m</td>
<td>2.44m</td>
<td>3.05m</td>
<td>3.66m</td>
</tr>
<tr>
<td>STYLE 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>610</td>
<td>37m</td>
<td>5.5 =</td>
<td>610</td>
<td>37m</td>
</tr>
<tr>
<td>Top Slab</td>
<td>206</td>
<td>206</td>
<td>206</td>
<td>206</td>
<td>206</td>
</tr>
<tr>
<td>Size Bar #</td>
<td>22</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Spacing</td>
<td>305</td>
<td>279</td>
<td>305</td>
<td>279</td>
<td>305</td>
</tr>
<tr>
<td>Length</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
</tr>
<tr>
<td>&quot;b&quot; Size Bar #</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>305</td>
<td>279</td>
<td>305</td>
<td>279</td>
<td>305</td>
</tr>
<tr>
<td>Length</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
</tr>
<tr>
<td>&quot;c&quot; Size Bar #</td>
<td>19</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Spacing</td>
<td>305</td>
<td>279</td>
<td>305</td>
<td>279</td>
<td>305</td>
</tr>
<tr>
<td>Length</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
<td>11.98m</td>
</tr>
<tr>
<td>&quot;d&quot; Dist. Bars</td>
<td>36</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Top Slab-Total No.</td>
<td>36</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Bottom Slab-Total No.</td>
<td>36</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>&quot;e&quot; Bars</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Spacing</td>
<td>457</td>
<td>178</td>
<td>286</td>
<td>305</td>
<td>146</td>
</tr>
<tr>
<td>Spacers</td>
<td>76</td>
<td>80</td>
<td>84</td>
<td>104</td>
<td>110</td>
</tr>
<tr>
<td>Concrete: cu m per lin. ft.</td>
<td>1.99</td>
<td>2.43</td>
<td>2.92</td>
<td>2.06</td>
<td>2.49</td>
</tr>
<tr>
<td>Rein kg per lin. ft.</td>
<td>222</td>
<td>229</td>
<td>285</td>
<td>225</td>
<td>234</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.
US TABLE – SPAN 12’ (all measurements in feet and/or inches).
For Metric table (3.66m Span) – see drawing D781

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

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

Reinf. for interior walls under 203mm (8")..

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

TYPICAL SECTION

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

FLAT INVERT ALTERNATIVE
(When shown)
GENERAL NOTES
QUANTITIES: Quantities are for the sloped invert slab and do not include splices in the longitudinal bars, nor temperature reinforcement for exposed top culvert, nor concrete or reinforcement for parapets or cutoff walls.

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

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

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

REINF. PLACEMENT: Main reinforcement is positioned unless "Square Ends" designation. Ends of culvert will be rounded unless "V Span" is included in plans. Wherever "V Span" is included, "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.

CONSTRUCTION NOTES
CONCRETE: Bottom slab & walls shall be class 332 kg/m³—B—22Mpa (560—B—3250). Top slab shall be class 332 kg/m³—C—22Mpa (560—C—3250).

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

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

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

REINFORCEMENT: Main reinforcement is spaced from 3.20mm (1/8") dia. clear, min. 25.4mm (1") increments, except as noted. Distances between bars are 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 exceeds distance between exterior walls. When cover exceeds distance between exterior walls, live load should 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.

SPECIAL COVERAGE: No. 1 DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Chairperson R.C.E. 19246 Date

SAN DIEGO REGIONAL STANDARD DRAWING
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Chairperson R.C.E. 19246 Date

BOX CULVERT

MISCELLANEOUS DETAILS No. 1

REVISED
BY
APPROVED
DATE

ORIG. Kercheval 1/2/75
Add Metric T. Stanton 03/03
Reviewed T. Stanton 04/06

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D—81A

August 2009
**PARAPET DETAILS FOR SINGLE SPAN CULVERTS**

<table>
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<tr>
<th>PARAPET f BAR Nos.</th>
<th>SPAN</th>
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<th>16' TO 30'</th>
<th>31' TO 45'</th>
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<td>#13 (#4)</td>
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<td>4.27M (14')</td>
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<td>#29 (#9)</td>
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</table>

**PART SECTION**

**PART PLAN—SKewed**

**PART SECTION**

**PART PLAN—SKewed**

**PARAPET DETAIL FOR SKewed CULVERTS W/O WINGWALLS**

- **Cover:** 305mm (1') AND GREATER
- **CULVERT EXTENSION**
  - **20' SKew MAXIMUM**
  - **SAN DIEGO REGIONAL STANDARD DRAWING**
  - **BOX CULVERT**
  - **MISCELLANEOUS DETAILS NO. 2**

**Revision By Approved Date**

- **Add Metric T. Stanton 03/03**
- **Reviewed T. Stanton 04/06**

**Recommended By**

- **San Diego Regional Standards Committee**

**Drawing Number** D-81B

**Date**

- **August 2009**
NOTES:

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

SECTION

ELEVATION

Backfill to natural ground after fence installation.

Length shown on plans

Tension Cables

Ground Line

76mm (3") Steel Posts

Stream Flow

Rip Rap size and length to be shown on plans. See Standard Drawing D-40.
CHAPTER 3
ELECTRICAL SYSTEM
ARM LENGTH 8' MAX. FOR CONCRETE OR FIBERGLASS, 12' FOR TYPE 15 UNLESS NOTED OTHERWISE.

POLE TOP

POLE TOP

LUMINAIRE

MAST ARM

LIGHT STANDARD, CONCRETE OR FIBERGLASS.

LIGHT STANDARD, TYPE 15 SHALL BE STEEL. OTHER MAY BE CONCRETE OR FIBERGLASS.

MIN. 1" OVERHANG

CORE 5" DIA

12" HIGH MIN

HAND HOLE TO FACE STREET

SLOPE 30:1

FINISH GRADE

UNDISTURBED EARTH

SELECT SAND, 95% MINIMUM RELATIVE COMPACTION

DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

ANCHOR BOLTS (4 REQ.) 1"x 36"x 4" HOOK, GALV USE TWO LEVELING NUTS WITH WASHERS (ALL GALV) ON EACH BOLT.

FINISHED GRADE FOR STEEL AND FIBERGLASS STANDARDS, PROVIDE ANCHOR BOLT NUT COVERS.

FINISHED GRADE FOR STEEL AND FIBERGLASS STANDARDS, PROVIDE ANCHOR BOLT NUT COVERS.

560-C-3250 PCC ANCHOR BASE SQUARE OR ROUND, ADD 1" TO EACH DIMENSION FOR LOOSE SOIL OR SOFT CLAY CONDITIONS.
VENT OPENINGS
WITH FILTER,
BOTH SIDES.

VENT HOOD

DOOR OPENING
32 x 22".

BASE ADAPTER

23 1/8"

170 CONTROLLER
POWER DISTR.
ASSY.

OUTPUT

INPUT FILE

FILE

MONITOR

BASE ADAPTOR PLAN VIEW

4 1/2" NUTS WELDED
TO ADAPTER

1/2" R

1" LIP TYPICAL
TOP LIP SHADED

MODEL 336 CABINET
NOTES:

1. POSTS TO BE SET 1'-6" BEHIND FACE OF CURB UNLESS OTHERWISE SPECIFIED.

2. IN EXISTING SIDEWALK AREA SET POSTS INTO 4" CORE BORING, PACK WITH GROUT.

3. R49 SIGNS ON ALUMINUM SHEETING CENTERED BETWEEN POSTS.
NOTES:
1. LOOP DIAMETER = 6' TYP
2. DEPTH OF CUT = 3 1/8' MIN

SAWCUT & WINDING DETAIL

MODIFIED TYPE E LIMIT LINE / CROSSWALK DETECTOR

PLAN DRAWING SYMBOL
10mm (#8) copper wire grounded to pole steel with lug.

19mm x 2.4m (3/4" x 8") copper covered steel ground rod.

Alternate Ground: 4.57m (15') 35mm (no. 4) stranded copper wire, coiled.

Approved non-metallic conduit.

Steel conduit.

Anchor Rods

Steel Conduit

Ground Wire

Attach ground wire under anchor nut.

305mm (1')

16mm (1/2"
Rigid Steel Conduit

Details of Concrete Lighting Standards:

- Steel Conduit
- Non-Metallic Conduit
- Direct Burial Foundation
- Anchor Base Foundation

Recommended by the San Diego Regional Standards Committee.

August 2009
Galvanized steel conduits. Size and number as required.

6.35mm x 51mm (1/4" x 2") galvanized steel bars.

254mm (10") Diameter, use Sonotube for smooth finish (Class 1).

Permissible hole to allow auger and pour against soil.

406mm (16") dia.

NOTE: Concrete shall be class 332 kg/M^3 C 22 Mpa (560-C-3250)

SAN DIEGO REGIONAL STANDARD DRAWING

PEDESTAL FOR ELECTRICAL EQUIPMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
CHAPTER 4

GENERAL SURFACE IMPROVEMENTS
NOTE

1. BROOM FINISH PARALLEL WITH TRAFFIC.
TYPICAL SECTION

EXisting PAVING

TAPER AT END

MILL EX. PAVING

EXISTING PAVING

TAPER AT END

MILL EX. PAVING

EXISTING PAVING

TYPICAL PAVEMENT COLD MILLING

COLD MILLING ASPHALT
CONCRETE PAVEMENT DETAIL

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. #5271 DATE 1/31/2012

SDG-106
PAVE FLUSH TO MATCH EXISTING PAVEMENT SURFACE (SEE NOTE 2) FULL DEPTH ASPHALT CONCRETE OR ASPHALT PLUS BASE (SEE TABLE)

MILL AND RESURFACE OR OVERLAY PER NOTE 2

EXISTING A.C. PAVEMENT

EXISTING BASE OR OLD CONCRETE PAVEMENT

SUBGRADE OR BASE (SEE TABLE)

CONCRETE (SEE TABLE)

18'-14" TYPE III CLASS F ASPHALT CONCRETE FOR USE ON ASPHALT CONCRETE STREETS

NOTES:

1. ANY STREET TRENCH 7 FEET IN WIDTH OR GREATER AND LONGER THAN 100 FEET IN OVERALL LENGTH SHALL BE RECONSTRUCTED WITH THE PAVEMENT SECTION FOR THE STREET CLASSIFICATION PER SCHEDULE "J" (SDG-113).

2. ASPHALT TRENCH CAPS IN STREETS NOT RECEIVING A FULL WIDTH OVERLAY PRIOR TO ACCEPTANCE SHALL BE MILLED AS SHOWN AND RESURFACED WITH 12" TYPE III CLASS C2 ASPHALT NO LESS THAN 30 DAYS AFTER INITIAL ASPHALT PLACEMENT.

3. 560-C-3250 CONCRETE TREATED WITH A MINIMUM 2% CALCIUM CHLORIDE SOLUTION IN ACCORDANCE WITH 201-1 OR 650-CW-4000 (W/C CC) CONCRETE MAY BE OPENED TO TRAFFIC 3 DAYS AFTER IT IS PLACED. 650-CW-4000 CONCRETE TREATED IN SAME MANNER (W/C) MAY BE OPENED TO TRAFFIC 24 HOURS AFTER IT IS PLACED. CONCRETE SPECIFIED BY ALTERNATE CLASS OR OTHERWISE CONTAINING FLY ASH IS NOT ALLOWED.

4. USE TYPE "A" UNLESS OTHERWISE SHOWN ON THE PLANS OR AS DIRECTED BY THE CITY ENGINEER.
**NOTES**

1. **EXISTING CONCRETE PAVEMENT SHALL BE REMOVED.**

2. PRIOR TO PLACING CONCRETE, PAVEMENT EDGES SHALL BE TRIMMED TO NEAT HORIZONTAL AND VERTICAL LINES.

3. 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.

4. ANY STREET TRENCH 7' IN WIDTH OR GREATER AND LONGER THAN 100' IN LENGTH SHALL BE RECONSTRUCTED WITH THE PAVEMENT SECTION FOR THE STREET CLASSIFICATION PER SCHEDULE "J" (SDG-113). STREET TRENCH SECTIONS 7' IN WIDTH OR GREATER BUT LESS THAN 100' IN OVERALL LENGTH SHALL BE RESURFACED TO A THICKNESS OF 1" GREATER THAN REQUIRED BY NOTE 3 ABOVE.

* IN FOUR-LANE MAJOR OR GREATER STREETS, AN APPROVED SET ACCELERATING ADMIXTURE SUCH AS CALCIUM CHLORIDE, SHALL BE USED IN THE CONCRETE.
NOTES

1. EXPANSION JOINTS — AT CURB RETURNS, ADJACENT TO STRUCTURES AND AT 45' INTERVALS.

2. WEAKENDED PLANE JOINTS — AT MID POINT OF CURB RETURN, WHEN REQUIRED, AND AT 15' INTERVALS FROM PCR'S ABSENT A CURB RAMP.

3. TOOLED JOINTS — 1/4" GROOVES WITH 1/4" RADIUS EDGES AT 5' INTERVALS.

4. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK SCORING (GROOVES) PATTERN SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
H CURB PROFILE - INLET TRANSITION
NOTES:

1. CONCRETE SHALL BE 520-C-2500.

2. COLOR & PATTERN OF COLORED STAMPED CONCRETE SHALL BE SHOWN ON PLANS.

3. CONCRETE COLOR SHALL BE INTEGRATED THROUGHOUT.
DETAILED LOCATION OF TYPE "I" CATCH BASIN WITH GRATE

ANCHOR GRATE WITH M-4 BOLTS
GRADE FRAME. ALL GRATES SHALL
BE ANCHORED.

TYPE "I" CATCH BASIN

TYPICAL FOR ALL
18" SLOTTED CMPC:

SAW CUT AC
FOR TRENCH EDGE

18" SLOTTED CMPC-14 GA
WITH 6" HIGH SLOT

PCC BEDDING 420-C-2000
THE FOLLOWING TABLES ARE TO BE USED TO DETERMINE THE SCHEDULE "J" PAVEMENT DESIGN SECTIONS FOR STREETS, ALLEYS, PARKING LOTS FOR PUBLIC FACILITIES, DRIVEWAYS, AND EASEMENTS, INCLUDING PUBLIC ACCESS EASEMENTS. THESE DESIGNS SHALL BE USED IN THE PUBLIC RIGHT-OF-WAY, OR PRIVATE PROPERTY IN THE AREAS WHERE PUBLIC EASEMENTS ARE GRANTED.

1. RESISTANCE VALUES (R-VALUES) WILL BE DETERMINED FROM SAMPLES TAKEN FROM THE 12" MATERIAL LOCATED IMMEDIATELY BELOW THE FIRST LAYER OF SUBBASE, BASE OR PAVEMENT. THIS 12" SECTION SHALL REPRESENT THE TOP 36 INCHES OF UNIFORM SOILS BELOW THE SUBBASE, OR PAVEMENT. IF A LOWER BEARING SOIL IS ENCOUNTERED IN THIS 36" SECTION, THE R-VALUE WILL BE DETERMINED FROM THE LOWEST BEARING SOIL. DETERMINATION OF THE R-VALUE SHALL BE IN ACCORDANCE WITH CALTRANS TEST METHODS 301-F AND 301-G.

2. AVERAGE DAILY TRAFFIC (ADT) IS THE MAXIMUM AVERAGE ANNUAL ADT EXPECTED AT BUILDOUT. FUNCTION SHALL ALSO BE CONSIDERED WHEN DETERMINING THE MINIMUM SCHEDULE "J" PAVEMENT SECTION PER THE ENGINEER.

3. RIGID PAVEMENTS: THE DESIGN THICKNESS SHOWN IN THE TABLES ARE BASED ON A MODIFIED PORTLAND CEMENT ASSOCIATION (PCA) DESIGN. PROJECTS REQUIRING CALTRANS REVIEW SHOULD UTILIZE THE DESIGN METHODS PRESCRIBED IN THE CALTRANS HIGHWAY DESIGN MANUAL.

4. PORTLAND CEMENT CONCRETE (PCC) PAVEMENT SHALL BE CONSTRUCTED IN STREETS ON GRADES GREATER THAN 12.0 PERCENT AND IN ALLEYS AND IN ALLEY INTERSECTIONS. THE PAVEMENT SHALL BE CLASS 560-B-3250 CONCRETE WITH A MINIMUM MODULES OF RUPTURE (MOR) OF 600.

5. NEW PAVEMENT, LESS THAN 6' IN WIDTH, SHALL BE PAVED WITH PORTLAND CEMENT CONCRETE PAVEMENT SECTION NOTED IN SCHEDULE "J" FOR THE STREET CLASSIFICATION PLUS A 3/8" TO 1/4" CLASS F ASPHALT CONCRETE CAP. AN EQUIVALENT SECTION OF LEAN CONCRETE SHALL BE SUBSTITUTED FOR ANY REQUIRED CTB SUBBASE.

6. PERSONNEL FROM THE CITY'S ENGINEERING LABORATORY WILL DESIGNATE WHERE A PRIVATE LABORATORY SHALL SAMPLE FOR R-VALUES.
<table>
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<th>STREET CLASSIFICATION</th>
<th>MAX ADT</th>
<th>MAX TRAFFIC INDEX</th>
<th>&quot;R&quot; VALUE</th>
<th>STANDARD SECTIONS</th>
<th>CONCRETE M.O.R. 600 MIN</th>
<th>FULL DEPTH</th>
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| Collector              | 15000   | 9.0               |           | 4.0      | 13.5     | 8.5       | -        | -        | 12.0     |
| Major (4-Lane)         | 30000   | 10.5              |           | 5.0      | 16.0     | 8.5       | -        | -        | 14.5     |
| Major (6-Lane)         | 40000   | 11.0              |           | 5.0      | 17.0     | 8.5       | -        | -        | 15.5     |
| Primary Arterial       | 50000   | 11.5              |           | 5.5      | 17.5     | 9.0       | -        | -        | 16.0     |
| Expressway             | 60000   | 12.0              |           | 6.0      | 18.0     | 9.0       | -        | -        | 17.0     |
| Expressway             | 80000   | 12.5              |           | 6.0      | 19.5     | 8.5       | -        | -        | 17.5     |
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NOTES:

1. ALL STAMP / IMPRESSION (STREET NAME, CONTRACTOR, NAME AND / OR DATE) LOCATIONS AND ORIENTATIONS SHALL BE PRE-APPROVED BY THE ENGINEER.

2. SINGLE STAMP / IMPRESSION SHALL BE PLACED AS CLOSE TO ITS ORIGINAL LOCATION AS CONSTRUCTION ALLOWS.

3. MULTIPLE STAMPS / IMPRESSIONS (EXISTING AND / OR NEW) SHALL BE EVENLY SPACED ALONG THE NEWLY CONSTRUCTED SIDEWALK.

4. EXISTING STAMP / IMPRESSION SHALL BE SAWCUT TO NO LESS THAN 2" FROM Stamp LETTERING OR SYMBOL.
NOTES:
1. CONCRETE ENCASEMENT OR SAND CEMENT SLURRY BACKFILL SHALL HAVE A MINIMUM SLUMP OF 4".
2. CONCRETE ENCASEMENT AND SAND CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMERS OR VIBRATORS SHALL BE USED.
3. CONCRETE SHALL BE SCREEDED OFF TO MATCH PAVEMENT GRADE AND FLOATED TO ASSURE PROPER EDGE MATCH.
4. A TACK COAT SHALL BE APPLIED TO THE CONCRETE AND EXISTING ASPHALT PAVEMENT PRIOR TO PLACEING THE NEW ASPHALT PAVEMENT WEARING SURFACE.
5. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAW CUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.
6. CONCRETE TRENCH COVER SHALL BE A MINIMUM 5 1/2" THICK IN ALLEYS OR LOCAL RESIDENTIAL STREETS, AND 7" THICK IN LOCAL THROUGH 4-LANE COLLECTORS AND 9" FOR MAJOR OR GREATER.
7. ALLOW CONCRETE BACKFILL OR CONCRETE TRENCH COVER 7 CALENDAR DAYS MINIMUM, BUT NO LONGER THAN 30 CALENDAR DAYS TO CURE AND DRY BEFORE APPLYING THE ASPHALT CONCRETE WEARING SURFACE.
8. IN MAJOR OR PRIME ARTERIAL STREETS, AN APPROVED SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, SHALL BE USED.
9. ONLY TYPE A SHALL BE PERMITTED FOR SUPPLY CABLES OF 750 VOLTS OR LESS. SEE CALIFORNIA PUBLIC UTILITY COMMISSION GENERAL ORDER NO. 128, RULE 33.4 D.(1)(b).
NOTES:

1. CEMENT SLURRY BACKFILL:
   A. CEMENT SLURRY BACKFILL SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.
   B. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS.
   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. A TACK COAT SHALL BE APPLIED TO THE CEMENT SLURRY BACKFILL AND EXISTING ASPHALT PAVEMENT PRIOR TO PLACING THE NEW ASPHALT SURFACE.

3. ASPHALTIC CONCRETE RESURFACING:
   TYPE C
   A. ALLOW CEMENT SLURRY BACKFILL 48 HOURS MINIMUM TO CURE BEFORE RESURFACING, UNLESS APPROVED BY THE ENGINEER.
   B. THICKNESS SHALL MATCH THE EXISTING AC WITH A MINIMUM OF 2".
   C. AC SHALL BE HOT MIX.

   TYPE D
   A. ALLOW CEMENT SLURRY BACKFILL SEVEN DAYS MINIMUM TO CURE BEFORE MILLING.
   B. MILL EXISTING ASPHALT PAVEMENT AND SLURRY BACKFILL, ONE HALF THICKNESS OF EXISTING AC, (1" MINIMUM NOT TO EXCEED 2").
   C. AC SHALL BE HOT MIX.

4. AC RESURFACING SHALL BE SEALED OR CHIP SEALED WHEN SPECIFIED.

5. EXISTING AC PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.
CONCRETE TRENCH COVER
560-C-3250

EXISTING CONCRETE
PAVEMENT

EXISTING BASE OR OLD
CONCRETE PAVEMENT

CONCRETE BACKFILL
480-D-2000

SAND CEMENT
SLURRY BACKFILL
100-E-100

SELECT MATERIAL AND FOR
OPTION SEE NOTE 8

TYPE E

TYPE F

NOTES:
1. CONCRETE SLURRY BACKFILL SHALL HAVE A MAXIMUM SLUMP OF 4".
2. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMPER OR VIBRATORS SHALL
BE USED.
3. CONCRETE SHALL BE SCREED OFF TO MATCH EXISTING PAVEMENT GRADE AND FLOATED TO ASSURE PROPER EDGE MATCH.
4. CONCRETE TRENCH COVER SHALL BE A MINIMUM OF 5 1/2" THICK IN ALLEY OR LOCAL RESIDENTIAL STREETS AND 7" THICK IN ALL OTHER STREETS.
5. EXISTING CONCRETE PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.
6. IN MAJOR OR PRIME ARTERIAL STREETS, AN APPROVED SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, MAY BE USED ONLY WITH PRIOR APPROVAL OF THE ENGINEER.
7. ONLY TYPE E SHALL BE PERMITTED FOR SUPPLY CABLES OF 750 VOLTS OR LESS. SEE CALIFORNIA PUBLIC UTILITY COMMISSION GENERAL ORDER NO. 128, RULE 33.4 (1)(b).
8. SELECT MATERIAL WITH A MINIMUM SAND EQUIVALENT OF 50 SHALL BE BACKFILLED TO 3" MINIMUM ABOVE THE CONDUIT. SAND CEMENT SLURRY BACKFILL 100-E-100 MAY BE SUBSTITUTED FOR SELECT MATERIAL.
NOTES

1. CURB RAMPS SHALL BE INSTALLED AS SHOWN ON THE PLANS.
2. D = DISTANCE SHOWN ON PLANS.
3. R = RADIUS SHOWN ON PLANS 3' MINIMUM.
4. O = ELEVATIONS SHOWN ON PLANS (TOP OF CURB AND GUTTER ELEV.).
5. ——— —— = 12" EXPANSION JOINTS.
6. CONSTRUCTION OF ALLEY APRON INCLUDES THE ADJACENT 6" CURB.
7. REFER TO CURB RAMP DETAILS.

SECTION A-A

GUTTER ELEVATION SHOWN ON PLANS
TOE OF GUTTER ELEVATION
GUTTER ELEVATION
ELEVATION SHOWN ON PLANS
1 1/2" EXCEPT WHERE ELEVATIONS SHOWN INDICATE OTHERWISE

LEGEND ON PLANS

REVISION BY APPROVED DATE
ORIGINAL KA J. NAGELVOORT 01/12
CITY OF SAN DIEGO - STANDARD DRAWING

ALLEY APRON

SDG-120
TILE SHALL EXTEND TO THE FULL WIDTH OF CURB RAMP

DETAIL 1

Plan - Tile

Notes:
1. The detectable/tactile warning tile shall be slip resistant and consist of an inline pattern of raised truncated domes.
2. Color: The detectable/tactile warning tile shall be yellow conforming to federal standards 595B table IV, color no. 33538.
GENERAL CURB RAMP
NOTES & SUPPLEMENTAL DETAILS

NOTE:
CASE A THRU E MAY BE USED ONLY WITH APPROVAL OF THE ENGINEER.
NOTES:
1. WHERE AN ISLAND PASSAGeway LENGTH IS LESS THAN OR EQUAL TO 8'-0", THE DETECTABLE / TACTILE WARNING TILE SHALL EXTEND THE FULL WIDTH AND FULL LENGTH OF THE PASSAGeway. WHERE AN ISLAND PASSAGeway LENGTH IS GREATER THAN 8'-0", A DETECTABLE / TACTILE WARNING TILE SHALL EXTEND THE FULL WIDTH AND 3'-0" DEPTH OF THE PASSAGeway LENGTH.
2. THE DETECTABLE / TACTILE WARNING TILES AT FLUSH REFUGE OR PASSAGeway SHALL BE IN LINE WITH MEDIAN EDGE.
3. FOR FLUSH ISLAND PASSAGeway, DETECTABLE WARNING TILE SHALL BE STAINLESS STEEL OR REPLACEABLE PANELS PLACED ON CONCRETE PASSAGeway.
**DETAIL A**
TWO-RAMP CORNER INSTALLATION

**DETAIL B**
TYPICAL ONE-RAMP CORNER INSTALLATION

**SECTION A-A**

**DETAIL C**

**DETAIL D**
NOTES

1. AS SITE CONDITIONS DICTATE, 2 CURB RAMPS MAY BE USED FOR CORNER INSTALLATIONS SIMILAR TO THOSE SHOWN IN DETAIL A. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO THE APPLICATION OF CASES A THROUGH D SHEET 2 OF 5.

2. WHEN A CURB RAMP IS LOCATED IN THE CENTER OF THE CURB RETURN, CROSSWALK CONFIGURATION SHALL BE SIMILAR TO DETAIL B.

3. CURB RAMP SURFACES (FLARES AND RAMP) SHALL HAVE A MEDIUM TO HEAVY BROOM TEXTURED FINISH, PERPENDICULAR TO THE AXIS OF TRAVEL.

4. THE CURB RAMP SHALL BE OUTLINED WITH A 12" BORDER, WITH 1/4" GROOVES APPROXIMATELY 3/4" ON CENTER. SEE DETAIL C.

5. CURB RAMPS SHALL BE CONCRETE CLASS 520-C-2500.

6. INSTALL 1/4" EXPANSION JOINT FILLER MATERIAL BETWEEN A NEW CURB RAMP AND THE EXISTING SIDEWALKS.

7. TOOLED JOINT - PROVIDE 1/4" DEEP GROOVE WITH 1/4" RADIUS EDGES. GROOVE SHALL NOT EXTEND TO BOTTOM CURB OR GUTTER.

8. IF OBSTRUCTIONS SUCH AS INLETS, POLES, FIRE HYDRANT, ETC., ARE ENCOUNTERED, THE RAMP LOCATION(S) MAY BE ADJUSTED ONLY UPON THE EVALUATION & APPROVAL OF THE ENGINEER.


10. IF THE 4 1/2% MAXIMUM COUNTER SLOPE AT THE BOTTOM OF THE RAMP (AT STREET TRANSITION) CANNOT BE ACHIEVED DUE TO EXISTING CONDITIONS, THE RAMP SLOPE SHALL BE ADJUSTED SO THE SUM OF BOTH SLOPES DOESN'T EXCEED 13.3%.

11. IF THE CONDITION OF THE STREET AND SIDEWALK IS SUCH THAT THE EXISTING SLOPES DO NOT ALLOW THE INSTALLATION OF THE REQUIRED CURB RAMP SLOPE, THEN THE RAMP SHALL BE EXTENDED UP TO A MAXIMUM LENGTH OF 15'-0" (LINEAR FEET) TO CATCH THE REQUIRED SLOPE EVEN IF THE REQUIRED SLOPE IS NOT ACHIEVED. COORDINATION WITH ENGINEER IS REQUIRED PRIOR TO ANY DEMOLITION OR CONSTRUCTION.

12. THE REMOVAL OF EXISTING CONCRETE CURB, GUTTER, SIDEWALK, AND PAVEMENT (OR CURB RAMP) FOR A NEW CURB RAMP SHALL COMPLY WITH SDG-156. THE REMOVAL OF ADDITIONAL SIDEWALK PANELS MAY BE REQUIRED TO MEET EXISTING GRADE AND TO COMPLY WITH THE ACCESSIBILITY REGULATIONS.

13. PROVIDE A 2" X 2" KEYWAY BENEATH SAWCUT EDGES OF THE EXISTING SIDEWALK.

14. THE CROSS SLOPE OF THE RAMP SHALL BE 1.5%.

15. WATER PONDING WITHIN THE CURB RAMP LIMITS IS NOT ALLOWED.

16. NO GRADE BREAK IS ALLOWED ALONG THE RAMP SURFACE.

17. IF THE CROSS SLOPE OF THE SIDEWALK ADJACENT TO THE CURB RAMP IS MORE THAN 2%, PROVIDE A MINIMUM 4' TRANSITION.

18. HISTORICAL STAMPS/IMPRESSIONS SHALL BE PRESERVED PER SDG-115.

19. UTILITY PULL BOXES, MANHOLES, VAULTS AND OTHER UTILITY FACILITIES WITHIN THE BOUNDARIES OF THE CURB RAMP SHALL BE RELOCATED OR ADJUSTED TO GRADE PRIOR TO, OR IN CONJUNCTION WITH THE CURB RAMP CONSTRUCTION. COORDINATE WITH THE ENGINEER.

20. ANY DEVIATION FROM THESE PROVISIONS REQUIRES PRIOR APPROVAL BY THE ENGINEER.
**NOTE:**
1. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.
NOTES

1. TYPE C1 CURB RAMP SHALL ONLY BE USED TO MITIGATE EXISTING CONDITIONS WHERE INADEQUATE RIGHT OF WAY EXISTS. TYPE C1 SHALL BE USED WHEN X<8'. X=DISTANCE FROM FACE OF CURB TO PROPERTY LINE.

2. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.
1. TYPE C2 CURB RAMP SHALL ONLY BE USED TO MITIGATE EXISTING CONDITIONS WHERE INADEQUATE RIGHT OF WAY EXISTS. TYPE C2 SHALL BE USED WHEN X = 8' OR 8' < X < 10'. X = DISTANCE FROM FACE OF CURB TO PROPERTY LINE.

2. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.
NOTES:

1. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAILS DRAWINGS.
3. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND / OR DATE) SHALL BE PRESERVED.
**NOTES:**

1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAIL DRAWINGS.
3. ON THE SIDE OF OF SUPER ELEVATED CURVES THE GUTTER SHALL BE SLOPED TO MATCH CROSS SECTION GRADE OF THE ROADWAY.
4. PLACE EXPANSION JOINTS AT CURB RETURNS ADJACENT TO STRUCTURES AND AT NO GREATER THAN 45' INTERVALS.
5. PLACE WEAKENED PLANE JOINTS AT DRIVEWAYS AND AT 15' INTERVALS FROM POINT OF CURB RETURN.
6. ALL HISTORICAL STAMPS / IMPRESSIONS SHALL BE PRESERVED.

**LEGEND ON PLANS**

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* WITH 6" CURB FACE

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**CITY OF SAN DIEGO - STANDARD DRAWING**

**CURB AND GUTTER - COMBINED**

**ORIGINAL**

**DRAWING NUMBER** SDG-151

**REVISION BY APPROVED DATE**

**COORDINATOR** R.C.E. 85271

**DATE** 1/31/2012
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAIL DRAWINGS.
3. EXTRUDED TYPE B-3 CURB SHALL BE ANCHORED TO EXISTING PAVEMENT.
4. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND/or DATE) SHALL BE PRESERVED.
NOTES:

1. CONCRETE SHALL BE 520-C-2500.

2. SEE JOINT DETAIL DRAWINGS.

3. SIDEWALK SHALL MAINTAIN A MINIMUM CLEAR WIDTH OF 4' OF TRAVEL FROM ANY OBSTRUCTION.

4. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND/OR DATE) SHALL BE PRESERVED.

5. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

LEGEND ON PLANS

- 1/2" R
- 1.5% GRADE
- 2" WEAKENED PLANE JOINT

CITY OF SAN DIEGO - STANDARD DRAWING

SIDEWALK - TYPICAL SECTIONS

SDG-155
EXISTING SCORE MARK  
AREA TO BE REMOVED  
8', OR FROM 
JOINT TO JOINT IN PANEL 
WHICHER IS LESS

EXISTING JOIN T

SIDEWALK PLAN

EXISTING SCORE MARK  
AREA TO BE REMOVED  
5', OR FROM 
JOINT TO JOINT IN PANEL 
WHICHER IS LESS

EXISTING JOIN T

EXISTING JOINT OR EDGE

AREA TO BE REMOVED 5', OR FROM 
JOINT TO JOINT IN PANEL 
WHICHER IS LESS 
30' MIN

EXISTING JOINT OR EDGE

CURB LINE

PAVEMENT SECTION

EXISTING SCORE MARK  
AREA TO BE REMOVED 5', MIN

EXISTING JOINT OR EDGE

5' MIN FROM 
EXISTING JOINT OR EDGE OF PAVEMENT

REMAINING EDGE TO BE 
SMOOTH AND TRUE WITH 
NO SHATTER

SECTION SHOWING CUT

CONCRETE TO BE REMOVED

SAW CUT

NOTES:

1. SIDEWALK CROSS SLOPE SHALL BE 1.5%.

2. 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.

3. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) 
SHALL BE PRESERVED.

4. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN COLOR, 
TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

CITY OF SAN DIEGO - STANDARD DRAWING

CONCRETE CURB, GUTTER, 
SIDEWALK AND PAVEMENT 
REMOVAL AND REPLACEMENT

REVISION BY APPROVED DATE

COORDINATOR R.C.E. 69271

DRAWING NUMBER SDG-156

1/31/2012
NOTES:

1. CONCRETE SHALL BE 560-C-3250.
2. WEAKENED PLANE JOINTS.
3. TYPICAL FLOWLINES.
4. ELEVATIONS TO BE SHOWN ON PLANS.
5. RETURN SEGMENTS TO BE 7" THICK.
6. CURB BETWEEN POINT OF CURB RETURNS (PCR) SHALL BE A MONOLITHIC POUR WITH THE CROSS GUTTER.
7. IN ALL CASES SUBGRADE SHALL BE COMPACTED TO 95% MIN RELATIVE COMPACTION TO A DEPTH OF 12".
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
TRANSITIONAL CROSS SLOPE OF GUTTER TO MATCH CROSS GUTTER SLOPE

CURB

GUTTER CROSS SLOPE

PLAN

SECTION A-A

7" UNLESS OTHERWISE SHOWN ON PLANS

1. CROSS GUTTER TO BE CONSTRUCTED WHERE THE DRAINAGE IS CARRIED ACROSS 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% MIN RELATIVE COMPACTION TO A DEPTH OF 12".
5. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

LEGEND ON PLANS

CITY OF SAN DIEGO – STANDARD DRAWING

MID-BLOCK CROSS GUTTER

SDG-158
PLACE 1/4 INCH EXPANSION JOINTER FILLER MATERIAL

NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500 FOR RESIDENTIAL USE; 560-C-3250 FOR COMMERCIAL USE.
3. SEE DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS FOR CURB AND JOINT DETAILS.
5. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.
6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
7. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7 1/2" PCC THICKNESS MINIMUM.
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

SECTION A-A
TYPE - A

CONCRETE DRIVEWAY
(CONTIGUOUS SIDEWALK)
NOTES:
1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520-C-2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560-C-3250.
3. SEE STANDARD DETAIL DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVeway RAMP TO EXTEND TO 10' FROM CURB FACE OR TO RIGHT-OF-WAY, WHICHEVER IS LESS. (FOR COMMERCIAL USE ONLY).
5. PLACE EXPANSION JOINT AT RIGHT-OF-WAY OR 10', WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6' CURB HEIGHT.
8. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
9. DRIVeway IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7 1/2' PCC THICKNESS MINIMUM.
10. ALL HISTORICAL STAMPS/IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
11. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
TRANSITION

PLACE 1/4 INCH EXPANSION JOINT FILLER MATERIAL

~ A ~
I u ~
§ I ~
9.67% 1.5% 1.5%
3'-0" MIN
5'-0" PARKWAY
1.5% 1.5%
5'-6"

SIDEBALK

PLAN

DEPRESSED CURB
GUTTER

CURB LINE

PARKWAY

MIN

DRIVEWAY CURB OPENING

DRIVEWAY WIDTH

SHOWN ON PLANS

BOTTOM OF CURB

EDGE OF SIDEWALK

ELEVATION

SECTION A-A

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS FOR CURB AND JOINT DETAILS.
5. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.
6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
7. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7" PCC THICKNESS MINIMUM.
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, DATE) SHALL BE PRESERVED.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
It is... ...

I \~ /ALK

\~-\CONTIGUOUS SIDEW

\~ I/1/

CURB LINE

PLAN

\\ \ DRIVETWAY CURB OPENING
\\ \ DRIVETWAY WIDTH
\\ \ SHOWN ON PLANS

BOTTOM OF CURB

ELEVATION

EDGE OF SIDEWALK

SECTION A-A

GUTTER

\-R TYP

5 12" 1.5%

NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE DETAILS DRAWINGS 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. SEE DETAILS DRAWINGS FOR CURB AND JOINT DETAILS.
6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
7. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
8. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ADJACENT PROPERTIES.
MONOLITHIC CURB IF SPECIFIED OR REQUIRED PRIVATE DRIVEWAY

PLAN

DRIVEWAY CURB OPENING

BOTTOM OF CURB

ELEVATION

SECTION A-A

NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500 FOR RESIDENTIAL USE; 560-C-3250 FOR COMMERCIAL USE.
3. SEE DETAILS DRAWING FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWING FOR CURB AND JOINT DETAILS.
5. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
6. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:
1. CONCRETE SHALL NOT BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED AND APPROVED BY THE RESIDENT ENGINEER.
2. CONCRETE SHALL BE 560-C-3250.
3. SEE DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS FOR CURB AND JOINT DETAILS.
5. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY. SEE WS-03.
6. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL BE A MINIMUM OF 7" PCC.
7. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:

1. Curb openings, except for joint-use driveways and driveways on lots having 21'-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 roadway from the front of the property, 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 city.
**NOTES:**

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

**APPROX. DIKE QUANTITIES**

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<th>REQD PER LIN. FT.</th>
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<tr>
<td>A</td>
<td>25.4kg (0.0250 tn.)</td>
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<tr>
<td>B</td>
<td>38.1kg (0.0375 tn.)</td>
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<tr>
<td>C-152mm (6&quot;)</td>
<td>38.1kg (0.0375 tn.)</td>
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<td>C-203mm (8&quot;)</td>
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<td>C-229mm (9&quot;)</td>
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<td>D</td>
<td>63.3kg (0.0623 tn.)</td>
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<td>E</td>
<td>41.4kg (0.0407 tn.)</td>
</tr>
<tr>
<td>F</td>
<td>63.3kg (0.0623 tn.)</td>
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**Concrete Joint Details**

Expansion Joint

- 8mm (1/4"
- 3mm (1/8"
- 13mm (1/2") (Pavement)
- 9.5mm (3/8") (Sidewalk)

Contact Joint

- 13mm (1/2") x 610mm (24"
- Smooth, Greased or Oiled Bar,
- 762mm (30") center to center.

Weakened Plane Joint

- 3mm (1/8"
- 4.8mm (3/16"

Keyed Joint

- 38mm (1-1/2"
- 3mm (1/8"
- 41mm (1-5/8"

---

**Revision:** ORIGINAL  
**By:** Parkinson  
**Approved:** 2/95  
**Date:**  
ADD METRIC: T. Stanton 03/03  
**Reformatted:** T. Stanton 04/08  
**SAN DIEGO REGIONAL STANDARD DRAWING: **

**CONCRETE JOINT DETAILS**

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

**DRAWING NUMBER:** G-10  
**August 2009**
**REQUIREMENT 1**
No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb as shown by arc A.

**REQUIREMENT 2**
No portion of any curb opening shall be permitted in the curb return where the radius of curb is 7.62m (25') or less, as shown by arc B.

**REQUIREMENT 3**
On all curb returns where the radius is more than 25', curb openings may encroach upon each end of the return a distance equal to 12 1/2% or .125 (1/8) of the total length of the arc on the curb return, thus leaving at least 75% of the length of arc on the return face free from driveway encroachment, provided Requirement 1 is met.

**REQUIREMENT 4**
No portion of any curb opening shall be permitted in the curb return where a separate turning movement is provided, as shown by arc C.

---

*San Diego Regional Standard Drawing: Driveway Location - Adjacent to Curb Returns and Street Lines*
NOTES:
1. Concrete shall be 332 kg/m³ C 22 Mpa (560-C-3250).
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

SECTION

- Contact Joint
- Pavement Width = 12.2m (40') or less
- 6.1m (20') max.
- 3.0m (10') min.

PLAN

- Weakened Plane Joints
- Contact Joints
- Transverse Contact Joints shall be constructed at end of Pour
- Expansion Joints shall be constructed at locations shown on plans.

Revision

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<th>Approved By</th>
<th>Date</th>
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<td>T. Stanton</td>
<td>03/03</td>
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<td>T. Stanton</td>
<td>04/06</td>
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SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE PAVEMENT
WIDTH 12.2m (40') OR LESS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Dale T. Stanton, R.C.E. 19246

DRAWING NUMBER G-18

August 2009
NOTES:
1. Concrete shall be 332 kg/m³ C 22 Mpa (580–C–3250).
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Pavement Width = 19m (62') or less, but more than 12.2m (40')

SECTION

PLAN

3.35m (11') 3.35m (11') 6.1m (20') max

3.0 m (10') min

Contact Joints

13mm (1/2") R

Weakened Plane Joints

Contact Joints

Transverse Contact Joints shall be constructed at end of Pour

4.57m (15') 4.57m (15') 4.57m (15')

Expansion Joints shall be constructed at locations shown on plans.

SAN DIEGO REGIONAL STANDARD DRAWING
CONCRETE PAVEMENT
WIDTH 12.2m (40') TO 19m (62')

August 2009
NOTES:
1. Concrete shall be 332 kg/M^2 C 22 Mpa (560–C–3250).
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.
NOTES:
1. Concrete shall be 332 kg/m³ C 22 Mpa (560-C-3250).
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.
The diagram shows an elevation view of a pavement section. The section includes details such as the Curb and Gutter, Surface Course, Expansion Joint, Base Course, and measurements.

- **Elevation**: 1.524 m (5' 0") A
- **Elevation**: 457 mm (1' 6")

**Section A-A**

- **332 kg/m³ C 22 Mpa (520-C-2500 Concrete)**
- **203 mm (8'')**

**Legend on Plans**

**San Diego Regional Standard Drawing**

**Cutoff Wall**

**At End of Pavement**

**Drawing Number**: G-22

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

**August 2009**
ELEVATION

SECTION A-A

LEGEND ON PLANS
NOTES
1. Trench resurfacing shall be done according to governmental (permitting) agency's requirements.

2. The sand used for the slurry backfill shall meet the requirements for fine aggregate (subsection 400-1.3) listed in the Standard Specifications for Public Works Construction. Slurry must be firm prior to trench resurfacing.

3. Slurry backfill shall not be used where it will impede subsurface drainage.
CHAPTER 5
SPRINKLER IRRIGATION SYSTEMS
NOTES:

1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLOM TAPE SHALL BE USED ON THREADED 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.
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 SDI-103, 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. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.

6. CLOSE NIPPLES SHALL NOT BE USED.

7. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER ALL HEADS.
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. TEFNON 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.
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. TEFLOM TAPE SHALL BE USED ON ALL THREADED CONNECTIONS.

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

CITY OF SAN DIEGO - STANDARD DRAWING

ISOLATION GLOBE/GATE VALVE
2 1/2" AND LARGER
FINISHED GRADE

15" FOR LATERALS
24" UNDER PAVEMENT

21" FOR MAINLINE
(30" UNDER PAVEMENT)

9'-12"

BACKFILL FREE OF ROCK AND DEBRIS.

3" WIDE BLUE METALLIC TRENCH MARKER TAPE OVER EVERY MAINLINE. (PURPLE FOR RECYCLED WATER)

3" RED PLASTIC TRENCH MARKER TAPE FOR CONTROL WIRE.

SE50 PLASTER OR MORTAR SAND.

2" BEDDING

PVC OR COPPER PIPE

CONTROL WIRES

6" MIN 6" MIN

MAINLINE TRENCH

NOTES:

1. BACKFILL MATERIAL SHALL BE COMPACTED TO A RELATIVE COMPACATION 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. SPlicing SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE STANDARD DRAWING SDI-115 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. SEAL CONDUIT OPENINGS WITH ELECTRICAL CONDUIT SEALANT AS APPROVED BY THE ENGINEER.
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 / GROUNDCOVER 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 PIPE AND FITTINGS DOWNSTREAM SHALL BE SCH 80 PVC.
11. Teflon TAPE SHALL BE USED ON THREADED CONNECTOR.

LEGEND ON PLANS
\[ \text{MV} \]

CITY OF SAN DIEGO - STANDARD DRAWING

MASTER VALVE

SDI-111
CONCRETE VALVE BOX

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

FLOW SENSOR CENTERED IN BOX.

PLAN

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

CONTROL WIRE 24" LEAD LENGTH (COILED WITH WEATHERPROOF PLASTIC I.D. TAG)

FINISHED GRADE

MULCH DEPTH, PER PLAN

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

MAINLINE TO SYSTEM

ELBOW WITH CONCRETE BLOCK 9" x 9" x 9"

SCH 80 PVC LENGTH 5X PIPE DIAMETER

ELEVATION

FLOW

1" MIN PVC CONDUIT FOR FLOW SENSOR DATA CABLE TO CONTROLLER.

4" MIN

2" MIN

36" PEA GRAVEL 4" MIN DEPTH

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

LEGEND ON PLANS

F FS

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.

CITY OF SAN DIEGO - STANDARD DRAWING

FLOW SENSOR

SDI-112
CONCRETE VALVE BOX WITH LOCKING TOP AS APPROVED BY THE ENGINEER

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

CONCRETE RECTANGULAR VALVE BOX WITH HINGED CAST IRON, SELF-Locking, Lid, Imprinted W/RCV AND CONTROLLER ID LETTER ON Lid.

FINISHED GRADE

CONTROL WIRES 24' LEAD LENGTH (COILED WITH VALVE ID TAG)

3" MIN

12" MAX

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

SIDEWALK OR MOW CURB

COMPACT SOIL AROUND VALVE BOX

NIPPLE, ELBOW AND RISER FROM MANIFOLD TEE OR ELBOW AS SHOWN / NOTED ON SDI-133 UNLESS OTHERWISE SPECIFIED.

ELEVATION

FINISHED GRADE (TURF)

PVC PIPE AND ELBOW, SCH 40

15'

RED BRASS

38" PEA GRAVEL

4" MIN DEPTH

NIPPLES AND ELBOW, SCH 80

PVC UNION

NOTES:
1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 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 / GROUND COVER 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. TEFOLUM TAPE SHALL BE USED ON THREADED CONNECTIONS.

LEGEND ON PLANS

\[ \text{RCV} \]

REMOTE CONTROL VALVE

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 86271 DATE 1/31/2012

DRAWING NUMBER SDI-114
UNMORTARED STANDARD BRICKS (4) FOUNDATION ON COMPACTED SUBGRADE (USE 6 BRICKS FOR OVERSIZED BOXES)

CONDUIT WIRE RUN

CONCRETE PULL BOX

PLAN VIEW

FINISHED GRADE

LOCKABLE HINGED CAST IRON TOP IMPRINTED "ELECTRIC"

LOOP 24" MIN OF CONTROL WIRES INTO PULL BOXES

BEDDING MATERIAL

ELEVATION

CONTROL WIRE RUN

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 HARNESSED 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.

LEGEND ON PLANS

PB

CITY OF SAN DIEGO – STANDARD DRAWING

ELECTRICAL PULL BOX
FOR DIRECT BURIAL CONTROL WIRES
AND SPLICING NOTES

REVISION BY APPROVED DATE
ORIGINAL RH. NAGELVOORT 09/12

COORDINATOR R.C.E. 85271 DATE 1/31/2012

DRAWING NUMBER SDI-115
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

ELECTRICAL PULL BOX

FINISH GRADE

CONCRETE PAD TO SLOPE AWAY FROM CONTROLLER COLUMN

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.
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 ENGINEER.

LEGEND ON PLANS

CONDUIT SWEEPS TO TRENCH DEPTH. REFER TO TRENCH DETAIL.
BUILDING WALL

CONTROLLER ASSEMBLY

POWER SWITCH AND GFI RECEPTACLE

CONDUITS

STEEL CONDUIT STRAPS AND FASTENERS

GROUNDING ROD PER MANUFACTURER'S SPECS

PULL BOX

3' MAX

CONTINUOUS CONDUIT WITH SWEEPS TO TRENCH DEPTH. REFER TO TRENCH DETAIL.

SIDE VIEW

LABEL ENCLOSURE DOOR WITH CONTROLLER DESIGNATION USING 2" BLACK VINYL LETTERS AND NUMBERS.

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.

FRONT VIEW

PRE ASSEMBLED STAINLESS STEEL BACK BOARD MOUNTED PER MANUFACTURERS RECOMMENDATIONS

GROUNDING ROD PER MANUFACTURER'S SPECS

CONTROLLER POWER SOURCE CONDUIT

POWER SWITCH AND GFI RECEPTACLE

CONDUITS - PVC SCH 40

SEAL CONDUITS AT BOTH ENDS.

(1) FOR CONTROL WIRES.

SEE NOTE #1 BELOW.

(1) 1" FOR MASTER VALVE WIRE.

(1) 1" FOR FLOW SENSING CABLE.

(2) 1" SPARE.

STEEL CONDUIT STRAPS AND FASTENERS, 4 PER CONDUIT.

CITY OF SAN DIEGO - STANDARD DRAWING

AUTOMATIC IRRIGATION CONTROLLER

INDOOR WALL MOUNTED

SDI-118
NOTES:

1. BEDDING MATERIAL SHALL BE 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.
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

SWING JOINT AND PIPE INSTALLATION ON SLOPES ABOVE GROUND PIPE INSTALLATIONS
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 THREADED CONNECTIONS.
NOTES:
1. WIRE SPlicing SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICE / SOLDERING NOTES.
2. SPARE WIRES TERMINATING IN VALVE BOXES SHALL HAVE THEIR ENDS INSULATED, THE SAME AS FOR A SPLICE.
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 ENGINEER.
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 / GROUND COVER 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. TEFLOn TAPE SHALL BE USED ON THREADED CONNECTIONS.

LEGEND ON PLANS

REMOTE CONTROL VALVE
DRIP IRRIGATION

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE
COORDINATOR R.C.E. 65271 DATE
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. TEFOLON TAPE SHALL BE USED ON THREADED CONNECTIONS.
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.
CHAMFER AS NEEDED TO ELIMINATE SOIL SLOUGHING.

1:1 MAX SLOPE.

PLANT TABLETS PER SPECS., MAX 3" DEEP.

TREE STAKES (TYP)

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

DO NOT REMOVE SIDE GROWTH ALONG TRUNK. PRUNE ONLY AS DIRECTED BY ENGINEER.

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.

TOP OF ROOT BALL 1" ABOVE FINISHED GRADE.

6" FROM LOWEST OR NEAREST BRANCH.

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

PLANT TABLETS PER SPECS., MAX 3" DEEP.

TREE BUBBLERS ON UP HILL SIDE OF TRUNK (SDI-104)

4" PVC RIGID PERFORATED BREATHER TUBE

PLANTER HOLE

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

EACH TREE TIE SHALL BE NAILED TO STAKE USING GALVANIZED NAILS.

TOP OF ROOT BALL 1" ABOVE FINISHED GRADE.

2"-3" MULCH, 3" CLEAR FROM TRUNK.

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 PIT.

BACKFILL

SCARIFY BOTTOM AND EDGES OF PLANT PIT.

UNDISTURBED NATIVE SOIL

4" PVC RIGID PERFORATED BREATHER TUBE

TREE STAKES (TYP)

PLANTER HOLE

4" HIGH BERM FIRMLY COMPACTED

2" PVC RIGID PERFORATED BREATHER TUBE PLANTER HOLE

TREE BUBBLERS (SDI-104)

TREE TRUNK

4" PVC RIGID PERFORATED BREATHER TUBE

PLANTER HOLE

A - SLOPES

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.
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.

SHRUB PLANTING - SLOPES

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).

Edge of planting area.

Ground cover spacing.

City of San Diego - Standard Drawing

Shrub planting/ground cover spacing

Recommended by the City of San Diego Standards Committee

1/31/2012

Coordinator R.C.E. 65271 Date

Drawing Number SDL-102
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 ENGINEER.
EXPANSION JOINT TYP
BASE OF TRUNK
SHALL BE
FLUSH WITH TOP OF GRATE
SEE NOTE 3
GRATE
EXISTING CURB

NOTES:
#3 OR #4 SMOOTH DOWEL 8",
GREASED ON ONE END,
18" OC, TYP.

SECTION A-A
(CONCRETE SUPPORTS)

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. GRATE 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. GRATE 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-FLUSH 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. GRATE 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 GRATE DESIGN FOR APPROVAL.
WEAKENED PLANE JOINT

MIN CLEAR

TURF FINISH
GRADE 12" BELOW CONCRETE

NEW CONCRETE WALK

PULL BOX

MIN CLEAR

TURF FINISH
GRADE 12" BELOW CONCRETE

R 2'-3"
LIGHT POLE

R 2'-3"
LIGHT POLE

SQUARED WHEN POURED NEXT TO EXISTING WALK.

MONOLITHIC CONCRETE PLACEMENT

PAD WHEN ADJACENT TO EXISTING CONCRETE

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 EDGED BOX WITH BRICK FOUNDATION)

CITY OF SAN DIEGO - STANDARD DRAWING

LIGHT POLE PAD IN TURF AREAS

SDL-105
NOTE:
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 SDL-104.
NOTES:

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

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

FILTER FABRIC

PIPE TO EXTEND INTO THE
GRAVEL SUMP

3/4" GRAVEL SUMP AT BOTTOM OF
PERFORATED DRAIN PIPE

FLAT, BLACK SLOTTED GRATE
(FASTEN TO PIPE WITH
STAINLESS STEEL SCREWS (2))

PLASTIC TAPE OVER HOLES
WITHIN 6" OF FINISHED GRADE

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

DETAIL - A
BREATHER TUBE

SDL-107
CHAPTER 7
MISCELLANEOUS
Y = 2.25 \frac{W(X^2)}{L}

L = LENGTH OF TRANSITION
W = MAXIMUM OFFSET DISTANCE
X = DISTANCE ALONG BASELINE
Y = OFFSET FROM BASELINE

### DISTANCE X

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**NOTE:**
To determine offset distance for any length of transition use the formula $Y = 2.25W\frac{X^2}{L}$ for the portions AB and C'D which are parabolic curves. The portion B'C is a tangent. When the baseline is curved, the offsets are applied to the curved baseline, and B'C is no longer a tangent.
NOTES
1. LETTER STYLE: FUTURA BOLD CONDENSED
2. LETTER SIZE: 6" 5" 2 1/2"
3. CITY SEAL: 4"
4. BACKGROUND: TYPE IV PRISMATIC SHEETING
5. ELECTRO CUT BLUE OVER WHITE
6. .065 ALUMINUM
7. MOUNTED TO TELSPAR WITH 3/8" DRIVE RIVETS
8. 4" TALL BY 1 1/4" SQ. CHANNEL SPACER HELD WITH VHB 4950 TAPE
9. CONTACT CITY OF SAN DIEGO SIGN SHOP, (619) 527-7528 FOR A LIST OF APPROVED VENDORS FOR CITY SEAL.
PERMANENT STREET NAME SIGNS

GENERAL:
Street name sign assembly for post top mounting shall consist of name blade units, 24" long 1 1/2" square telespar extension and drive rivets. All as indicated on the standard drawings and/or specified in these notes. Assemblies shall be mounted to 1 3/4" square telespar posts.

NAME BLADE UNITS:
Name blade units shall be single faced and made from 10" wide (top to bottom) aluminum sheet stock, mill flat, 6061-T6 or 5052 alloy, .063 thick. Ends of blade shall be perpendicular to top bottom edges. Edges shall be free of sharp burrs. Each blade shall be drilled with two 7/16" holes, one at top and at bottom edge of sign. Holes to be centered on blade and 1/2" from edge.
Blade shall be covered with type IV prismatic white reflective sheeting.

LETTERING:
Street name shall be cut from blue E.C. film material and applied over the white background, creating a sign with a blue background and white lettering. Type font shall be Futura Bold Condensed. Lettering height of street name shall be 6" for first letter and 5" for the rest of the name. Street and block number suffix shall be 2 1/2" Futura Bold Condensed. Layout to be as shown on Sheet 1 of 4 on the standard drawing.

MOUNTING OF SIGN:
Each name blade shall be mounted to the 1 1/2" telespar extension with a 3/8" drive rivet. Each street name shall be mounted back to back with the telespar sandwiched in between and the ends fastened together with VHB double stick tape. A square channel spacer is required on blades shorter than 36". The extension is to be placed inside the 1 3/4" telespar post and fastened with a drive rivet.
STREET NAME SIGN STANDARDS

SUFFIX AND PREFIX ABBREVIATIONS:

AVENUE AVE
STREET ST
COURT CT
DRIVE DR
ROAD RD
BOULEVARD BLVD
TERRACE TER
MOUNTAIN MTN
MOUNT MT
POINT PT
CAMINITO CMTO
CAMINO CAM
RANCHO RCHO

SPELL OUT "FIRST AVE THROUGH TWELFTH AVE"
THEN: 13TH ST – 14TH ST ETC.

NOTE:
FOR A COMPLETE LIST OF SUFFIX AND PREFIX ABBREVIATIONS REFER TO THE OFFICIAL USPS ABBREVIATION.
LOCATION NOTES

1. ALONG MAJOR OR PRIMARY STREETS
   THERE SHALL BE 2 SIGN INSTALLATIONS
   PER INTERSECTION PLACED ON
   OPPOSITE CORNERS

2. ALONG A COLLECTOR OR LOCAL
   STREETS THERE SHALL BE ONE
   SIGN INSTALLATION PER INTERSECTION

STREET NAME SIGN LOCATION
(NUMBERS INDICATE PRIORITY OF LOCATION
SELECTION WHEN THERE IS A CONFLICT
WITH OTHER IMPROVEMENTS)
NOTES
1. ALL DIMENSIONS ARE TYPICAL UNLESS OTHERWISE NOTED.

2. THE LOCATION OF UTILITIES AS SHOWN BY THE STANDARD DRAWING SHALL IN NO WAY VIOLATE EXISTING CODES OR REGULATIONS APPLICABLE TO INDIVIDUAL UTILITIES.

3. INSTALLATION OF SEWER OR WATER UTILITIES ARE NOT PERMITTED IN THE JOINT TRENCHES SHOWN ABOVE.

4. MINIMUM DEPTH OF GAS Pipe MAY, SUBJECT TO GAS COMPANY INSPECTORS APPROVAL, BE REDUCED TO 24" WHERE NECESSARY TO CLEAR STRUCTURE CROSSINGS.

5. DEPTH AND WIDTH OF TRENCH VARIES.

6. CATV MAIN OR TRUCK LINE CONDUIT REQUIRED ALONG ALL STREETS, EXCEPT CUL-DE-SAC STREETS LESS THAN 1000' IN LENGTH WHICH MAY BE SERVED BY FEEDER LINES ONLY.

7. CATV 1 1/2" FEEDER CONDUIT SHALL RUN ACROSS STREETS WITH EACH POWER SERVICE LINE AND CAPPED AT EDGE OF SIDEWALK.

8. ALL CATV TERMINALS AND CONDUITS SHALL BE TERMINATED AT GENERALLY ACCEPTED LOCATIONS AND MARKED. A MAP SHALL BE FILED WITH THE CITY SHOWING THE LOCATIONS OF THE CATV SYSTEM.

9. IN NO CASE SHALL CATV CONDUITS BE PLACED WITHIN 12" OF GAS LINES, ALSO CONDUITS SHALL NOT BE PLACED DIRECTLY OVER GAS LINES.

10. CATV CONDUIT MAY BE PLACED WITH THE TELCO CONDUIT PROVIDED THE TELCO MINIMUM DEPTH IS HELD.

11. TRAFFIC SIGNAL CONDUIT SHALL BE PLACED WHERE STREET LIGHT CONDUIT IS ShOWN.
NOTES:
1. INSTALL DRINKING FOUNTAINS 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 SHALL DRAIN AWAY FROM FOUNTAIN.
4. USE RED BRASS BUSHING REDUCERS TO ADAPT TO FEED PIPE.
5. LOCATE DRINKING FOUNTAINS IN AN ALCOVE OR AT AREAS OUTSIDE THE PATH-OF-TRAVEL OTHERWISE PROVIDE PROTECTIVE RAILING PER SDM-108.
6. NO WATER PONDING IS ALLOWED IN LANDING AND ALCOVE AREAS.
NOTES:

1. UNLESS LOCATED IN AN ALCOVE, WING WALLS OR PROTECTIVE RAILINGS ARE REQUIRED ON BOTH SIDES OF DRINKING FOUNTAINS THAT PROJECT INTO THE PATH OF TRAVEL.

2. HANDRAILS AND GUARDRAILS MATERIAL & FINISH:
   A. PIPE RAILINGS SHALL BE HOT DIPPED GALVANIZED OR AUSTENITIC (NON-CORROSIVE) STAINLESS STEEL.
   B. PIPE RAILINGS SHALL BE SEAMLESS STEEL, ASTM A53 GRADE B.

3. THE LANDING SHALL BE PAVED WITH A SOLID AND STABLE MATERIAL WITH A SLIP-RESISTANT FINISH.
NOTE:

SIDEWALK SHALL HAVE A MINIMUM OF 4' CLEAR (PATH) PASSING PEDESTALS, PULLBOXES AND OTHER STRUCTURES.
NOTES:

1. AT CATCH BASIN LOCATIONS, JOINT TRENCH SHALL BE 7’ MINIMUM FROM BACK OF CURB TO INSIDE WALL OF TRENCH.

2. SEWER AND RECLAIMED WATER MAINS AND LATERALS SHALL BE DESIGNED TO CROSS UNDER POTABLE WATER MAINS WITH A MINIMUM VERTICAL SEPARATION OF 12”.

3. SEWER AND RECLAIMED WATER MAINS SHALL MAINTAIN A 10’ MINIMUM HORIZONTAL SEPARATION FROM ANY POTABLE WATER.
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 OR CALLED FOR IN THE SPECIAL PROVISIONS:
   A. BARBED WIRE
   B. EXTENSION ARM

3. CHAIN LINK FENCE SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION UNLESS SPECIFICALLY NOTED ON THIS DRAWING.

4. CHAIN LINK FENCE AND ALL FITTINGS SHALL BE BLACK 22 MIL PRESSURE - BONDED OR 7 MIL THERMALLY - FUSED VINYL COATED OVER 9 GAUGE ALUMINIZED STEEL CORE FABRIC PRIOR TO COATING. POSTS AND RAILS SHALL BE GALVANIZED STEEL PVC VINYL BONDED, 10 - 14 MIL (COLOR SHALL MATCH FABRIC).

5. CHAIN LINK FABRIC SHALL HAVE KNUCKLED FINISH ON TOP EDGE.
DRILL AND TAP FOR 0.625" X 20 PENTA BOLT S/S UNC THREAD, 1.50" DEEP C BORE 1.625" DIA X 0.625" DEEP

LIFTING HOOP 0.625" WIDTH

DRILL ALL THE WAY UP TO THE END

2" X 1.625" X 1.25" DEEP WITH 1.125" LIFTER IN BETWEEN

DRILL ALL THE WAY UP TO THE END

2" X 1.625" X 1.25" DEEP WITH 1.125" LIFTER IN BETWEEN

DRILL ALL THE WAY UP TO THE END

3.25" IN LENGTH WEDGE ANCHORS

NOTES:
1. 0.625" X 20 PENTA BOLT S/S UNC THREAD, 316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND 1.50" OD x 0.687" ID X 0.078" THICK 316 STAINLESS STEEL WASHER.
2. 0.25" NEOPRENE O-RING GASKET SHALL BE GLUED INTO MACHINED GROOVE. GLUE SHALL MEET THE REQUIREMENTS OF MIL-M-81288 (AMEND. 1).
3. BOLTDOWN PATTERNS:
   - M-1 DETAIL (COVER & FRAME): INSTALL TWO (2) BOLTS AT 180 DEGREES.
   - M-3A DETAIL (CONCENTRIC COVERS): BETWEEN INNER AND OUTER COVERS INSTALL TWO (2) BOLTS AT 180 DEGREES.
   - M-3B DETAIL (OUTER COVER & FRAME): BETWEEN OUTER COVER & FRAME INSTALL FOUR (4) BOLTS AT 90 DEGREES.
   - FOR M-1 AND M-3 OUTER COVER FRAME DRILL 4 HOLES FOR 0.375" X 16 STAINLESS STEEL WEDGE ANCHORS 3.75" IN LENGTH AT 90 DEGREES.
1. All footings shall be S20-C-2500 concrete.

2. Extension post shall be furnished and installed only when shown on the plans or called for in the special provisions.

3. Chain link fence shall conform to the standard specifications for public works construction unless specifically noted on the drawing.

4. Chain link fabric shall have knuckled finish on top edge.

Legend on Plans:

- Chain link gate
- Gate post
- Gate frame
- Truss rods
- Intermediate member
- Hinge
- Fittings
- Latch
- Stretcher bar
- Fastener
- Plunger bar
- Gate stop
- 10" diameter stop footing
- OMIT IF ROADWAY IS CONCRETE
- ROADWAY OR GROUND
- Half elevation double swing gate

NOTES:

- GATE STOP 10" DIAMETER STOP FOOTING
- Omit if roadway is concrete

- GATE STOP
- 10" CLEAR
- ROADWAY OR GROUND
- Diameter of footing = 4 times outside diameter of post.

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 86271 DATE 1/31/2012

DRAWING NUMBER SDM-114
Notes:
1. Gates that are accessible to and usable by persons with disabilities shall be provided with at least one International Symbol of Accessibility sign as shown above.
2. The running and cross slope within the level maneuvering clearance area shall be 1.5% and designed to prevent water from accumulating within the entire surface.
3. If the gate is not self-closing, provide acceptable gate hardware on both sides.
4. Provide 3/8" diameter tension rod and tightener for gates that are over 3' in width.
5. If provided, tie fabric top and frame with 11 gauge wire.
6. Latching and locking gates that are hand operated shall be operable with a single effort not to exceed 5-pound pressure.
7. The symbol contrast on sign shall be light on dark or dark on light.
8. Mounting height - the sign shall be installed on the fence/wall adjacent to the latch outside of the door. It shall be mounted to the centerline of the accepted gate hardware. Mounting location shall be determined so that a person may approach within 3' of signage without encountering protruding objects or standing within the swing door.
9. Landing & approach space shall comply with current CBC Title 24 and ADA/ADAS.

Legend on plans:
- Chain link gate
- Pedestrian gate
- Pedestrian gate
- Panorama
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- Chain link gate
LENGTH OF EACH SEGMENT OF RAMP RUN

<table>
<thead>
<tr>
<th>MAX SLOPE</th>
<th>MAXIMUM LENGTH OF EACH RAMP SEGMENT (L)</th>
<th>MAXIMUM RISE BETWEEN LANDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:15 (6.67%)</td>
<td>37.5&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>1:16 (6.25%)</td>
<td>40&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>1:17 (5.88%)</td>
<td>42.5&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>1:18 (5.55%)</td>
<td>45&quot;</td>
<td>30&quot;</td>
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<tr>
<td>1:19 (5.26%)</td>
<td>47.5&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>1:20 (5%)</td>
<td>50&quot;</td>
<td>30&quot;</td>
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</tbody>
</table>

NOTES:
1. WIDTH OF BOTTOM LANDING (W) TO EXIT SHALL BE AS WIDE AS THE RAMP IF NO CHANGE OF DIRECTION. 60" WIDE MINIMUM. IF CHANGE OF DIRECTION OF 30 DEGREES OR MORE.
2. NO WATER PONDING ALLOWED ON LANDINGS.
RAMP:

1. ANY WALKING SURFACE THAT IS PART OF AN ACCESSIBLE ROUTE WITH THE SLOPE GREATER THAN 5% SHALL BE CONSIDERED A PEDESTRIAN RAMP AND MUST COMPLY WITH THE PEDESTRIAN RAMP STANDARDS.

2. THE LEAST POSSIBLE SLOPE SHALL BE USED WITHOUT EXCEEDING 6.67%, PER CITY OF SAN DIEGO ACCESS MEMO.

3. CROSS SLOPE SHALL NOT EXCEED 1.5%.

4. LANDINGS SHALL HAVE 1.5% SLOPE IN BOTH DIRECTIONS.

5. WALKING SURFACE MUST BE STABLE, FIRM AND SLIP RESISTANT. CONCRETE SHALL HAVE A MEDIUM BROOM TRANSVERSE FINISH.

HANDRAIL:

1. HANDRAILS ARE REQUIRED ON BOTH SIDES OF A PEDESTRIAN RAMP.

   EXCEPTIONS:
   a. RAMPS AT EXTERIOR DOOR LANDINGS THAT RISE LESS THAN 6" OR HAVE LESS THAN 72" LENGTH. HOWEVER LEVEL LANDINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM.
   b. RAMPS IMMEDIATELY ADJACENT TO A SEATING IN ASSEMBLY AREAS.

2. HANDRAILS SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE RAMP RUN PLUS THE EXTENSION.

3. INSIDE HANDRAILS AT "U" SHAPED AND "L" SHAPED RAMPS SHALL BE CONTINUOUS.

4. HANDRAILS SHALL EXTEND 12" MINIMUM BEYOND THE TOP, INTERMEDIATE AND BOTTOM OF EACH RAMP SEGMENT IN THE DIRECTION OF THE RAMP RUN, THE HANDRAIL EXTENSION SHALL BE PARALLEL TO THE LANDING SURFACE.

5. HANDRAIL EXTENSION SHALL NOT EXTEND INTO THE REQUIRED WIDTH OF AN ADJACENT ROUTE OF TRAVEL IN EXISTING FACILITIES WHERE THE ENCROACHMENT OF THE EXTENSION IN THE DIRECTION OF THE RAMP CREATES A HAZARD. THE EXTENSION SHALL BE BENT 90 DEGREES TO THE RUN OF THE RAMP.

6. END OF HANDRAIL EXTENSION SHALL BE TURNED TO THE WALL, FLOOR OR POST.

7. END OF HANDRAIL EXTENSION SHALL BE TURNED TO THE FLOOR WHEN EXTENSION IS PROTRUDING PERPENDICULAR INTO PATH OF TRAVEL.

8. TOP GRIPPING SURFACE OF THE HANDRAIL SHALL BE UNIFORM IN HEIGHT. THE GRIPPING SURFACE SHALL BE CONTINUOUS AND SMOOTH (NO SHARP CORNERS).

9. THE GRIPPING PORTION SHALL BE 1-1/4" TO 1-1/2" IN CROSS SECTIONAL NOMINAL DIMENSION OR SHAPED WITH EQUIVALENT GRIPPING SURFACE DESIGN AND SHOP DRAWINGS SHALL BE APPROVED BY THE CITY ENGINEER ACCESS COMPLIANCE OFFICER PRIOR TO FABRICATION.

10. ADJACENT WALL OR OTHER SURFACES SHALL BE FREE OF ANY SHARP OR ABRASIVE ELEMENT (SMOOTH FINISH).

11. A GUARDRAIL 42" ABOVE FINISHED FLOOR SHALL BE INSTALLED ALONG OPEN EDGES OF THE RAMP AND LANDINGS THAT ARE 30" OR MORE IN HEIGHT FROM THE ADJACENT GROUND SURFACE AND THE RAMP IS NOT BOUNDED BY A WALL OR FENCE. SEE SDM-118.

12. PROVIDE A CONTINUOUS GUIDE CURB OR GUIDE RAIL IF POSTS ARE INSTALLED ON THE RAMP SURFACE OR IF THE FINISH SURFACE IS ≥ 4" HIGHER THAN THE ADJACENT GROUND SURFACE.

13. FOR HANDRAIL AND GUARDRAIL MATERIAL, FINISHES AND ADDITIONAL DETAILS, SEE RELATED DETAIL DRAWINGS.
PARKING REQUIREMENTS:

1. WHERE PARKING IS PROVIDED ON EACH FACILITY (LOT OR STRUCTURE), ACCESSIBLE PARKING SPACES SHALL BE PROVIDED.

   **MINIMUM REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING SPACES**

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY</th>
<th>MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES</th>
</tr>
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<tbody>
<tr>
<td>1-25</td>
<td>1</td>
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<tr>
<td>26-50</td>
<td>2</td>
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<tr>
<td>51-75</td>
<td>3</td>
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<tr>
<td>76-100</td>
<td>4</td>
</tr>
<tr>
<td>101-150</td>
<td>5</td>
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<tr>
<td>151-200</td>
<td>6</td>
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<td>201-300</td>
<td>7</td>
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<td>301-400</td>
<td>8</td>
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<tr>
<td>401-500</td>
<td>9</td>
</tr>
<tr>
<td>501-1,000</td>
<td>2% OF TOTAL</td>
</tr>
<tr>
<td>1,001 AN OVER</td>
<td>20, PLUS 1 FOR EACH 100, OR FRACTION THEREOF, OVER 100</td>
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EXCEPTIONS:

i. PARKING SPACES USED EXCLUSIVELY FOR BUSES, TRUCKS, OTHER DELIVERY VEHICLES, LAW ENFORCEMENT VEHICLES, OR VEHICULAR IMPOUND SHALL NOT BE REQUIRED TO COMPLY WITH THE PARKING RATIO PROVIDED THAT LOTS ACCESSED BY THE PUBLIC ARE PROVIDED WITH A PASSENGER LOADING ZONE COMPLYING WITH PASSENGER LOADING ZONE STANDARDS.

ii. 10% OF THE TOTAL NUMBER OF PARKING SPACES AT OUTPATIENT UNITS AND FACILITIES SHALL BE ACCESSIBLE.

iii. 20% OF THE TOTAL NUMBER OF PARKING SPACES AT UNITS AND FACILITIES SPECIALIZING IN TREATMENT OR SERVICES FOR PERSONS WITH MOBILITY IMPAIRMENTS SHALL BE ACCESSIBLE.

NOTES:

A. THE REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING STALLS IS PROVIDED FOR EACH PARKING LOT ON THE SITE.

B. AT LEAST ONE VAN PARKING SPACE IS REQUIRED FOR EVERY 6 OR FRACTION OF SIX PARKING SPACES. IN BUILDINGS OR FACILITIES WITH MULTIPLE ACCESSIBLE ENTRANCES WITH ADJACENT PARKING SPACES SHALL BE DISPERSED AND LOCATED CLOSEST TO THE ACCESSIBLE ENTRANCES. A VAN ACCESSIBLE SPACE SHALL BE PROVIDED AT EACH LOCATION.

C. VERTICAL CLEARANCE - PARKING SPACES FOR VANS AND ACCESS AISLE AND VEHICULAR ROUTES SERVING THEM SHALL PROVIDE A VERTICAL CLEARANCE OF 96" MINIMUM.

2. THE SURFACE OF THE ENTIRE AREA OF THE ACCESSIBLE PARKING SPACE(S) AND ACCESS AISLE(S) SHALL HAVE A SLOPE OF 1.5% IN ANY DIRECTION.

A. GUTTERS AND SWALES SHALL NOT TO BE INCLUDED IN THE OVERALL DIMENSIONS OF THE ACCESSIBLE PARKING SPACES AND ACCESS AISLES.

B. THE SURFACE SLOPE OF THE AREA IMMEDIATELY SURROUNDING THE ACCESSIBLE PARKING SPACE SHALL BE 1.5% FOR A WIDTH OF 4'-0".

C. ADEQUATE DRAINAGE SHALL BE PROVIDED SO THAT WATER DOES NOT ACCUMULATE WITHIN THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.

D. THE GUTTER SLOPE AT THE OPENING OF THE CURB RAMPS SERVING THE ACCESS AISLES SHALL BE 1.5%.
3. ACCESS AISLES (LOADING AND UNLOADING AREAS) SHALL BE PROVIDED FOR SINGLE AND DOUBLE ACCESSIBLE PARKING SPACES.

   A. THE ACCESS AISLE SHALL BE CONNECTED TO AN ACCESSIBLE ROUTE.
   
   B. THE ACCESS AISLE SHALL BE PLACED ON THE SIDE OPPOSITE THE DRIVER'S SIDE WHEN THE VEHICLE IS GOING FORWARD INTO THE PARKING SPACE (i.e., PASSENGER SIDE OF THE VEHICLE).
   
   C. THE CURB RAMP MAY NOT ENCROACH INTO THE REQUIRED DIMENSIONS FOR THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.
   
   D. CURB RAMPS SERVING THE ACCESS AISLES SHALL COMPLY WITH THE APPROPRIATE CURB RAMP STANDARDS.

4. IN EACH PARKING AREA, A WHEEL STOP SHALL BE PROVIDED TO PREVENT VEHICLES FROM OBSTRUCTING THE REQUIRED CLEAR WIDTH OF ADJACENT ACCESSIBLE ROUTES.

5. EACH ACCESSIBLE PARKING SPACE SHALL BE LOCATED SO THAT PERSONS WITH DISABILITIES ARE NOT COMPELLED TO WHEEL OR WALK BEHIND PARKING SPACES OTHER THAN THEIR OWN.

6. SIGNAGE:

   A. PAVEMENT PARKING SIGNS SUCH AS THE INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA) AND "NO PARKING" AT THE ACCESS AISLES SHALL BE PLACED SO THAT THEY ARE VISIBLE TO TRAFFIC ENFORCEMENT OFFICIALS WHEN THE VEHICLE IS PARKED PROPERLY.
   
   B. WHEN POSTED IN A PATH OF TRAVEL, THE SIGN SHALL BE MOUNTED 80" PER M-45. SIGNS MAY BE CENTERED ON THE WALL AT THE INTERIOR END OF THE PARKING SPACE 5' ABOVE GRADE.
   
   C. A TOW AWAY SIGN SHALL BE INSTALLED AND VISIBLE AT EACH ENTRANCE TO THE OFF STREET PARKING FACILITY OR IMMEDIATELY ADJACENT TO THE ACCESSIBLE PARKING SPACE.


8. PASSENGER LOADING ZONE:

   A. WHERE PROVIDED, AT LEAST ONE ACCESSIBLE PASSENGER LOADING ZONE SHALL BE ACCESSIBLE.
   
   B. AN ACCESSIBLE PASSENGER LOADING ZONE SHALL BE PROVIDED IN EVERY CONTINUOUS 100 LINEAR FEET OF LOADING SPACE, OR FRACTION THEREOF.
   
   C. VEHICLE PULL-UP SPACE - PASSENGER LOADING ZONES SHALL PROVIDE A VEHICULAR PULL-UP SPACE 96" WIDE MINIMUM AND 20'-0" LONG MINIMUM.
   
   D. ACCESS AISLE - PASSENGER LOADING ZONES SHALL BE PROVIDED WITH ACCESS AISLES ADJACENT TO THE VEHICLE PULL-UP SPACE. ACCESS AISLES SHALL CONNECT DIRECTLY TO AN ACCESSIBLE ROUTE AND SHALL NOT OVERLAP THE VEHICULAR WAY.
   
   E. ACCESS AISLES SHALL BE MARKED AS REQUIRED FOR ALL ACCESS AISLES FOR ACCESSIBLE PARKING SPACES.
   
   F. PASSENGER LOADING ZONES SHALL BE IDENTIFIED BY A REFLECTORIZED SIGN POSTED IMMEDIATELY ADJACENT TO AND VISIBLE FROM THE PASSENGER DROP-OFF AND LOADING ZONE STATING "PASSENGER LOADING ZONE ONLY" AND INCLUDES THE ISA WHEN LOCATED IN A PATH OF TRAVEL, THE SIGN SHALL BE MOUNTED PER M-45.
   
   G. VEHICLE PULL-UP SPACES AND ACCESS AISLES SERVING THEM SHALL BE AT THE SAME LEVEL AS THE VEHICLE PULL-UP SPACES THEY SERVE. ANY CHANGES IN ELEVATION SHALL BE SERVED BY A CURB RAMP(S).
   
   H. SLOPES SHALL BE 1.5% IN ANY DIRECTION. ADEQUATE DRAINAGE SHALL BE PROVIDED SO THAT WATER DOES NOT POND IN THE ACCESS AISLE.
   
   I. A MINIMUM OF 114" VERTICAL CLEARANCE SHALL BE PROVIDED AT ACCESSIBLE PASSENGER DROP-OFF AND LOADING ZONES AND ALONG AT LEAST ONE VEHICLE ACCESS ROUTE TO SUCH AREAS FROM SITE ENTRANCE(S) AND EXIT(S).
   
   J. PARKING FACILITIES THAT PROVIDE VALET PARKING SERVICES SHALL PROVIDE AT LEAST ONE ACCESSIBLE PASSENGER LOADING ZONE.
The International Symbol of Accessibility (ISA) shall be located so that it is visible to traffic enforcement officers when the vehicle is parked in the space.

International Code of Accessibility

Blue color to match color A-1290 in the Federal Standard 595A as specified in Section 522(B) 2.

ISA symbol shall be painted white on blue background.

The words "No Parking" shall be painted in white letters no less than 12" high located at the end of the access aisle so that it is visible to traffic enforcement officials.

Access Aisle Minimum Width is 5' Min between regular accessible parking stalls; 8' Min to the right of each van accessible parking stall.
ON-STREET PARKING
WITH LOADING ZONE

RESTRICTED RIGHT OF WAY WIDTH
ON-STREET PARALLEL PARKING

AREA TO BE MARKED
4" HATCHED DIAGONAL LINES AT 85° MAX ON CENTER PAINTED A CONTRASTING COLOR WITH THE PARKING SURFACE WHITE ON A.C. BLUE ON CONCRETE

NO PARKING AS REQUIRED
BLUE PAINTED CURB

REGULAR PARKING SPACE
CURB RAMP
PARKING SIGN
CURB
SIDEWALK

FULL LENGTH OF VEHICLE PULL-UP SPACE
CURB LINE

4" BLUE LINE BORDER

NOTE 1:
ACCESSIBLE ON-STREET PARKING SPACES SHALL NOT BE SMALLER IN LENGTH OR WIDTH THAN THAT SPECIFIED FOR OTHER PARKING SPACES, BUT NOT LESS THAN 20'-0" IN LENGTH AND NOT LESS THAN 8'-0" IN WIDTH.
PARKING SIGNS

NOTES:
1. POST MOUNTED SIGNS, SEE M-45 FOR BREAK-AWAY SIGN POST
2. SIGN SHALL BE CONSTRUCTED OF A MINIMUM 1/8" THICK ALUMINUM
3. COLORS: BORDER, TEXT, AND SYMBOL - WHITE (RETROREFLECTIVE)
   BACKGROUND - BLUE (RETROREFLECTIVE)
4. FONT SANS-SERIF CLEARVIEW
UNAUTHORIZED VEHICLES PARKED IN DESIGNATED ACCESSIBLE SPACES NOT DISPLAYING DISTINGUISHING PLACARDS OR SPECIAL LICENSE PLATES ISSUED FOR PERSONS WITH DISABILITIES WILL BE TOWED AWAY AT OWNER'S EXPENSE.

TOWED VEHICLES MAY BE RECLAIMED AT

(INSERT ADDRESS)

OR BY TELEPHONING

(INSERT TELEPHONE NUMBER OF A LOCAL LAW ENFORCEMENT AGENCY)

(CITY OF SAN DIEGO) (619) 531-2000 S.D.P.D.

C.V.C. Section 22511.8 (d)

TOW-AWAY SIGN

NOTES:

1. AN ADDITIONAL SIGN SHALL BE POSTED IN A CONSPICUOUS PLACE AT EACH ENTRANCE TO OFF-STREET PARKING FACILITIES, OR IMMEDIATELY TO AND VISIBLE FROM EACH STALL OR SPACE.

2. COLORS – THE SIGN HAS A WHITE REFLECTIVE BACKGROUND WITH NON-REFLECTIVE BLACK BORDER AND TEXT.

3. BLANK SPACES MUST BE FILLED IN WITH APPROPRIATE INFORMATION AS A PERMANENT PART OF THE SIGN AT THE TIME OF FINAL INSPECTION.

4. POST MOUNTED SIGNS, SEE M-45 FOR BREAK AWAY SIGN POST.

5. SIGN SHALL BE CONSTRUCTED OF A MINIMUM 1/16" THICK ALUMINUM.
PLAN AT END OF HANDRAIL

EXTENSION PARALLEL TO THE FLOOR SURFACE STARTING AT THE NOSE EXTENDS DIAGONALLY ONE TREAD WIDTH

LANDING WHERE OCCURS

PIPE HANDRAIL WALL MOUNTED

12" PLUS WIDTH OF TREAD MIN

12" MIN LEVEL

EXTENDS DIAGONALLY ONE TREAD WIDTH

LEVEL

3" 6" 3"

1 1/2" STD PIPE

7 MAX

34" MIN TO 38" MAX

TO 21-3/8" MIN

12" MIN LEVEL

EXTENDS DIAGONALLY ONE TREAD WIDTH

LEVEL

POST SHALL BE CENTERED IN STAIR TREAD.

PIRCE HANDRAIL POST MOUNTED

SURFACE OF STEP NOSING LIMIT

12" PLUS WIDTH OF TREAD MIN

8 1/4" R

HANDRAIL WHEN REQUIRED

HANDRAIL BRACKET

1 1/2" STD PIPE TYP

3 7/8" TYP

3 7/8" TYP

7 MAX

34" - 36" MIN

PIE GUARDRAIL - POST TYPE

SKATE STOPPER @ 36" OC (FOR OUTDOOR CONDITION ONLY), WHEN REQUIRED

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 85271 DATE 1/31/2012

REVISION BY APPROVED DATE

ORIGINAL BS J. NAGELVOORT 6/12

CITY OF SAN DIEGO - STANDARD DRAWING

PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL

DRAWING NUMBER SDM-118
RAILING 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. INSTALL HANDRAILS ON BOTH SIDES.
6. STAIRS AND LANDINGS THAT ARE OPEN ON ONE OR BOTH SIDES AND MORE THAN 30" ABOVE THE ADJACENT GROUND SHALL BE PROVIDED WITH GUARDRAIL.

*POST SHALL BE GROUTED IN PLACE USING NON-SHRINK GROUT.

CITY OF SAN DIEGO - STANDARD DRAWING

PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL

SDM-118
SECTION B-B

NOTES
1. BROOM FINISH ON TREADS, TROWEL FINISH ON ALL OTHER EXPOSED SURFACES.
2. \( \frac{1}{4} \)" PER 1'SLOPE ON TREADS FOR DRAINAGE.

SECTION A-A
CONCRETE STEPS

PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL
NOTE:
1. CHAIN LINK FABRIC SHALL BE ERECTED ON THE INTERIOR SIDE OF THE COURTS.
2. CHAIN LINK FABRIC SHALL HAVE KNUCKLED FINISH ON TOP EDGE.

CAUTION:
THIS STANDARD DRAWING IS NOT TO BE USED IF ANY WIND SCREEN IS TO BE APPLIED TO THE FENCE.
NOTES:
1. THIS STANDARD DRAWING SHALL BE USED WHEN GUARDRAIL IS INSTALLED ADJACENT TO CURB, GUTTER, AND SIDEWALK. THE POST KNOCKOUT DETAIL DOES NOT APPLY WHEN GUARDRAIL IS INSTALLED IN A PARKWAY.

2. SEE CALTRANS STANDARD PLANS FOR ADDITIONAL GUARDRAIL DETAILS.
## NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
2. Weights: Frame 75.3kg (166) – 87.6kg (193) lbs.
   Cover 67.7kg (147) – 77.6kg (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

**FOR MARK**

<table>
<thead>
<tr>
<th>Sewer Projects</th>
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<tr>
<td>Storm Drain Projects</td>
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<td>Water Projects</td>
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**.61m (24”) MANHOLE FRAME AND COVER**

**HEAVY DUTY**

<table>
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<th>RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE</th>
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<td>Chairperson R.C.E. 19246 Date</td>
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<td>T. Stanton</td>
<td>04/06</td>
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August 2009
Open position mark, 3mm (1/8") deep groove in both sides of rim and cover.

51mm (2") X 25mm (1") diamond mat, 3mm (1/8") deep

19mm (3/4") Dia. Pick Hole

600mm (23 5/8") outside dia. of cover

552mm (21 3/4") Dia.

559mm (22") Dia. Clear Opening

6mm (1/4") R

22mm (7/8")

19mm (3/4")

16mm (5/8") R

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

**FOR MARK**

- Sewer Projects
- Storm Drain Projects
- Water Projects

**MARK**

- Sewer
- Storm Drain
- Water

**SAN DIEGO REGIONAL STANDARD DRAWING**

**.61m (24") MANHOLE FRAME AND COVER**

**LIGHT DUTY**

**DRAWING NUMBER** M-2
NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.

2. Weights:
   - Frame: 142.4kg (314 lbs) - 164.6kg (363 lbs)
   - Outer Cover: 129.3kg (285 lbs) - 149.7kg (330 lbs)
   - Inner Cover: 66.7kg (147 lbs) - 77.5kg (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.

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SAN DIEGO REGIONAL STANDARD DRAWING

914mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS HEAVY DUTY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER M-3

August 2009
NOTES
1. Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 51mm (2")x 203mm (8") select grade Douglas Fir, surfaced four sides.
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 10mm (3/8") x 152mm (6") galvanized lag screws with one (1) washer each.
4. Reflector sign fasteners to be 10mm (3/8") x 38mm (1 1/2") galvanized lag screws.
   a. Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow.
   b. Reflector material shall be plastic or other approved reflectorized material.
5. 1.8m (6') long hat section metal post per Caltrans Std. Plan A74-A optional for guard post.

LEGEND ON PLANS
- Guard Post

Front View

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

1. Material—Brass A.S.T.M. B-16. All machine tolerances ±0.4mm (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.
## DATUMS

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### LEGEND
- Mean of all high water in San Diego Bay.
- 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 610mm (2') in length placed upright in the ground so that the top of said pipe is flush with the surface. Said pipe shall be filled with a metal or cement plug at least three inches in depth and centered with a metal tack and disc; or

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

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

LEGEND

- Fd 51mm (2") Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted
- Fd Street Survey Monument Stamped RCE XXXX or LS XXXX
- Set 51mm (2") x 610mm (24") Iron Pipe Marked RCE XXXX or LS XXXX
- Set Lead and Disc Stamped RCE XXXX or LS XXXX
- Set 13mm (½") x 457mm (18") Iron Pipe Marked RCE XXXX or LS XXXX
- Set Street Survey Monument Stamped RCE XXXX or LS XXXX per Standard Drawing M-10

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

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

Unless otherwise shown on this map:

1. All lot corners except as described below will be monumented by a 13mm (½") by 457mm (18") iron pin stamped (RCE or LS number).

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

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

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

WEIGHT

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

AREA

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

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

VOLUME

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

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

CAPACITY

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

1 Cu. in. = 16.3872 cu. cm.
1 Cu. ft. = 0.0283 cu. m.
1 Cu. yd. = 0.7646 cu. m.
1 Liter = 0.00164 liter
1 Cu. ft. = 28.3162 liters
1 Gal. = 3.7853 liters
1 Bu. = 35.2383 liters

LENGTH

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

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

MULTIPLE PREFIX

MULTIPLE PREFIX

1000000 mega
1000 kilo
100 hecto
10 deka

1/10 deci
1/100 centi
1/1000 milli
1/1000000 micro

TEMPERATURE

Degrees Fahrenheit = 9/5 (Degrees Celsius) + 32
Degrees Centigrade = 5/9 (Degrees Fahrenheit - 32)
6mm (1/4") Steel Plate welded to top (burrs removed).

102mm (4") Diameter Steel Pipe

13mm (1/2") Expansion Joint
Back of curb or joint in walk

127mm (5") Diameter Steel Pipe Sleeve

Concrete to be same as walk

457mm (18") Diameter

229mm (9")

229mm (9")

1mm (4")

127mm (5") Diameter Steel Pipe Sleeve

3mm (1/8")

102mm (4") Pipe

380mm (12")

from bottom of post

HASP DETAIL

NOTES

1. Chain to be 6mm (1/4") proof coil chain galvanized steel. Weld four links to post and three links to pipe sleeve.

2. All metal to be hat-dip galvanized after fabrication.

LEGEND ON PLANS
Horizontal brace with truss rod may be used as an alternate to a diagonal brace.

Diagonal Brace

3.05m (10')

Line posts at 305m (1000') max. intervals braced and trussed in both directions.

Tension Wires

9.5mm (3/8") steel rods.

Line Post Bracing

Gate post

Gate panel

Vertical stay

Gate

Latch post

Diagonal brace or horizontal brace with truss rods

GATE ASSEMBLY

SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK FENCE

DETAILS

August 2009
NOTES

1. Sidewalk shall have a minimum of 1.2m (4') clear area (path, not including curb) passing pedestals, pullboxes and other structures.

NOTES

1. Structural steel tubing used for post & sleeves shall be galvanized 12 gauge cold rolled steel, of the nominal dimensions shown hereon and meet the requirements of ASTM A446 Grade A.

2. Galvanizing shall be per ASTM A525. Posts & sleeves shall have 11mm(7/16") dia. holes spaced 25mm(1") c.c. ±3mm(1/8") & shall have no more variation in straightness than 1.6mm(1/16") in 914mm(3'). Posts shall be square within ±.36mm(0.014"), have twist no greater than 0.062" in 3' and have corner radii of 4mm(5/32") ±.4mm(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.
CHAPTER 8

RECYCLED WATER SYSTEM
NOTES:
1. (*) INDICATES MINIMUM RELATIVE COMPACTION. IT SHALL BE 95% MIN IN THE TOP FOOT.
2. MINIMUM COVER: 4' FOR RECYCLED WATER MAIN.
3. RECYCLE WATER PIPE SHALL BE PURPLE COLOR CODED INTEGRALLY STAMPED OR MARKED AS "CAUTION - RECYCLED WATER - DO NOT DRINK".
4. WARNING / IDENTIFICATION METAL TAPE SHALL BE PLACED AT 4' BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.
5. THE TERM RECLAIMED WATER IS THE SAME AS THE TERM RECYCLED WATER.
6. 1" SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
**NOTES:**

1) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION

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 SDRW-101

5) WATER LATERALS INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS

6) SILVER SOLDER JOINTS SHALL NOT BE USED

7) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)

8) TOP TAPS ARE NOT PERMITTED AND ANY GLUE JOINT SHALL BE BEVELED PRIOR TO ASSEMBLY

9) NO RECYCLED WATER SHALL ENTER INTO THE STORM DRAIN

---

**ITEM NO** | **SIZE AND DESCRIPTION** | **ITEM NO** | **SIZE AND DESCRIPTION**
---|---|---|---
1 | SIZE x 2" BRONZE SERVICE SADDLE (DOUBLE STRAP) | 6 | 2" BRONZE ANGLE METER STOP WITH LOCKWING
2 | RECYCLED WATER MAIN | 7 | WATER METER FURNISHED AND INSTALLED BY THE CITY
3 | 2" BRONZE CORPORATION STOP | 8 | METER BOX WITH LID, 17"x 30"
4 | 2" x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFTRIGID OR UNLESS OTHERWISE SPECIFIED. | 9 | CUSTOMER SHUT-OFF VALVE (LOCKABLE)
5 | 36" ROCK, 4" TO 6" DEEP |  | |

---

**REVISION BY APPROVED DATE**

CITY OF SAN DIEGO - STANDARD DRAWING

2" RECYCLED WATER SERVICE INSTALLATION AND MARKING

SDRW-102
NOTES:

1. FOR ALL RECYCLED WATER SERVICE READING LID OF METER BOX SHALL BE PAINTED WITH PURPLE PANTONE #512 FOR ALL RECYCLED WATER SERVICE.

2. METER AND VALVES SHALL BE LABELED OR TAGGED TO INDICATE RECYCLED WATER.
NOTES:
1. PROVIDE HEXAGON TYPE VALVE STEM EXTENSION IF DEPTH TO VALVE NUT EXCEEDS 2'.
2. USE FOR H10 LOADING OR LESS.
3. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS. TYPE 1 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.
CONCRETE 560-C-3250
13" DIA 6" MIN

VALVE WELL COVER

ROAD SURFACE (TYP.)
TRENCH RESURFACING

ROAD SUBGRADE
8" ID x 1/4" THICK WALL STEEL CASING
(VALEWELL)
WOOD BLOCKS (4 PL TYP)

TOP OF VALVE BONNET
SEE NOTE 1

CONCRETE VALVE BLOCKING

VALVE WELL & FRAME
FOR NEW INSTALLATIONS

NOTES:
1. PROVIDE RECYCLED WATER VALVE KEY EXTENSION FOR ALL VALVES.
2. THE SURFACE OF THE VALVE WELL COVER SHALL MATCH THE STREET CROSS SLOPE AND PROFILE.
3. VALVE BOX AND COVER BASED ON SOUTH BAY FOUNDRY #1208N OR APPROVED EQUAL.
4. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS.
   TYPE 1 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.

CAST IRON VALVE WELL FRAME

CAST IRON RISER RING
FOR RETROFITTING AND OVERLAY PROJECTS
1" LETTERS (FLUSH W/HEIGHT OF GRID)

36° RADIUS (BOTH ENDS OF SLOT)

1/2" DIA.

STANDARD DIAMOND PATTERN TREAD WITH 3/32" WIDE X 3/32" DEEP GROOVES

0.5"

SLOT THRU

1/4" RADIUS (BOTH ENDS OF SLOT)

60°

0.75"

DIAM.

PLACE FOUNDRY STAMP ON INSIDE SURFACE OF COVER

7.70 DIAM.

9.5" DIAM.

CAST IRON VALVE WELL COVER
WEIGHT = 20 lb MIN

DETAIL 1

CAST IRON COVER
WEIGHT = 15 lb

CAST IRON RING

CAST IRON COVER
WEIGHT = 15 lb

V4-T BOX
WEIGHT = 60 lb

DETAIL 2

NOTE
COVER SHALL BE COLORED PURPLE W/RED DOT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE 1/31/2012

REVISION BY APPROVED DATE

ORIGINAL J. NAGELVOORT 01/12

CITY OF SAN DIEGO - STANDARD DRAWING

RECYCLED WATER VALVE WELL COVER

DRAWING NUMBER SDRW-105
FINISH GRADE

25" MAX
8" MIN

2' MIN

1/8" FLAT PLATE CENTERING GUIDE

1 1/4" DIA STEEL SHAFT EXTENSION MACHINED TO MATCH NUT

8" ID x 1/4" THICK WALL STEEL CASING (VALVE WELL)

ADAPTOR TO FIT AWWA SQUARE NUT

RECYCLED WATER VALVE KEY EXTENSION

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.G.E. 65271 DATE 1/31/2012

DRAWING NUMBER SDRW-106
WE ARE CONSERVING OUR MOST VALUABLE RESOURCE BY IRRIGATING OUR LANDSCAPE WITH RECYCLED WATER

RECYCLED WATER
AQUA RECLICLADA

DO NOT DRINK
NO TOME EL AQUA

RECYCLED WATER IRRIGATION ADVISORY SIGN
Recycled Process Water
DO NOT DRINK

SIZE: 4" HIGH x 8" WIDE
COLORS:
- BACKGROUND: WHITE
- LETTERS: PANTONE 522 PURPLE
- CIRCLE/SLASH: DARK RED OVER WATER GLASS
- WATER GLASS: PANTONE 522 PURPLE
- 1/4" WIDE BORDER: PANTONE 522 PURPLE
- HOLES: 1/8" AT CORNERS

RECYCLED WATER PROCESS SIGN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR: R.C.E. 65271 DATE: 1/31/2012
DRAWING NUMBER: SDRW-108
Recycled Irrigation Water
DO NOT DRINK

SIZE: 4" HIGH x 8" WIDE
COLORS:
BACKGROUND: WHITE
LETTERS: PANTONE 522 PURPLE
CIRCLE/SLASH: DARK RED WATER TAP
WATER TAP: PANTONE 522 PURPLE
1/4" WIDE BORDER: PANTONE 522 PURPLE
HOLE: 1/8" AT CORNERS

RECYCLED WATER SIGN FOR IRRIGATION
Recycled Water used for Toilet and Urinal Flushing

SIZE: 4" HIGH x 8" WIDE
COLORS:
- BACKGROUND: WHITE
- LETTERS: PANTONE 522 PURPLE
- CIRCLE/SLASH: DARK RED OVER WATER GLASS
- WATER GLASS: PANTONE 522 PURPLE
- 1/4" WIDE BORDER: PANTONE 522 PURPLE
- HOLES: 1/8" AT CORNERS

RECYCLED WATER SIGN FOR TOILET & URINAL FLUSHING
NOTES:
1. RECYCLE WATER IRRIGATION VALVE BOX COVER SHALL BE COLOR CODED PANTONE #522
2. TEFLON SHALL BE USED ON THREADED CONNECTIONS
NOTE:
RECYCLE WATER IRRIGATION VALVE BOX COVER
NOTE:
ALL RECYCLED METERS, AIRWACUUM RELIEF VALVES, VALVES, PRESSURE REDUCING VALVES, PUMPS, PUMP CONTROL VALVES, ETC., SHALL BE TAGGED OR LABELED INDICATING THAT THE DEVICES ARE ON RECYCLED WATER SYSTEM AND COLOR CODED PANTONE #522.
12" MINIMUM CLEARANCE BETWEEN GROUND AND WATER CONTROL DEVICES.
NOTE:
ALL RECYCLED WATER IRRIGATION BOX COVERS AND LIDS SHALL BE COLOR CODED PANTONE #522

RECYCLED WATER
DO NOT DRINK—NO TOMAR

RECYCLED WATER
DO NOT DRINK—NO TOMAR
CONTROLLER BOX PURPLE (PANTONE #522) MARKER DECAL–SHOWN AFFIXED TO BOX EXTERIOR; PREFERABLY, AFFIX TO INTERIOR OF BOX

NOTES:
RECYCLED WATER IRRIGATION SYSTEM CONTROLLER BOX SHALL BE COLOR CODED PANTONE #522
RECYCLED WATER
DO NOT DRINK

AVISO,
AGUA IMPURA
NO TOMAR

FRONT

BACK

SAMPLE WARNING TAG. BACKGROUND PURPLE (PANTONE #522)
WITH BLACK LETTERING.
1" QUICK COUPLING VALVE (NELSON)
#7645 OR RAINBIRD #44 NP WITH
ACME THREAD KEY.

NOTE:
1. NEW CONSTRUCTION - ALL QUICK COUPLING VALVES SHALL HAVE NON-POTABLE
   LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.
2. RETROFITS - REPLACE ALL EXISTING QUICK COUPLING VALVES WITH NON-POTABLE
   LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.
3. TEFLOM SHALL BE USED ON THREADED CONNECTIONS.

TYPE A (#4 ROD)
PVC ELL OR TEE ON MAINLINE PIPE

NOTE:
QUICK COUPLING VALVE SHALL BE OF A TYPE APPROVED FOR RECLAIMED WATER USE, AND COLOR DESIGNATED AS SUCH WITH PURPLE-COLORED LID.

TYPE B (KICK BLOCK)

1. 1" QUICK COUPLING VALVE WITH PURPLE-COLORED LID (SEE LEGEND AND SPECIFICATIONS)
2. FLUSH IN TURF AREAS, 2" IN SHRUB AND GROUND COVER AREAS.
3. RED BRASS NIPPLE, 6" LENGTH MIN
4. RED BRASS COUPLING, EXTEND 1/2" ABOVE TOP OF CONCRETE THRUST BLOCK
5. RED BRASS NIPPLE, LENGTH AS REQUIRED
6. UNDISTURBED OR 90% COMPACTED SUBGRADE
7. RED BRASS ELL
8. RED BRASS NIPPLE, 8" LENGTH MIN
9. RED BRASS STREET ELL
10. PVC ELL OR TEE ON MAINLINE PIPE
11. SCHEDULE 80 PVC NIPPLE, 4" LENGTH MIN
BRICK SUPPORTS ON COMPACTED UNDISTURBED SUBGRADE (MIN OF FOUR PER BOX)

PVC SCHEDULE 40 SOLVENT WELD FITTINGS

BALL VALVE WITH 3/4" FEMALE THREAD

MAIN LINE

36" DIAMETER PEA GRAVEL SUMP (MIN 12 CU FT)

PURPLE COLOR VALVE BOX AND LID

CITY OF SAN DIEGO - STANDARD DRAWING

CROSS CONNECTION CONTROL TEST STATION

DRAWING NUMBER: SDRW-116

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 85271 DATE: 1/31/2012
SWIVEL ELL DETAILS

NOTES: SWIVEL ELL SHOWN IN NORMAL POSITION
(SUPPLY FROM RECYCLED WATER SOURCE)
NORMAL RECYCLED WATER CONNECTION

SHORT-TERM POTABLE SUPPLY CONNECTION DURING INTERRUPTION OF NORMAL RECYCLED WATER SOURCE

KEY:

- RISER WITH ELBOW
- RISER (WITH BLIND FLANGE)
- ISOLATION VALVE
- SWIVEL ELL
- REDUCED PRESSURE BACKFLOW PREVENTER

SWIVEL ELL SCHEMATIC
NOTES:

1- TEE SIZE TO MATCH EXISTING PIPE
2- REDUCER TO 2" DIAMETER PIPE, IF TEE IS LARGER THAN 2" DIAMETER
   INCREASE TO 2" DIAMETER PIPE, IF TEE IS SMALLER THAN 2" DIAMETER
3- 2" BRASS BALL VALVE
4- 1 1/2' FIRE HOSE CONNECTION, MIN. 4" HORIZ
   CLEARANCE 6" TO 14" ABOVE EXISTING GROUND
5- 1 1/2' CAP
6- MISCELLANEOUS NIPPLES AS REQUIRED
7- INSTALL BRASS BALL VALVE SIZE TO MATCH EXIST PIPE
8- INSTALL UNION SIZE TO MATCH EXISTING PIPE
CHAPTER 9
SEWER
SYSTEM
(A) SDR - 35 OR PIPE STIFFNESS OF 46 PSI PER ASTM D2412

(B) SDR - 35 IF SOIL REPORT SUBSTANTIATES THE ASSUMPTIONS IN NOTE 1, OTHERWISE USE SDR-18, IN LIEU OF THE SOIL REPORT

NOTE:

1. THIS STANDARD DRAWING SHALL BE USED ONLY WHERE EXISTING SOIL CONDITIONS ARE STABLE. STABLE SOIL IS DEFINED AS STANDARD Penetration Test Blow Count EQUAL TO OR GREATER THAN 13 BLOWS PER FOOT OR SHEAR STRENGTH GREATER THAN 750 PSF. OBTAINED FROM UNCONFINED COMPRESSION TEST.

2. STANDARD DESIGN ASSUMPTION:
   \[ K_B = 0.110, D_L = 1.0, E' = 750 \text{ psi} \]
   \[ W_C = \text{PRISM LOAD @ } W = 125 \text{ LB/FT}^3 \]

3. SEE PIPE BEDDING AND TRENCH BACKFILL DRAWING.

4. INSTALLATIONS IN GROUND WATER SHALL REQUIRE A SPECIAL DESIGN.

5. DESIGN REF.: ASCE MANUALS AND REPORTS ON ENGINEERING PRACTICE - NO. 60 "GRAVITY SANITARY SEWER DESIGN AND CONSTRUCTION."
NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.

2. CLEANOUT SHALL BE PLACED INSIDE A STANDARD CLEANOUT BOX WITH CAST IRON Lid MARKED “CLEANOUT” OR EQUAL.

3. INSTALL METAL TAPE ON TOP OF NON-METALLIC SEWER PIPE

4. LATERALS ARE NOT ALLOWED IN DRIVEWAYS.
NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE LOCATED WITHIN CITY RIGHT OF WAY, BEHIND THE SIDEWALK.
3. INSTALL METAL TAPE ON TOP OF NON-METALLIC SEWER PIPE.
RIGHT-OF-WAY
PROPERTY LINE

CLEANOUT TO BE LOCATED
ON STREET SIDE OF
RIGHT-OF-WAY OR PROPERTY LINE

SEWER LATERAL

CUT-OUT

PROPERTY LINE

RIGHT-OF-WAY

PLAN VIEW

BACKWATER DEVICE

SEWER LATERAL

SECTION A-A

PAVEMENT SURFACE

UNMORTARED
BRICK FOUNDATION

PIPE BEDDING

3/8" MAX
AGGREGATE

FLOW

SEWER LATERAL

STD. WYE BRANCH

12" MAX

V/2"

SECTION A-A

V/2"

8"

4"

13" X 24" X 12"
PER APPROVED MATERIAL
LIST RECTANGULAR STRUCTURAL FOAM
POLYETHYLENE BOX WITH STRUCTURAL
RIBS AND DROP IN COVER.
SEE NOTE 1

NO. 1

WHEN BACKWATER DEVICE IS INSTALLED IN THE DRIVEWAY, SEE PAGE 2

NO. 2

INSTALL VALVE BOX SO THAT IT IS FLUSH WITH PAVEMENT SURFACE
OR 1" ABOVE FINISH GRADE (SOIL SURFACE).

NO. 3

PVC BACKWATER DEVICE AND ATTACHED PARTS SHALL BE PER THE
APPROVED MATERIALS.

NO. 4

CLEANOUT PLUG (ABS) THREADED.

NO. 5

STANDARD 45° BEND.

NO. 6

THE BACKWATER DEVICE SHALL BE LOCATED AS CLOSE TO THE STRUCTURE
AS REASONABLY POSSIBLE TO MINIMIZE THE DEPTH OF THE BACKWATER DEVICE.
1. THE BOX & COVER IS 10K LOAD RATED.
NOTES

1. IN NO CASE SHALL A LATERAL CONNECT TO THE SEWER MAIN DIRECTLY ON TOP OF THE PIPE.

2. ALL JOINTS ON SEWER LATERAL PIPE SHALL BE COMPRESSION TYPE OR APPROVED SOLVENT WELD.

3. LATERAL SHALL EXTEND TO PROPERTY LINE UNLESS SHOWN OTHERWISE ON PLANS.

4. DO NOT TAP HOLE AND INSERT LATERAL PIPE DIRECTLY INTO MAIN. ALL CONNECTIONS SHALL BE MADE USING A SADDLE OR WYE CUT IN.

5. SEWER LATERAL SHALL HAVE 6" METAL TAPE WITH GREEN LETTERING INDICATING "SEWER" INSTALLED ABOVE THE ALIGNMENT OF THE NON-METALLIC PIPE FROM SEWER MAIN TO PROPERTY LINE.

DETAIL SHOWING THE MANNER OF CONNECTING OPPOSITE LATERALS TO A SEWER MAIN. TWO CONNECTIONS SHALL NOT BE MADE IN THE SAME LENGTH OF PIPE.
TRENCH RESURFACING

MANHOLE FRAME AND COVER SEE M-3.

ROAD SURFACE

GRADE RING OR RISER

SHAFT

CHANNEL SHALL BE VERTICAL ABOVE SPRING LINE

LEVEL

SECTION A-A

NOTES:

1. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN CLASS "C" MORTAR.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTORS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3')
   B) 6" TO 18" OF 3" DIAMETER GRADE RINGS AND/OR RISERS.
   C) 5" DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.
10. MANHOLES SERVING 18" DIAMETER PIPE AND LARGER SHALL USE PRECAST RISERS LINED WITH WHITE PVC SHEETS IMBEDDED WITH LOCKING EXTENSIONS TO THE CONCRETE WALL. THE BASE AND ALL REMAINING EXPOSED CONCRETE SHALL BE COATED WITH AN APPROVED POLYURETHANE COATING.

LEGEND ON PLANS
CONCRETE ENCASEMENT OR BACKFILL

* EITHER CONCENTRIC OR ECCENTRIC CONE MAY BE USED

HALF SECTION SHALLOW MANHOLE

NOTES

1. ALL RISER JOINTS SHALL BE EPOXY MORTARED.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTIONS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3').
   B) 3" TO 18" OF 3' GRADE RINGS AND RISERS.
   C) 4' DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE, EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

MANHOLE 4' X 3' DIAMETER
(FOR 15" MAXIMUM DIAMETER PIPE)
NOTES:
1) A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE 'B') SHALL BE USED WHEN BREAKING INTO EXISTING MANHOLE
2) FOR MANHOLES REQUIRING COATING AND LINING, SEE SM-07
NOTES

1. SIMILAR POLYVINYL CHLORIDE COMPONENTS MAY BE USED IN ACCORDANCE WITH ASTM STANDARD SPECIFICATION D2241 AND D3139.
2. CONCRETE SLAB SHALL BE 560-C-3250.
3. USE HEAVY DUTY MANHOLE FRAME AND COVER, M-1,
   IN AREAS SUBJECT TO VEHICULAR TRAFFIC; USE LIGHT DUTY MANHOLE FRAME AND COVER, M-2, IN ALL OTHER LOCATIONS.
4. MINIMUM PIPE PRESSURE CLASS 200.
NOTES
1. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE STANDARD DRAWINGS SDG-107 AND SDG-108.

2. (*) INDICATES MINIMUM RELATIVE COMPACTION.

3. MINIMUM DEPTH OF COVER FROM THE TOP OF PIPE TO FINISH GRADE FOR PVC SDR 35 SEWER MAIN SHALL BE 5'. FOR SHALLOWER DEPTH, SPECIAL DESIGN IS REQUIRED.

4. SEE TYPE A INSTALLATION FOR DETAILS NOT SHOWN FOR TYPES B AND C.

5. FOR PIPE SIZE ENCASTEMENT LARGER THAN 15', MAXIMUM SIDE WALL CLEARANCE SHALL BE 12' OR AS SHOWN ON THE PLANS.

6. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.

7. 1' SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1' NEOPRENE PAD SHALL BE PLACED FOR CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
NOTES
1. ENCASE PIPE TO THE NEAREST FLEXIBLE JOINT.
2. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE SDG-107 AND SDG-108.
3. CONCRETE ENCASEMENT SHALL BE USED FOR RIGID PIPE ONLY.
4. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION.
5. (*) INDICATES MINIMUM RELATIVE COMPLETION.

LEGEND ON PLANS
- 470-C-2000 CONCRETE
- CONCRETE BLOCK

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE
1/31/2012

CONCRETE ENCASEMENT

CITY OF SAN DIEGO - STANDARD DRAWING

DRAWING NUMBER SDS-112
TRENCH WIDTH

TRENCH DEPTH

BACKFILL 90%*

95%*

1-0'

4" TO 18" PIPE

BELL

PIPE OD

INVERT ELEVATION

6" MIN
8" MAX

470-C-2000 CONCRETE

3/4" CRUSHED ROCK

SECTION

NOTE
1. FOR TRENCHING IN IMPROVED STREETS SEE SDG-107 AND SDG-108.
2. CONCRETE BACKFILL FOR PVC PIPE CAN BE USED ABOVE THE PIPE BEDDING ZONE.
3. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION.
4. (*) INDICATES MINIMUM RELATIVE COMPACTION.
8" MIN

PLAN

8" MIN

TRENCH WIDTH

BLOCKS TO BE LAID TIGHTLY AS POSSIBLE TO DOWNSTREAM SIDE OF NOTCH

8" X 8" X 16" CONCRETE BLOCK, FILL CORES WITH GROUT

1/2" EXPANSION JOINT MATERIAL OR JUTE AROUND PIPE

#9 WIRE LADDER TYPE REINFORCEMENT IN ALL HORIZONTAL JOINTS

NOTE
PIPE PROTECTION CAN ONLY BE USED ABOVE THE PIPE BEDDING ZONE FOR PVC PIPE

LEGEND ON PLANS

CONCRETE ANCHOR

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 85271 DATE 1/31/2012

DRAWING NUMBER SDS-114

REVISION BY APPROVED DATE

ORIGINAL RA AOSKULI 1/06
UPDATED KA J. NAGELVOORT 1/12

PLAN

FRONT ELEVATION

SIDE ELEVATION

TRENCH DEPTH

8" MIN
8" X 8" X 16" CONCRETE BLOCK, FILL CORES WITH GROUT

1/2" EXPANSION JOINT MATERIAL OR JUTE AROUND PIPE

#9 WIRE LADDER TYPE REINFORCEMENT IN ALL HORIZONTAL JOINTS

BLOCKS TO BE LAID TIGHTLY AS POSSIBLE TO DOWNSTREAM SIDE OF NOTCH

8" MIN TRENCH WIDTH 8" MIN

PLAN

FRONT ELEVATION

SIDE ELEVATION

LEGEND ON PLANS

CUTOFF WALL

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 86271 DATE 1/31/2012

DRAWING NUMBER SDS-115
CONCRETE PROTECTION
FOR EXISTING SEWER PIPE

NOTES:

1. FOR EXISTING PVC PIPE, IT SHALL BE COVERED WITH TAR PAPER, POLYURETHANE BAGGIE OR RUBBER MAT PRIOR TO POURING CONCRETE.

2. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION.

3. (*) INDICATES MINIMUM RELATIVE COMPACTION
NOTES

1. FOR WATER LINE CONSTRUCTION, ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHER IS LESS.

2. WHERE CONNECTING TO FLEXIBLE PIPE, JOIN USING TWO COUPLINGS WITH A SHORT PIPE SPOOL (TYPICAL).

3. NO ENCASEMENT IS REQUIRED WHERE THE TRENCH WIDTH IS 24" OR LESS.

4. FOR EXISTING PVC PIPE, IT SHALL BE COVERED WITH TAR PAPER, POLYURETHANE BAGGIE OR RUBBER MAT PRIOR TO POURING CONCRETE.

TYPICAL SECTION

2'-MIN SEE NOTE

#5 BARS REQUIRED WHEN CROSSING WATERLINE ONLY

#5 BARS REQUIRED WHEN CROSSING WATERLINE ONLY

OUTSIDE DIAMETER OF PIPE

OUTSIDE DIAMETER OF PIPE

#5 BAR

#5 BAR

ADDITIONAL #5 BAR MAX 12" OC

SECTION A-A
NOTE:

FOR WATER LINE CONSTRUCTION, PIPE REPAIR SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHEVER IS LESS.
NOTES:

1. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE OTHER STANDARD DRAWINGS.

2. (*) INDICATES MINIMUM RELATIVE COMPACTION.

3. MINIMUM DEPTH OF COVER FROM THE TOP OF PIPE TO FINISH GRADE FOR PVC SDR 35 SEWER MAIN SHALL BE 5'. FOR SHALLOWER DEPTH, SPECIAL DESIGN IS REQUIRED.

4. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.

5. 1" SAND CUSHION OR A 6" MIN SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSING UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
CHANNEL SHALL BE VERTICAL ABOVE SPRING LINE

NOTES:

1. MANHOLE BASES FOR MAINS 18" AND LARGER SHALL BE COATED.

2. LOWEST POINT ON SHELF SHALL BE EVEN WITH TOP OF PIPE.

3. CAST IN PLACE MANHOLE BASES CAST WITH 560-C-3250 SHALL BE CURED A MINIMUM OF THREE DAYS PRIOR TO STACKING MANHOLE BASES CAST WITH 660-CW-4000 (WITHOUT CALCIUM CHLORIDE (CC)) OR WITH 560-C-3250 TREATED WITH A MINIMUM OF 2% CC SOLUTION IN ACCORDANCE WITH 201-1 SHALL BE CURED A MINIMUM OF 24 HOURS. THESE CURING REQUIREMENTS APPLY TO MANHOLES WITH A MAXIMUM HEIGHT OF 25'. SHORTER CURING TIMES, DEEPER INSTALLATIONS, AND ALTERNATE CONCRETE MIX DESIGNS REQUIRE ENGINEER'S PRIOR APPROVAL.

4. CONCRETE SPECIFIED BY ALTERNATE CLASS OR OTHERWISE CONTAINING FLY ASH IS NOT ALLOWED FOR USE IN CAST IN PLACE MANHOLES.

5. CONCRETE MIX DESIGNS CONTAINING ACCELERATING ADMIXTURES OTHER THAN CC REQUIRE A BREAK HISTORY AND ENGINEER'S APPROVAL.

SLOPE 1:12
LEVEL
WATER TIGHT SEAL
RING(S)
6" OF 3/4" CRUSHED ROCK BASE
CAST IN PLACE
NOTES:

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

LEGEND ON PLANS

<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>300mm (12&quot;) CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED</td>
<td></td>
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<tr>
<td>2</td>
<td>CONCRETE RING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>300mm (12&quot;) PVC, C-900 x 380mm (15&quot;) LONG (CLEANOUT BOX)</td>
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<tr>
<td>4</td>
<td>SIZE x REQUIRED LENGTH PVC PIPE</td>
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<tr>
<td>5</td>
<td>45' ELBOW</td>
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<tr>
<td>6</td>
<td>19mm (3/4&quot;) CRUSHED ROCK PIPE BEDDING</td>
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<tr>
<td>7</td>
<td>SEWER MAIN</td>
<td></td>
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<td>8</td>
<td>19mm (3/4&quot;) CRUSHED ROCK SEE NOTE 4</td>
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<td>9</td>
<td>STANDARD WYE BRANCH</td>
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</tr>
<tr>
<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

Original: Kercheval 12/75
Add Metric: T. Stanton 03/03
Replaced S-03: J. Tomasulo 03/05

Drawn by: R.C.E. 19246  Date: 09/04/2005
Drawing Number: SC-01

August 2009
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) MANHOLES FOR SEWER MAINS 450mm(18") AND LARGER SHALL BE COATED AND LINED
3) MANHOLE SHAFT AND CONE SECTIONS, AND GRADE RINGS SHALL HAVE A PVC LINER PLACED WITH T-SHAPED SUPPORTS INTEGRALLY CAST INTO THE CONCRETE
4) ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE BASES
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
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

EXIST FINISH GRADE

REMOVE MANHOLE FRAME & COVER, RINGS & CONE & BASE AND PIPE TO REMAIN

FILL VOID WITH SAND/CEMENT SLURRY

PLUG WITH SUITABLE MATERIAL TO HOLD CONCRETE

CONCRETE PLUG

450mm (18") CONCRETE PLUG

EXIST MANHOLE RINGS
### Outlet Reinforcing

<table>
<thead>
<tr>
<th>Ratio of Outlet ID to Pipe ID</th>
<th>Pipe Class</th>
<th>Angle Between Outlet Axis and Mainline Axis</th>
<th>Type of Reinforcing</th>
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</thead>
<tbody>
<tr>
<td>0.2 AND LESS</td>
<td>ALL ALL</td>
<td>0° to 75°</td>
<td>COLLAR WRAPPER</td>
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<tr>
<td>0.2 TO 0.6</td>
<td>UNDER 150</td>
<td>0° to 75°</td>
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<td>150 AND OVER</td>
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<td>0° to 90°</td>
<td>CROTCH 1 PL</td>
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<tr>
<td></td>
<td>150 AND OVER</td>
<td>0° to 90°</td>
<td>CROTCH 2 PL</td>
</tr>
</tbody>
</table>

### Notes

1. Collar OD or Wrapper Width shall be equal to twice the length of the opening in the mainline pipe measured along the pipe axis. Thickness shall be equal to that specified for pipe specials.
2. If a crotch plate is required, the outlet length shall be adjusted to clear the maximum length of bolt used for flange.
3. Outlets less than 3" in dia. may be installed without collars providing that rod reinforcing is not cut and outlets are welded to rods.
4. Reinforcing for outlets on pipe other than SCRW pipe or steel pipe, shall be as shown on plans or submitted for approval.
5. Nozzle fabrication details are typical for all sizes of outlets.
6. Repeat Note 1 for SDW-103.
7. Flanges shall conform to AWWA C207 and drilling shall match the above flange drilling.
8. Minimum lining thickness for outlets shall be:
   - 1/4" for 8" ID and less
   - 1/2" for 10" ID 16" ID
   - 3/4" for 16" ID and greater
9. Coating thickness for outlets shall be:
   - 3/4" for 16" ID and less
   - 1 1/4" for 18" ID and greater
   Specified coating thickness shall be reduced by 50% for the distance of one bolt length back from the flange face.
DRILL AND TAP FOR AIR-VALVE SIZE
(AIR RELEASE VALVE STATION ONLY)

3/4" DIA BAR
(2 PLACES)

SECTION THROUGH COVER

HANDLE DETAIL
(TYPICAL 2 PLACES)

SECTION A-A

SECTION ON PIPE AXIS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRESSURE RANGE (PSI)</th>
<th>FLANGE ID</th>
<th>FLANGE OD</th>
<th>BOLT CENTER</th>
<th>NO. OF BOLTS</th>
<th>STUD DIA</th>
<th>THICKNESS (T)</th>
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<tr>
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<td>22&quot;</td>
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<td>20</td>
<td>6&quot; x 1-1/4&quot;</td>
<td>1-3/16&quot;</td>
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<td>22&quot;</td>
<td>29-1/2&quot;</td>
<td>29-1/4&quot;</td>
<td>24</td>
<td>7&quot; x 1-1/2&quot;</td>
<td>1-15/16&quot;</td>
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<td>24</td>
<td>7&quot; x 1-1/2&quot;</td>
<td>1-7/8&quot;</td>
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</table>

FURNISH:
REQUERED STUD BOLTS W/FULL LENGTH THREAD & TWO (2) HEX NUTS EACH 1/4" THICK FULL FACE GASKET
AND 3/4 INCH DIA STAINLESS STEEL FORCING BOLT ON DC

NOTES:
1. APPLY TWO (2) COATS OF COAL-TAR EPOXY 16 MILS TOTAL (MIN) TO ALL EXPOSED METAL SURFACES.
   AMEROCAOT 78 OR KOP-COAT 300 M OR EQUAL MEETING U.S. PUBLIC HEALTH STANDARDS ARE APPROVED
   FOR SUCH APPLICATION PER MANUFACTURER'S STANDARDS.
2. DETAILS OF MANHOLES ON PIPELINES LESS THAN 24" DIAMETER SHALL BE SHOWN ON DESIGN
   DRAWINGS OR SUBMITTED FOR APPROVAL.
3. MANHOLES SHALL BE BEVELED DURING FABRICATION, SO THAT THEY ARE TRUE TO VERTICAL UPON INSTALLATION.
4. ALL WELDS TO CONFORM TO ANSI/AWWA C205 - 91.
ITEM NO. | DESCRIPTION |
--- | --- |
1 | 6" WET BARREL FIRE HYDRANT |
2 | .75" X 3.5" MIN HEX HEAD BREAKAWAY (SHEAR) BOLTS AND NUTS (ASTM A307) SHALL BE 3/4" NC THREAD. HEX HEAD ON TOP OF FLANGES (ALL) |
3 | 6" CAST IRON BREAKAWAY SPOOL WITH 0.25" V (SINGLE OR DOUBLE) BREAK OFF GROOVE |
4 | 4" X 4" X 4" THICK CONCRETE PAD WITH 6" X 12" DEEP THICKENED EDGE AROUND PERIMETER OF CONCRETE PAD |
5 | 6" CAST IRON EXTENSION NON-GROOVED SPOOL - AS REQUIRED (F, F) |
6 | 6" LONG RADIUS DI BASE ELBOW (F, PO / MJ) |
7 | CONCRETE THRUST BLOCK |
8 | COLD JOINT STRIP |
9 | PIPE - 6" C-900 PVC |
10 | GATE WELL WITH CAP |
11 | 6" GATE VALVE (MJ / PO, F) |
12 | TEE - SIZE X 6" (MJ, MJ, F) |

NOTES:
1. NUMBER OF OUTLETS SHALL BE AS SHOWN ON THE PLANS.
2. CONNECT TO BASE OF THE HYDRANT WITH SHEAR BOLTS INSTALLED WITH HEX HEAD ON TOP OF THE FLANGE (3½/64" DIAMETER HOLE 2" DEEP IN BOLTS, GALVANIZED AFTER BORING)
FIRE HYDRANT LOCATIONS AND PORT ORIENTATION

NOTES:
1) LOCATE FIRE HYDRANT AS SHOWN ABOVE OR AS DIRECTED BY THE ENGINEER.
2) FIRE HYDRANTS SHALL BE INSTALLED WITH THE LARGEST PORT PERPENDICULAR TO THE STREET.
3) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE CURB OR SIDEWALK, A COLD JOINT STRIP SHALL BE INSTALLED.
4) CONCRETE APRON SHALL BE REQUIRED WHERE THE FIRE HYDRANT IS INSTALLED IN AN UNPAVED LOCATION. THE APRON SHALL BE 4" THICK 520-C-2500 CONCRETE.
5) WHEN DISTANCE FROM THE FIRE HYDRANT TO THE TOP OR TOE OF THE SLOPE OR WALLS IS LESS THAN 2', SPECIAL HYDRANT INSTALLATION DETAIL SHALL BE SHOWN ON THE PLANS.
6) THE DISTANCE FROM THE FACE OF THE CURB TO THE CENTERLINE OF THE FIRE HYDRANT SHALL BE 2 1/2' MINIMUM.
STREET LOCATIONS

FREEWAY LOCATION

MARKERS - SHALL BE BLUE 2-WAY STIMSONITE LIFELITE 88AB OR EQUAL.

ADHESIVE - AN AMPLE AMOUNT OF 2 (A&B) EPOXY OR EQUAL.

SURFACES - CLEAN AND DRY 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

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 SHALL 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.
## Item No | Size and Description
--- | ---
1 | Concrete Thrust Block See SDW-151
2 | Water Main
3 | Gate Well with Cap See SDW-153 or SDW-154
4 | Size x Size MUPOFLG x FLG Tee
5 | FLG x MUPOFLG RWGV
6 | FLG x MUPO Adapter (If Required)
7 | C-900 PVC Pipe
8 | MUPO x FLG 90° Bend
9 | Flanged Ductile Iron Pipe
10 | Cold Joint Strip
11 | Flanged 90° Bend, See Note 6
12 | Flanged OS&Y RWGV with Hand Wheel

## Item No | Size and Description
--- | ---
13 | RPDA See Note 3
14 | Chain with Knox Lock See Note 3
15 | Flanged Tee with "FDC" See Note 3
16 | Concrete Slab Minimum 4" Thick x 36" Wide x As Required
17 | 3/4" Bypass, Meter & RP Device
18 | Adjustable Valve Support
19 | PVC or DI Pipe See Note 8
20 | Flanged Angle Pressure Reducing Valve See Note 6
NOTES:

1) INSTALL WARNING / IDENTIFICATION TAPE

2) LOCATION OF FIRE SERVICES SHALL BE AS DIRECTED BY THE FIRE DEPARTMENT. FIRE SERVICES SHOULD BE LOCATED IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION, REPAIR, AND USE.

3) TAMPER SWITCH, AUTOMATIC RESET, CHAIN WITH KNOX LOCK, AND FIRE DEPARTMENT CONNECTION ("FDC") SHALL BE AS REQUIRED BY THE FIRE DEPARTMENT.

4) BALL VALVE TEST COCKS SHALL BE PROVIDED AND LOCATED PER THE MANUFACTURES RECOMMENDATIONS AND CITY STANDARDS.

5) 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.

6) 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.

7) INSTALL PIPE AND RELATED APPURtenANCES IN THIS AREA PER THE CITY REQUIREMENTS.

8) INSTALL PIPE AND RELATED APPURtenANCES IN THIS AREA AS REQUIRED BY THE FIRE DEPARTMENT.

9) ABOVE GROUND APPURtenANCES SHALL BE PAINTED AND IDENTIFIED AS CALLED FOR BY THE FIRE DEPARTMENT.

10) TESTING SHALL BE CONDUCTED AS CALLED FOR IN THE SPECIFICATIONS PRIOR TO ACCEPTANCE.

11) CONNECTIONS TO STEEL MAINS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.

12) CITY RESPONSIBILITY ENDS AT EDGE OF PROPERTY LINE, RIGHT OF WAY, OR EASEMENT.
NOTES:
1. SET TO FINISH GRADE.
2. PROVIDE CONCRETE PADS.
3. PROVIDE THRUST BLOCKS.
4. REFER TO OTHER CITY STANDARD DRAWINGS FOR MORE DETAILS.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WATER MAIN 3&quot; - 8&quot; INCL.</td>
</tr>
<tr>
<td>2</td>
<td>CAST IRON PLUG OR CAP MAIN SIZE X 2&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Brass Nipple 2&quot; X 8&quot;</td>
</tr>
<tr>
<td>4</td>
<td>BRONZE GATE VALVE WITH BRONZE WHEEL-SCREW ENDS 2&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Brass Nipple AS NEEDED</td>
</tr>
<tr>
<td>6</td>
<td>BRASS 90° EL 2&quot;</td>
</tr>
</tbody>
</table>
| 7    | BRASS RISER 2" X VARIABLE TO GRADE MINUS 4" | 3" X VARIABLE TO GRADE MINUS 4"
| 8    | BRASS COUPLING THREAD 2" | 3" |
| 9    | Brass Plug 2" | 3" |
| 10   | STEEL CASING FOR GATE VALVE AND RISER 6" X VARIABLE TO GRADE MINUS 3/4" | 8" X VARIABLE TO GRADE MINUS 3/4"
| 11   | CAST IRON VALVE WELL COVER FOR GATE VALVE AND RISER 8" | 8" |
FINISHED GRADE

IMPROVED STREETS
TRENCH RESURFACING
SEE SDG-107 OR SDG-108
AS APPLICABLE

SAND CEMENT SLURRY
BACKFILL 190-E-400

SE 50 BEDDING

TRENCH SECTION

NOTES:

1. THE PROPOSED WATER SERVICE SHALL BE SECURED IN CENTER OF THE TRENCH.

2. SAND CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMPERS OR VIBRATORS SHALL BE USED.

3. EXISTING PAVEMENT WILL NOT REQUIRE SAW CUTTING WHEN USING ROCKWHEEL FOR EXCAVATION EXCEPT WHEN THE EXISTING PAVEMENT IS CONCRETE AND TRENCH FINISH IS CONCRETE.

4. CUTS SHALL BE PARALLEL OR PERPENDICULAR TO STREET CENTERLINE, WHEN PRACTICAL.

5. IN MAJOR OR PRIME ARTERIAL STREETS, ON APPROVAL SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, MAY BE USED ONLY WITH PRIOR APPROVAL OF THE ENGINEER. OTHERWISE THE CONTRACTOR SHALL PROTECT THE TRENCH WITH THE APPROVAL OF THE ENGINEER.

6. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR: R.E. 85271
DATE: 1/31/2012

NARROW TRENCH FOR
1" & 2" WATER SERVICES

DRAWING NUMBER: SDW-107

ORIGINAL: K A NAGELVOORT
REVISION: 0/12
DATE: 0/12
NOTE:
HOLD OR CUT BACK COATING ON SPIGOT END

CONC GROUT PLACED IN FIELD

WELDED BELL AND SPIGOT RING

FORMED BELL AND WELDED SPIGOT RING

NOTE:
SEE OTHER STANDARD DRAWINGS FOR FULL DETAILS OF ABOVE JOINTS.

NOTE:
ALL WELDS TO CONFORM TO ANSI/AWWA C206 - 91
NOTES:
1. INSTALL VALVE KEY EXTENSIONS WHEN TOP OF VALVE IS 8' OR MORE BELOW GROUND OR PAVEMENT SURFACE.
2. PAINT ALL FINISHED SURFACES WITH ASPHALT VARNISH.
3. FOR VALVE BOX AND COVER, SEE OTHER DRAWINGS.
4. ALL WELDS TO CONFORM TO ANSI/AWWA C205 - 91.
NOTES:
1. (*) INDICATES MINIMUM RELATIVE COMPACTION.
2. MINIMUM COVER: 3' FOR DISTRIBUTION MAINS; 5' FOR TRANSMISSION MAINS.
3. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE: 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.
4. 1' SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
5. FOR MAINS LARGER THAN 16", TRENCH WIDTH SHALL BE AS SHOWN ON THE PLANS.
ITEMS CALL OUT:

1. MAXIMUM FIELD DEFLECTION IN A JOINT IS 3/8" PULL AND 3/8" PUSH, THE PULL TO BE UTILIZED FIRST.
2. CONCRETE GROUT PLACED IN FIELD.
3. CEMENT MORTAR PLACED IN FIELD AND HAND POINTED.
4. TOLERANCE BETWEEN BELL ID AND SPIGOT OD TO BE 1/32" TO 1/16" ON THE DIAMETER.
5. ALL WELDS TO CONFORM TO ANSI/AWWA C206 - 91.
NOTE:
UNLESS OTHERWISE INDICATED ON THE PLANS OR SPECIFIED IN SPECIAL PROVISIONS, COVERS WITH CONCRETE READING LID SHALL BE USED.

CONCRETE WATER METER BOX
FOR 1 1/2" OR 2" WATER METER

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE 1/31/2012

DRAWING NUMBER SDW-113
NOTE:

1. 8 1/4" FLOOR PLATE SHALL BE CUT OUT OF THE COVER AND THE OPENING SHALL BE FINISHED FOR TIGHT FIT.

2. READ HOLE IN COVER SHALL BE CENTERED OVER EACH METER REGISTER.
NOTES:

1. REMOVE COATING AND CLEAN APPROXIMATELY 2’ AREA TO A BRIGHT METAL SURFACE FOR WELDING.

2. THE EXACT TYPE, SIZE AND NUMBER OF BONDING WIRE/STRAP SHALL BE DETERMINED BY PIPE SIZE AND TYPE.

3. WHERE NOT PROTECTED BY CEMENT MORTAR COATING, THERMITE WELD SHALL BE COVERED WITH COLD APPLIED COAL TAR SOLUTION.
ITEMS CALL OUT:

1. 3/16" STEEL ENCLOSURE WITH ACCESS DOOR, MISC. HARDWARE, CABINET AND HARDWARE SHOULD BE ZINC RICH EPOXY POWDER PRIMER (2-3 MIL DRY FILM THICKNESS) AND POLYESTER POWDER TOP COAT (2-3 MIL DRY FILM THICKNESS).

2. 3' X 3' X 4" CONCRETE PAD 520-C-2500.

3. D AND H CHANGES ONLY WITH APPROVAL OF THE CITY ENGINEER.
NOTES:

a.) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER PER WM-04.

b.) AIR & VACUUM VALVES & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN THE SPECIFICATIONS.
ITEMS CALL OUT:

1. WATER MAIN

2. FLANGED TAPPING SLEEVE OR TEE (NO SIZE-ON-SIZE TAPS ALLOWED)
   (4 X 4, 6 X 6, ETC.) NO EXTENSIONS ALLOWED.

3. FULL RESILIENT SEAT GATE VALVE, SIZE OF VALVE SHALL MATCH SIZE
   OF FIRE SERVICE (4" MINIMUM DIAMETER). SEE NOTE #1.

4. 4" OR LARGER DIAMETER OF PIPE (DUCTILE IRON OR PVC PER APPROVED MATERIALS LIST).

5. VALVE WELL.

6. VALVE WELL COVER.

NOTES:

1. FOR SMALLER FIRE SERVICE REQUIREMENTS, USEReducer AT PROPERTY LINE.

2. FOR CORROSION CONTROL REQUIREMENTS, SEE PUBLIC UTILITIES DEPARTMENT DESIGN GUIDE.
NOT TO SCALE

NOTES:
1. All buried ductile iron pipe, fittings, valves and appurtenances shall be coated with a dielectric coating, a liquid epoxy coating system per AWWA C-210 at 24 mils minimum dry film thickness (MDFT), or a cold applied three-part system petroleum wax tape per AWWA C-217, or a 100% polyurethane coating of 24 mils (MDFT) suitable.
2. Any changes shall have Public Utilities Department approval.
3. Piping shall be symmetrical to slab centerline.
4. Supply pipe is one commercial size larger than proposed meter.
5. Concrete slab and fence will be installed by contractor.

ITEMS CALL OUT:
1. 90° flanged ductile iron elbow (Typ).
2. Flanged ductile iron spool, both ends shall be flanged (uni-flange shall not be used).
3. Diameter of tee shall be equal to the diameter of the supply pipe.

FULL RESILIENT SEATED GATE VALVE TYP (NO BUTTERFLY VALVES)

(Drawings updated for 2012 standards.)

REVISION
BY
APPROVED
DATE

ORIGINAL
JC

REVISION
BM
A. Oskouei
12/03

NOTES
JS
A. Oskouei
12/06

UPDATED
KA
J. Nagelvoort
07/12

SDW-119

CITY OF SAN DIEGO - STANDARD DRAWING

DUAL ABOVE GROUND METER AND BACKFLOW PREVENTION ASSEMBLIES

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR R.C.E. 85271 DATE

1/31/2012

DRAWING NUMBER

SDW-119 SHEET 1 OF 2

(Alternate materials must be approved by Water Dept. prior to construction) Optional.
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<th>LETTER CODE</th>
<th>PART DESCRIPTION</th>
<th>METER SIZE</th>
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<td>A</td>
<td>GATE VALVE 8&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>B</td>
<td>PIPE EXTENSION 1'-0&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<td>C</td>
<td>STRAINER * 7&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<td>D</td>
<td>TURBINE WATER METER * 1'-0&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>E</td>
<td>COMPOUND METER * 1'-5&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>F</td>
<td>TESTING TEE 1'-1&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>G</td>
<td>90 DEG. ELBOW (SHORT)</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>H</td>
<td>OVERALL SLAB LENGTH * 11&quot; 1'-10&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>I</td>
<td>SLAB TO CL PIPE 3'-0&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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<tr>
<td>J</td>
<td>BACKFLOW * 3'-2&quot;</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
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* NOTES: INDIVIDUAL DIMENSIONS MAY VARY PER MANUFACTURER
OVERALL DIMENSIONS INCREASE WITH USE OF THESE COMPONENTS
NOTES:
1. BACKFLOW PREVENTER ASSEMBLY SHALL BE TESTED UPON INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH WRITTEN TEST RESULTS COMPLETED BY A CERTIFIED BACKFLOW TESTER PRIOR TO BACKFLOW PREVENTER ASSEMBLY'S ACCEPTANCE.
2. ALL PIPE BELOW GRADE SHALL BE WRAPPED AS REQUIRED BY THE SPECIFICATIONS.
3. CONCRETE PAD SHALL BE 2" ABOVE GRADE UNLESS INSTALLED IN LAWN AREA WHERE IT WILL BE AT 1" ABOVE GRADE. SLOPE TO DRAIN.
4. VALVE SUPPORTS AS REQUIRED BY SPECIFICATIONS.
5. LOCATION SHALL BE APPROVED BY PUBLIC UTILITIES DEPARTMENT, WATER OPERATIONS DIVISION, METERS BACKFLOW GROUP AND SHOWN ON PLANS.

ITEMS CALL OUT:
1. REDUCED PRESSURE PRINCIPLE DETECTION ASSEMBLY SHALL BE INCLUDED IN THE LATEST EDITION OF THE "APPROVED FOR SERVICE ISOLATION CALIFORNIA PUBLIC WATER SYSTEM" ISSUED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES, OFFICE OF DRINKING WATER.
2. 90° FLANGED CAST IRON OR DUCTILE IRON ELBOW (TYP).
3. FLANGED DUCTILE IRON SPOOL. BOTH ENDS SHALL BE FLANGED (UNI-FLANGE SHALL NOT BE USED).
4. 90° DUCTILE IRON FLANGED ELBOW.
NOTES:

1. In paved, city-owned roadways, the repair of the road surface shall be per applicable SDRSD SDG-117 or SDG-118 in State highways, conform to applicable Caltrans Standards.

2. For location of test station, use regional STD DWG WS-03. Exact location shall be approved by corrosion engineer.

3. At roadways, use SDW-129 and at undeveloped areas use SDW-127.

4. For installation of directly buried cables & conduit see SDW-126.

ITEMS CALL OUT:

1. Cable AWG #8 Copper ASTM B3 stranded ASTM B8 insulation ASTM D1248 Type 1, Class C, Grade 5.

2. Polyethylene warning tape. See Detail 1.

3. Sand: 50 sieve complies with Section 200-1.5.
EXOTHERMIC WELD
SEE DWG SDW-122

CROSS

SPOOL

TEE

VALVE CROSSING

BEND

BELL AND SPIGOT PIPE JOINT

FLANGED VALVE

FLANGED OR MECHANICAL PIPE JOINT

FLEXIBLE COUPLING PIPE JOINT

BOND ACROSS FLANGES

NON-MORTAR LINED

NON-MORTAR LINED

NOTES:

1. ALL BOND CABLE SHALL BE INSTALLED AT MINIMUM LENGTH.

2. BOND CABLES SHALL NOT BE INSTALLED ACROSS INSULATING JOINTS.

3. ONE ADDITIONAL CABLE SHALL BE REQUIRED FOR PIPE DIAMETERS FROM 36" TO 48" AND 2 MORE FOR DIAMETERS LARGER THAN 48".

4. WELD BEFORE APPLYING INTERNAL COATING.

5. ONLY AT THE APPROVAL OF CITY'S CORROSION ENGINEER.

6. REFER TO SDW-116 FOR SCREW PIPE BOND DETAIL.

ITEM CALL OUT:

1. BOND CABLE: AWG #6 STRANDED ASTM B6 COPPER ASTM B5 INSULATED ASTM D1248 TYPE 1, CLASS C, GRADE 5.

2. STEEL PLATE: 16" THICK, WELD TO THE PIPE.

WIRE CONNECTION TO FLANGE BOLT SEE NOTE 5.
NOTES:
1. WHEREEVER POSSIBLE, INSULATING FLANGE ASSEMBLIES SHOULD BE ASSEMBLED PRIOR TO INSTALLATION & TESTED ELECTRICALLY USING GAS ELECTRONIC TOOL OR APPROVED EQUAL TO INSURE THAT THE INSTALLATION IS EFFECTIVE.
2. WRAP FLANGE ASSEMBLY AS SHOWN WITH 3-PART PETROLATUM TAPE PER AWWA C217.
3. INSULATING FLANGE BOLT HOLE DIAMETER SHOULD BE 1/8" BIGGER THAN THE INSULATING SLEEVE OD.
4. RECOMMENDED FLANGE INSTALLATION PROCEDURE:
   * CLEAN & INSPECT PIPE FLANGE FACES; APPLY NON-CONDUCTIVE LUBRICANT TO ALL THREADS.
   * INSTALL THE GASKET, ALIGN FLANGES & GASKETS.
   * USE ALIGNMENT PIN IN TWO DIAMETRICALLY OPPOSITE BOLT HOLES.
   * INSERT INSULATING SLEEVES INTO BOLT HOLES.
   * INSERT THE BOLT WITH BOTH INSULATING WASHERS.
   * TIGHTEN TWO DIAMETRICALLY OPPOSITE BOLTS TO 30% TOTAL TORQUE.
   * TIGHTEN ALL BOLTS TO 50% AFTER REPLACING TWO ALIGNMENT PINS WITH BOLTS AND TO 100% OF FINAL TORQUE VALUE.

ITEMS CALL OUT:
1. PROTECTIVE COATING: 3-PARTS PETROLATUM AWWA C217 OR APPROVED EQUAL.
2. TAPE WRAPAROUND 3" WIDE, 0.050" THICK. CROSS LINKED POLYOLEFIN. HEAT SHRINKABLE, PRECOATED WITH HOT MELT-ADHESIVE.
3. WASHER: INSULATING EPOXY GLASS
4. GASKET: 1/8" THICK EPOXY GLASS INSULATING MATERIALS WITH NEOPRENE SEALING ELEMENT.
5. SLEEVE: INSULATING EPOXY GLASS, 1/2" THICK. ID = BOLT DIAMETER + 1/64.
6. WASHER: STEEL, 1/8" THICK.
NOTES:

1. MOUNT WIRE TERMINATIONS AT 90 DEGREE ORIENTATION, FOR MORE THAN 4 WIRES, MOUNT WIRE TERMINATIONS 4" BELOW.

2. OFFSET MACHINE SCREW HEAD BY 90° FROM PIPE EXTERIOR WALL.

3. TAG WIRE WITH NAME, PIPE SIZE, MATERIALS AND STATION USING SELF-ADHESIVE LABELS. LABELS SHALL BE WRAPPED AROUND THE INSULATION AND ENCASED WITH CLEAR HEAT-SHRINK.

MATERIALS:

1. SCREW: MACHINE BRASS, ROUND HEAD SLOTTED, 1/4" - 20T 1 1/2" LONG

2. NUT: BRASS 14" 20 THREADS

3. WASHER: BRASS 1/4"

4. WASHER, INSULATION NYLON, 0.79" OD, 0.26" ID, 0.062" THICK NATURAL

5. LUG: OFFSET TONGUE SOLDERABILITY COPPER

6. WASHER: INSULATING, SHOULDER NYLON NATURAL, 0.250" OD, 0.342" CD FLANGE, 0.065" FLANGE THK, 0.270" SHANK THK

7. CABLE: AWG #8 COPPER ASTM B3, STRANDED ASTM B8, INSULATED ASTM D1248 TYPE 1, CLASS C, GR 5

8. PIPE: 4" DIAMETER SCH 40 ASTM A53, GALVANIZED
DETAIL 1
TYPICAL CONNECTIONS OF NO.6 AWG CABLE AND SMALLER CABLES

DETAIL 2
TYPICAL CONNECTIONS OF NO.4 AWG CABLE

DETAIL 3
TYPICAL CONNECTIONS OF NO.2 AWG CABLE AND LARGER CABLES

NOTES:
1. CLEAN AREA OF STEEL SURFACE APPROXIMATELY 2" x 2" FOR EACH THERMOWELD CONNECTION. WIRE BRUSH AND SCRAPE TO OBTAIN SSPC-SP-5 WHITE METAL SURFACE FINISH.
2. SELECT PROPER MOLD BASED ON STRUCTURE GEOMETRY, ORIENTATION AND MATERIAL TYPE.
3. STRIP CABLE END AND TWIST TO FIT THERMOWELD MOLD. CABLE SIZES LARGER THAN 6 AWG SHALL BE THERMOWELDED BY TWISTING CONDUCTORS INTO GROUPS APPROXIMATELY NUMBER 6 AWG CABLE SIZE. MINIMUM SPACING BETWEEN WELDS WILL BE DETERMINED BY MOLD GEOMETRY, NOMINALLY 3".
4. HOLD MOLD FIRMLY AGAINST PIPE WITH OPENING AWAY FROM THE OPERATOR. ILLUMINATE WITH FLINT GUN.
5. REMOVE ALL WELD SLAG, SPLATTER, SHARP EDGES AND BURRS WITH CHIP HAMMER AND METAL FILE.
6. TEST STRENGTH OF CONNECTION BY LIGHTLY TAPPING WITH 1 LB HAMMER, AND PULL WITH 5 LB FORCE ON CABLE.
7. WIPE PIPE SURFACE WITH CLEAN, OIL FREE RAGS TO REMOVE ANY LOOSE DUST.
8. PRIME CLEANED SURFACE WITH APPROVED PRIMER.
9. COAT THERMOWELD AND 6" OF CABLE TAIL WITH COMPATIBLE COATING, SUCH THAT ALL CORNERS ARE FILLED. THE COATING SHALL EXTEND FOR AT LEAST 2" AROUND THE THERMOWELD AREA.
10. THERMOWELD CARTRIDGE SIZE SHALL BE COMPATIBLE TO STEEL MATERIALS. MULTIPLE POWDER CARTRIDGE CHARGERS SHALL NOT BE USED. IF A THERMOWELD MUST BE REPEATED, A NEW PIPE SURFACE MUST BE PREPARED AT LEAST 3" FROM THE ORIGINAL WELD ATTEMPT. MORE THAN ONE WELD ATTEMPT ON THE SAME SPOT SHALL NOT BE PERMITTED.
11. IN NON-CONCRETE LINED PIPES, ALL EXOTHERMIC WELDS SHALL BE MADE IN A STEEL PAD.

ITEMS CALL OUT:
1. CABLE: AWG SIZE ASTM B388
   ASTM D-1248, TYPE 1, CLASS C, Installer INSULATION
2. SLEEVE: ADAPTER
3. APPROVED PRIMER & WELD CAP OR MORTAR OVER WELD LOCATION

CABLE STRAND DETAILS

<table>
<thead>
<tr>
<th>CABLE SIZE</th>
<th>NO. OF STRANDS</th>
<th>NO. OF EXOTHERMIC GROUPS PER CABLE CONNECTION</th>
<th>CABLE STRANDS PER GROUP</th>
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<tbody>
<tr>
<td>8</td>
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<tr>
<td></td>
<td>19</td>
<td></td>
<td>7-6-6</td>
</tr>
</tbody>
</table>
CABLE(S) AND CONDUIT TRENCH SECTION

NOTES:

1. MATERIAL:
   1. POLYETHYLENE WARNING TAPE, REFER TO DETAIL 1 ON SDW-121.
   2. SAND: 50 SIEVE COMPLIES WITH 200-1.5

2. IN PAVED CITY-OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER APPLICABLE SDG-117 OR SDG-118. IN STATE HIGHWAYS, CONFORM TO APPLICABLE CALTRANS STANDARDS.

3. CLEAN SHARP STONES AND RUBBLE FROM THE BOTTOM OF DITCH.

INSTALLATION OF DIRECTLY BURIED CABLES OR CONDUIT

CITY OF SAN DIEGO – STANDARD DRAWING

DIAOWNG NUMBER SDW-126
NOTES:

1. PLACE TWO DECALS, ONE FACING ROADWAY.

2. FILL THE PIPE WITH 50 SIEVE SAND FROM BOTTOM OF CONCRETE FOOTING TO 12" ABOVE GRADE.

3. THIS POST-MOUNTED STATION IS FOR USE ONLY IN AREAS WITH NO VEHICULAR TRAFFIC.

ITEM CALL OUT:

1. CABLE: AWG #8 COPPER ASTM B3 STRANDED ASTM B6 INSULATION ASTM D 1248 TYPE 1, CLASS C, GR. 5.

2. FOOTING: CONCRETE 12" DIA., SSPWC 295-C-17.

3. PIPE: 4" DIAMETER, SCH 40, ASTM A 53 GALVANIZED.


5. CAP: THREADED 4" DIAMETER GALVANIZED.
TEST BOX COVER ISOMETRIC

TEST BOX COVER PLAN

TEST BOX ISOMETRIC SECTION

NOTES:
1. COVER WEIGHT: 12 LB.
2. BODY WEIGHT: 58 LB.
3. THE COVER SHALL HAVE CASTED MARKING IN 1/2" HIGH RAISED LETTERS.

ITEM CALL OUT:
1. COVER ASTM A 48 CLASS 30.
NOTES:
1. SLOPE CONCRETE PAD AWAY FROM COVER.
2. FOR CONTINUATION OF CABLES.

ITEMS CALL OUT:
1. CONCRETE: 2' X 2' X 4' THK PER SSPWC S30-C-22
2. REINFORCING FABRIC 4" X 4" GAUGE 10 WIRE.
3. CABLE: REFER TO NOTE 2.

TEST BOX COVER

TEST BOX

WIRE IDENTIFICATION (TYP)

5' MIN

4'

2'

2'

18" SLACK

1. SEE NOTE 1
2. SEE NOTE 2

TEST STATION SECTION

NATIVE SOIL

GRAVEL

SDW-129
INSULATING FLANGE FOUR - WIRE TEST STATION INSTALLATION

NOTES:
1. IN PAVED CITY OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER APPLICABLE STANDARD DRAWINGS IN STATE HIGHWAYS, CONFORM TO APPLICABLE CALTRANS STANDARD.
2. FOR LOCATION OF TEST STATION USE REGIONAL STD DWG W15, EXACT LOCATION SHALL BE APPROVED BY CORROSION ENGR.
3. USE APPLICABLE TEST STATION DRAWING FOR UNDEVELOPED AREAS

ITEM CALL OUT:
1. CABLE: AWG #2 COPPER ASTM B3, STRANDED ASTM B9, INSULATED PER ASTM D1243, TYPE 1 CLASS C, GRADE 5.
2. POLYETHYLENE WARNING TAPE.
3. SAND: 20 SIEVE
WIRE LABEL DETAIL STATION

WIRE LABEL

CPTS# (CATHODIC PROTECTION TEST STATION NUMBERING)

CPTS#1, 2, 3, ...... N

NOTES:

1. CABLES SHALL BE TAGGED USING TIMES ROMAN 10 POINT FONT.

2. TEXT SHALL BE PRESENTED IN THE FOLLOWING ORDER:
   - CPTS#
   - TYPE OF INSTALLATION
   - FACULTY NAME
   - PIPE MATERIAL
   - WIRE DIRECTIONAL ORIENTATION
     - NORTH
     - SOUTH
     - EAST
     - WEST

3. PLACE SLEEVE AFTER ATTACHMENT OF LABEL TO CABLE.

ITEM CALL OUT:

1. CABLE: AWG ASTM B8 & B3
2. LABEL: FILE FOLDER, SELF ADHESIVE WHITE 23' X 3 7/16".
3. SLEEVE: HEAT SHRINK, ADHESIVE LINED POLYOLEFIN, CLEAR THIN WALL TUBING.

LEGEND

PIPE MATERIAL

CCI - COATED CAST IRON
CDI - COATED DUCTILE IRON
SCRC - STEEL CYLINDER REINFORCED CONCRETE
PSCS - PRE-STRESSED CONCRETE-STEEL CYLINDER
RCCP - REINFORCED CONCRETE CYLINDER PIPE (WO STEEL)
SCRW - STEEL CYLINDER REINFORCED ROD WRAPPED
CMLC - CEMENT MORTAR LINED-COATED STEEL CYLINDER
CMLCT - CEMENT MORTAR LINED-COATED-TAPED STEEL CYLINDER
CSTL - COATED STEEL CYLINDER

TYPE OF INSTALLATION

2WTS - 2-WIRE TEST STATION
   EXAMPLE: CPTS#1, 2WTS, 180+00, 30, OTAY 2, CSTL

4WJTS - 4-WIRE INSULATING JOINT TEST STATION
   EXAMPLE: CPTS#2, 4WJTS, 180+00, 30, OTAY 2, CSTL, NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

6WTS - 6-WIRE TEST STATION
   EXAMPLE: STRUCTURE#1 - CPTS#3, 6WTS, 180+00, 30, OTAY 2, CSTL
   NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

   STRUCTURE#2 - CPTS#3, 6WTS, 130+60, 24, MIDCITY, SCRW
   NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

   STRUCTURE#3 - CPTS#3, 6WTS, 101+25, 54, TRJAN, RCCP
   NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CTS - CURRENT TEST STATION
   EXAMPLE: CPTS#10, CTS, 180+00, 200 FT., OTAY 2, CSTL
   NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CSGTS - CASING TEST STATION
   EXAMPLE: CPTS#12, CSGTS, 180+00, 30, OTAY 2, CSTL
   NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

ASTA - ANODE STATION
   EXAMPLE: ANODE#1, 2, 3, ...... N FOR ANODE WIRES
   00, OTAY 2, CSTL, 180+00, CPTS#6 FOR STRUCTURE WIRE

BSTA - BOND STATION
   EXAMPLE: CPTS#18, BSTA, 30, OTAY 2, CSTL, 180+00:
   54, OTAY 3, SCRW, 65+20

FXSTA - FOREIGN CROSSING STATION
   EXAMPLE: CPTS#4, FXSTA, 30, OTAY 2, CSTL, 180+00, 24 SDGE

NOTES:

1. CABLES SHALL BE TAGGED USING TIMES ROMAN 10 POINT FONT.

2. TEXT SHALL BE PRESENTED IN THE FOLLOWING ORDER:
   * CPTS#
   * TYPE OF INSTALLATION
   * FACULTY NAME
   * PIPE MATERIAL
   * WIRE DIRECTIONAL ORIENTATION
     * NORTH
     * SOUTH
     * EAST
     * WEST

3. PLACE SLEEVE AFTER ATTACHMENT OF LABEL TO CABLE.

ITEM CALL OUT:

1. CABLE: AWG ASTM B8 & B3
2. LABEL: FILE FOLDER, SELF ADHESIVE WHITE 23' X 3 7/16".
3. SLEEVE: HEAT SHRINK, ADHESIVE LINED POLYOLEFIN, CLEAR THIN WALL TUBING.
WARNING

UNDERGROUND CABLES IN THE VICINITY

SEE NOTE 2

BEFORE DIGGING CALL

619-515-3525

DECal ELEVATION

NOTES:
1. 1" TEXT BOLD
2. 1/4" TEXT BOLD

ITEM CALL OUT:
1. DECAL: APWA BLUE, WITH WHITE REFLECTIVE LETTERS. DECAL MATERIAL SHALL BE UV RESISTANT PREMIUM GRADE CAST VINYL SHEETING WITH AGGRESSIVE ADHESIVE AND UNDER PROTECTIVE LAMINATE.

POST - MOUNTED CATHODIC PROTECTION WARNING DECAL

CITY OF SAN DIEGO - STANDARD DRAWING
POLYMER CONCRETE WATER METER BOX FOR 1" WATER SERVICE

NOTES:

1. METER BOX COLLAR AND COVER SHALL BE OF POLYMER CONCRETE REINFORCED WITH CONTINUOUS LAYERS OF WOVEN FIBERGLASS.

2. BOX AND COVER SHALL WITHSTAND AASHTO H-20 (ASTM C857).

3. FOR COVER DETAIL WITH DROP IN READER LID, SEE SDW-136.
NOTES

1. METER BOX COLLAR AND COVER SHALL BE OF POLYMER CONCRETE REINFORCED WITH CONTINUOUS LAYERS OF WOVEN FIBERGLASS.

2. BOX AND COVER SHALL WITHSTAND AASHTO H-20 (ASTM C857).
SOLID COVER FOR TRAVELED WAY

NOTES:

1. LID SHALL WITHSTAND AASHTO H-20 (ASTM 857).
2. LID SHALL HAVE NON-SKID SURFACE.
DROP IN COVER (OUTSIDE TRAVELLED WAY)

NOTES:

1. LID SHALL WITHSTAND AASHTO H-10 (ASTM C857-85).

2. LID SHALL HAVE NON-SKID SURFACE.

3. IF LID IS MANUFACTURED BY CDR, READER SHALL BE 6" X 9".

CITY OF SAN DIEGO - STANDARD DRAWING

SDW-136
NOTES:

1. REFER TO SDG-107 NOTE 3 FOR CURING REQUIREMENTS.

2. THIS DRAWING SHALL BE USED IN AREAS SUBJECT TO HEAVY TRAFFIC INCLUDING DRIVEWAYS, PARKING LOTS AND ALLEYS.

3. (*) FOR METER BOX OUTSIDE TRAVEL WAY, USE SAND SE 30.
ITEMS CALL OUT:
1. 1" WATER SERVICE
2. 1" CURB STOP
3. MAIN CONNECTION X MULTIPLE BRANCH CONNECTION
4. BRASS COUPLING OR 45 DEGREE ELBOW
5. BRASS NIPPLE - 4" MIN. LENGTH
6. BRASS 45 DEGREE ELBOW
7. CAST IRON CAP
8. ASBESTOS CEMENT PIPE
9. THRUST BLOCK

NOTE: NIPPLE LENGTHS TO BE SUFFICIENT TO ALLOW SERVICE CONNECTION TO CLEAR THRUST BLOCK.

ELEVATION

SDW-138
MULTIPLE SERVICE ASSEMBLY
DEAD END MAIN
NOTES:
CONTRACTOR SHALL PROVIDE HANDBOLES AS REQUIRED TO COMPLETE THE WORK.
NOTES:

1. BACKFLOW PREVENTER ASSEMBLY SHALL BE TESTED UPON INSTALLATION BY A CERTIFIED BACKFLOW DEVICE TESTER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH WRITTEN TEST RESULTS COMPLETED BY A CERTIFIED BACKFLOW TESTER PRIOR TO BACKFLOW PREVENTER ASSEMBLY'S ACCEPTANCE BY THE ENGINEER.

2. ALL METAL IN CONTACT WITH CONCRETE PIPE SHALL BE POLYETHYLENE WRAPPED USING 2' WIDE PLASTIC BACKED ADHESIVE TAPE MINIMUM 8 MILS. THICK WITH 1/2" OVERLAP.

3. CONCRETE PAD TO BE 2" ABOVE GRADE UNLESS IN LAWN AREA WHERE IT WILL BE AT 1" ABOVE GRADE. CONCRETE PAD SHALL BE 4" THICK AND 18" WIDE MINIMUM 520-C-2500. (OPTIONAL WITH WATER DEPARTMENT APPROVAL).

4. FACTORY ASSEMBLED REDUCED PRESSURE PRINCIPLE ASSEMBLY / DOUBLE CHECK ASSEMBLY SHALL BE INCLUDED IN THE LATEST EDITION OF THE "APPROVED FOR SERVICE ISOLATION IN CALIFORNIA PUBLIC WATER SYSTEMS" ISSUED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES, OFFICE OF DRINKING WATER.

5. REGULATOR MAY BE INSTALLED UPSTREAM OF THE BACKFLOW PREVENTER ASSEMBLY WHEN WATER PRESSURE EXCEEDS BACKFLOW PREVENTER ASSEMBLY RATING.

6. WYE STRAINER AND REGULAR, WHEN REQUIRED, SHALL BE LOCATED DOWNSTREAM OF THE #2 SHUTOFF VALVE.

7. PROTECTIVE ENCLOSURE FOR BACKFLOW PREVENTER ASSEMBLY SHALL BE USED AT THE DISCRETION OF THE PROPERTY OWNER.

8. LOCATE PREVENTER ASSEMBLY AS CLOSE TO METER AS PRACTICAL AS APPROVED BY THE ENGINEER.

9. ALL RISERS, ELBOWS AND UNDERGROUND PIPING SHALL BE M OR L COPPER, BRASS, OR APPROVED EQUAL.
NOTES:

1. SEE SDW-120 FOR COMPLETE INSTALLATION REQUIREMENTS.

2. LOCATION MUST BE APPROVED BY WATER DEPARTMENT, WATER OPERATIONS DIVISION, METER / BACKFLOW GROUP AND SHOWN ON PLANS.
NOTES:
1. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
2. LOCATE METER BOX
3. INSTALL WARNING / IDENTIFICATION TAPE
4. BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
5. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
6. CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
7. FOR BLOW OFF AT END OF MAIN, SEE OTHER STANDARD DRAWINGS

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>POLYMER METER BOX WITH LID 17&quot; x 30&quot;, SEE NOTE 2</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; CAM &amp; GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7</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>36&quot; ROCK 4&quot; TO 6&quot; DEEP</td>
</tr>
<tr>
<td>7</td>
<td>2&quot; BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING</td>
</tr>
<tr>
<td>8</td>
<td>2&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; RIGID OR SOFT</td>
</tr>
<tr>
<td>9</td>
<td>90° ELL (NO SWEAT JOINTS ALLOWED)</td>
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<td>10</td>
<td>2&quot; BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)</td>
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<tr>
<td>11</td>
<td>BRONZE CORPORATION STOP (INSTALL WITH KEY ON SIDE AND OPEN TAP)</td>
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<tr>
<td>12</td>
<td>SIZE x 2&quot; SERVICE SADDLE</td>
</tr>
<tr>
<td>13</td>
<td>WATER MAIN</td>
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</tbody>
</table>

LEGEND ON PLANS

2" BLOW-OFF INSTALLATION
NOTES:
1) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
2) LOCATE METER BOX
3) INSTALL WARNING / IDENTIFICATION TAPE
4) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE OTHER STANDARD DRAWINGS
5) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
6) 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
7) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK

<table>
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<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>POLYMER METER BOX WITH LID 17&quot; x 30&quot;, SEE NOTE 2</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; OR 6&quot; CAM &amp; GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot; PRESSURE PET COCK</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; OR 6&quot; FLANGED COMPANION x FIPT</td>
</tr>
<tr>
<td>5</td>
<td>36&quot; ROCK 4&quot; TO 6&quot; DEEP</td>
</tr>
<tr>
<td>6</td>
<td>4&quot; OR 6&quot; FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)</td>
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<tr>
<td>7</td>
<td>CONCRETE THRUST BLOCK SEE SDW-151</td>
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<tr>
<td>8</td>
<td>4&quot; OR 6&quot; FLG x MUPO 90° BEND</td>
</tr>
<tr>
<td>9</td>
<td>USE STEEL PIPE ONLY</td>
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<tr>
<td>10</td>
<td>VALVE WELL FRAME AND COVER (SEE SDW-153, SDW-154)</td>
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<tr>
<td>11</td>
<td>4&quot; OR 6&quot; FLG x MUPOFLG RWGV</td>
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<td>12</td>
<td>4&quot; OR 6&quot; FLG x MUPO ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>13</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>14</td>
<td>SIZE x 4&quot; OR 6&quot; MUPOFLG x FLG TEE</td>
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<tr>
<td>15</td>
<td>4&quot; OR 6&quot; FLANGED 45° BEND</td>
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<tr>
<td>16</td>
<td>4&quot; OR 6&quot; x 24&quot; FLG DI SPOOL</td>
</tr>
</tbody>
</table>
NOTES:
1) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE OTHER STANDARD DRAWINGS
2) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
3) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
4) 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

LEGEND ON PLANS

4" 6"

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<tr>
<td>1</td>
<td>GATE WELL WITH CAP SEE SDW-153 OR SDW-154</td>
<td>6</td>
<td>CAST IRON PIPE, DUCTILE IRON OR C-900 PVC</td>
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<td>2</td>
<td>GALVANIZED IRON PLUG</td>
<td>7</td>
<td>4&quot; OR 6&quot; FLG x MJ / PO / FLG RWGV</td>
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<td>3</td>
<td>GALVANIZED IRON COUPLING, THREADED</td>
<td>8</td>
<td>4&quot; OR 6&quot; FLG x MJ / PO / FLG ADAPTER (IF REQUIRED)</td>
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<tr>
<td>4</td>
<td>10&quot; STEEL GATE WELL, WITH CAP</td>
<td>9</td>
<td>4&quot; OR 6&quot; x 24&quot; FLG DI SPOOL</td>
</tr>
<tr>
<td>5</td>
<td>4&quot; OR 6&quot; FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)</td>
<td>10</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>6</td>
<td>CONCRETE THRUST BLOCK SEE SDW-151</td>
<td>11</td>
<td>SIZE x 4&quot; OR 6 MJ / PO / FLG x FLG TEE</td>
</tr>
<tr>
<td>7</td>
<td>FLANGE x FLANGE x 90° BEND</td>
<td>12</td>
<td>4&quot; OR 6&quot; FLANGED 45° BEND, SEE NOTE 4</td>
</tr>
</tbody>
</table>
NOTES:
1) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
2) FOR 2" BLOW-OFFS ON STEEL MAINS USE WELD ON COUPLINGS ON DUCTILE IRON MAINS USE DUCTILE IRON
3) SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED) SEE OTHER DRAWINGS FOR END OF MAIN DETAIL.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>CONCRETE THRUST BLOCKS SEE SDW-151</td>
<td>8</td>
<td>FLG x MJPO/FLG RWGV</td>
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<td>2</td>
<td>DI END CAP</td>
<td>9</td>
<td>FLG x MJPO ADAPTER (IF REQUIRED)</td>
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<tr>
<td>3</td>
<td>WATER MAIN</td>
<td>10</td>
<td>C-900 PVC PIPE</td>
</tr>
<tr>
<td>4</td>
<td>BRONZE SERVICE CLAMP (DOUBLE STRAP). SIZE x 2&quot; SERVICE SADDLE</td>
<td>11</td>
<td>FLG x MJPO 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 MJPO BEND (IF REQUIRED)</td>
</tr>
<tr>
<td>7</td>
<td>GATE WELL WITH CAP SEE SDW-153 &amp; SDW-154</td>
<td>14</td>
<td>FLG x MJPO 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>

CITY OF SAN DIEGO - STANDARD DRAWING

BLOW-OFF INSTALLATION FROM END OF MAIN & FROM STEEL MAIN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 86271 DATE: 1/31/2012

DRAWING NUMBER: SDW-146
NOTES:

1) 6" WARNING / ID TAPE SHALL BE INSTALLED ABOVE THE PIPE AS SPECIFIED AND RUN CONTINUOUSLY ALONG THE ENTIRE LENGTH OF THE PIPE AND ALL RELATED APPURTENANCES.

2) ELECTRICALLY BOND SERVICE TAPE AND MAIN TAPE TOGETHER. TAPE SHALL EXTEND WITHIN METER BOX ITSELF TO ALLOW MARKOUT BY CONTINUITY TESTER.
### NOTES:
1) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION
2) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE
3) LOCATE METER BOX
4) INSTALL WARNING / IDENTIFICATION TAPE
5) SILVER SOLDER JOINTS SHALL NOT BE USED
6) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
7) TOP TAPS NOT PERMITTED, ANY GLUE JOINT SHALL BE BEVELED PRIOR TO ASSEMBLY

### ITEM NO | SIZE AND DESCRIPTION
---|---
1 | WATER MAIN
2 | 2" BRONZE CORPORATION STOP
3 | SIZE x 2" BRONZE SERVICE SADDLE DOUBLE STRAP
4 | 2" x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT/STRAIGHT
5 | 36" ROCK, 4' TO 6' DEEP
6 | 2" BRONZE ANGLE METER STOP WITH LOCKWING
7 | WATER METER FURNISHED AND INSTALLED BY THE CITY
8 | METER BOX WITH LID, #8: 35" x 21"
9 | CUSTOMER SHUT-OFF VALVE (LOCKABLE)
### Notes:
1. Install corporation stop with key in the side position.
2. Set top of meter box flush with sidewalk, curb, or finish grade.
3. Locate meter box.
4. Install warning / identification tape.
5. Silver solder joints shall not be used.
6. On steel mains use weld on couplings. On ductile iron mains use ductile iron service saddles (insulating bushings are required).
7. Bronze pipe saddles are required for all taps into polyvinyl chloride (PVC) pipe. Top taps are not permitted.

### Legend on Plans

<table>
<thead>
<tr>
<th>Item No</th>
<th>Size and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Water Main</td>
</tr>
<tr>
<td>2</td>
<td>1&quot; Bronze Corporation Stop</td>
</tr>
<tr>
<td>3</td>
<td>Size x 1&quot; service saddle</td>
</tr>
<tr>
<td>4</td>
<td>Use copper tubing type K. Soft for 1&quot; services. Only, no intermediate joints permitted within the first 60 feet of the main for lengths longer than 60 feet, use flare joint union or Lok-Pac fittings with locking clamp and stainless steel bolt only. No sweat joints are allowed.</td>
</tr>
<tr>
<td>5</td>
<td>Bronze angle meter stop with locking device and meter coupling attached. Furnish and install bronze property valve. Use spacer for meter.</td>
</tr>
<tr>
<td>6</td>
<td>Water meter furnished &amp; installed by the city</td>
</tr>
<tr>
<td>7</td>
<td>Meter box with lid, #37; 22&quot; x 18&quot;</td>
</tr>
<tr>
<td>8</td>
<td>Customer shut-off valve (lockable). Furnished and installed by the city</td>
</tr>
<tr>
<td>9</td>
<td>36&quot; Rock, 4&quot; to 6&quot; deep</td>
</tr>
</tbody>
</table>
NOTES:

1) THE ANCHOR BLOCKS ON VERTICAL BENDS REQUIRE ENGINEER APPROVAL.

2) A MINIMUM OF 6" OF CONCRETE SHALL BE POURED ON WETTED UNDISTURBED OR COMPACTED SOIL BENEATH EACH INSTALLATION.

3) TEE SHALL BE CONCRETE BLOCKED A MINIMUM OF 6" ON ALL THREE SIDES.

4) USE 12" - 18" LENGTH OF PIPE BETWEEN THE END CAP AND THE LAST JOINT AS A BOND BREAKER ON DEAD END BLOCKING.
### Valve Support Block Dimensions

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Dimension &quot;A&quot;</th>
<th>Dimension &quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>12&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>12&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>13&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>14&quot;</td>
<td>16&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>15&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

### Thrust and Anchor Blocks Minimum Bearing Area in Square Foot (Square Meters) See Note 2

<table>
<thead>
<tr>
<th>Main Size</th>
<th>Tees</th>
<th>90° Bend</th>
<th>45° Bend</th>
<th>22½° Bend</th>
</tr>
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<tbody>
<tr>
<td>4&quot;</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>6&quot;</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>8&quot;</td>
<td>12</td>
<td>16</td>
<td>9</td>
<td>4.5</td>
</tr>
<tr>
<td>10&quot;</td>
<td>17</td>
<td>24</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>12&quot;</td>
<td>24</td>
<td>33</td>
<td>19</td>
<td>9.5</td>
</tr>
</tbody>
</table>

### Notes:

1. 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

2. Engineer shall determine sizes, refer to specifications for thrust and anchor block sizing.

3. Thrust blocks shall be centered on the fitting so that the bearing area is exactly opposite the resultant direction of thrust.

4. Concrete shall be placed so that fittings and valves will be accessible for repair or replacement.
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 SPECIFICATIONS.
POTABLE WATER

GATE WELL LID

COLOR | GATE WELL AND LIDS USED FOR:
-------|----------------------------------------------------
RED | NORMALLY CLOSED SYSTEM VALVES (NCV)
WHITE | RESILIENT WEDGE GATE VALVES
YELLOW | BUTTERFLY VALVES

INSIDE GATE WELL LID PAINTED IDENTIFICATION MARKING

<table>
<thead>
<tr>
<th>VALVE CONDITION</th>
<th>BUTTERFLY VALVE</th>
<th>GATE VALVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERMANENTLY CLOSED</td>
<td>RED</td>
<td>RED</td>
</tr>
<tr>
<td>TEMPORARILY CLOSED</td>
<td>YELLOW WRED DOT</td>
<td>WHITE WRED DOT</td>
</tr>
<tr>
<td>PERMANENTLY OPEN</td>
<td>YELLOW</td>
<td>WHITE</td>
</tr>
</tbody>
</table>

GATE WELL LID TOP COLOR & CONDITION

NOTES:

1) GATE WELL LIDS SHALL BE CAST IRON WITH "CITY OF SAN DIEGO" 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.
TRENCH RESURFACING PER SDG-107/SDG-108 BASE & FIC PAVEMENT

EXISTING BASE OR OLD CONCRETE PAVEMENT

GATE WELL (GATE VALVES)

GATE WELL (BUTTERFLY VALVES)

NOTES:
1) VALVES DEEPER THAN 6' REQUIRE A VALVE STEM EXTENSION
2) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT
3) GATE WELL AND CAP SHALL BE SET SO THAT NO MORE THAN TWO 1/2" ADJUSTMENT RINGS ARE USED
4) BFV OPERATORS TO BE LOCATED TO THE CURBLINE SIDE OF WATER MAIN
5) BFVs INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE SPECIFICATIONS
6) GATE WELLS AND CAPS SHALL BE IDENTIFIED
7) FOR INLINE VALVE ANCHOR BLOCK INSTALLATION
8) VALVE WELL FRAME SHALL BE SET TO SLOPE OF STREET

LEGEND ON PLANS

GATE WELL WITH CAP SEE NOTE 6
VALVE STEM EXTENSION SEE NOTES 1 & 2
8" OD x 18" STEEL CASING x REQUIRED LENGTH GATE WELL SEE NOTE 6
BUTTERFLY VALVE
RESILIENT WEDGE GATE VALVE
WATER MAIN
16" THICK, 8 5/8" OD STEEL PIPE

GATE WELL CAP & CAN INSTALLATION FOR VALVES 4" AND LARGER

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR R.C.E. 69271 DATE 1/31/2012
DRAWING NUMBER SDW-153
NOTES:
1. BYPASS SHALL BE SAME MATERIAL AS MAINLINE PIPE.
2. THE VALVE SHALL BE THE SAME SIZE AS THE BYPASS PIPE.
3. SEE TABLE FOR BYPASS SIZE.

<table>
<thead>
<tr>
<th>MAIN SIZE</th>
<th>BYPASS SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16&quot; TRANSMISSION</td>
<td>3&quot;</td>
</tr>
<tr>
<td>&gt; 16&quot; AND &lt;= 36&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>&gt; 36&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>
NOTES:

1) INSTALL WARNING IDENTIFICATION TAPE.

2) LOCATE BACKFLOW PREVENTION DEVICE (BPD) IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR.

3) STRAINERS SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE.

4) ALL ABOVE GROUND PIPING, UNIONS, ELBOWS & NIPPLES SHALL BE SOLDERED OR THREADED BRASS.

5) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE BPD EXCEEDS 18" (450mm). NO CONNECTIONS OF ANY KIND PERMITTED IN THIS AREA.

6) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI PER SPECIFICATIONS.

7) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE.

8) BACKFLOW PREVENTION DEVICE & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.

9) LOCATION MUST BE APPROVED BY UTILITIES DEPARTMENT CUSTOMER SUPPORT DIVISION, METER SERVICES AND SHOWN ON THE PLANS.

10) ALL RISER ELBOWS AND UNDERGROUND PIPING SHALL BE TYPE (L) OR (M) COPPER BRASS OR PUD APPROVED MATERIAL LIST BRASS UNIONS ACCEPTABLE.

LEGEND ON PLANS

ITEM NO | SIZE AND DESCRIPTION |
--- | --- |
1 | METER BOX & METER ASSEMBLY SEE SDW-149 & SDW-150 |
2 | SCH 80 PVC, BRASS OR COPPER PIPE |
3 | CONCRETE THRUST BLOCK SEE SDW-151 |
4 | 90° ELL SEE NOTES 4 & 6 |
5 | CONCRETE SLAB, MINIMUM 4" THICK x 18" WIDE |
6 | BRASS OR COPPER PIPE SEE NOTE 4 |
7 | 3" LONG NIPPLE SEE NOTE 4 |
8 | BALL VALVE "SHUT-OFF" |
9 | REDUCED PRESSURE BACKFLOW DEVICE |
10 | ENCLOSURE (OPTIONAL) |
11 | UNION SEE NOTE 4 |
12 | ANGLE PRV SEE NOTES 4 & 6 |

CITY OF SAN DIEGO - STANDARD DRAWING

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

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 1/31/2012
NOTES:
1. INSTALL WARNING IDENTIFICATION TAPE
2. LOCATE BACKFLOW PREVENTION DEVICE (BPD) IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR
3. STRainers SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE
4. INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE BPD EXCEEDS 18" (450mm)
5. INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90° ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI PER SPECIFICATIONS
6. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE
7. BPD & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS

ITEM NO | SIZE AND DESCRIPTION
---|---
1 | METER VAULT & METER ASSEMBLY SEE WS-04
2 | PVC OR DUCTILE IRON PIPE
3 | FLG x FLG OR MAPO x FLG 90° BEND
4 | CONCRETE THRUST BLOCK SEE SDW-151
5 | FLANGED DUCTILE IRON PIPE
6 | FLANGED 90° BEND, SEE NOTE 5
7 | FLANGED RESILIENT WEDGE GATE VALVE
8 | REDUCED PRESSURE BACKFLOW DEVICE
9 | ENCLOSURE (OPTIONAL)
10 | ADJUSTABLE VALVE SUPPORT
11 | CONCRETE SLAB, MINIMUM 4" THICK x 36" WIDE
12 | FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 5

3" AND LARGER REDUCED PRESSURE BACKFLOW PREVENTION DEVICE

CITY OF SAN DIEGO - STANDARD DRAWING

REVISION | BY | APPROVED | DATE
---|---|---|---
ORIGINAL | KA NAGELVOOR | 0/12 | 1/31/2012
COORDINATOR | R.C.E. 85271 | DATE
DRAWING NUMBER | SDW-156 |
NOTES:
1) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
2) LOCATE METER BOX
3) INSTALL WARNING IDENTIFICATION TAPE
4) MANUAL AIR VALVE INSTALLATION AT END OF MAIN TO BE SADDLED 24" FROM END CAP
5) MANUAL AIR VALVE ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
6) ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
7) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE RELEASE PET COCK

ITEM NO | SIZE AND DESCRIPTION
------- | ----------------------
1      | POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2
2      | 2" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7
3      | 1/4" PRESSURE PET COCK
4      | 2" 90° BRONZE MIPT x FIPT ELL
5      | 2" OVAL METER FLANGE FLG x FIPT, WITH GASKET
6      | 36" ROCK 4" TO 6" DEEP

LEGEND ON PLANS

ITEM NO | SIZE AND DESCRIPTION
------- | ----------------------
7      | 2" BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
8      | 2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
9      | 2" 90° BRONZE COMPRESSION ELL
10     | 2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
11     | 2" 90° BRONZE FIPT x COMP ELL
12     | 2" BRONZE MIPT x MIPT CORPORATION STOP
13     | SIZE x 2" SERVICE SADDLE
14     | WATER MAIN

CITY OF SAN DIEGO - STANDARD DRAWING

2" MANUAL AIR VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E.,89771 DATE 1/31/2012

DRAWING NUMBER SDW-158

REVISION APPROVED DATE
ORIG/KA NAGELVOORT 09/12
NOTES:
1. NO DIPS OR LOW SPOTS WILL BE ALLOWED IN INSTALLATION.
2. LOCATE ENCLOSURE.
3. INSTALL IDENTIFICATION TAPE.
4. AIR & VACUUM INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE SHOWN ON THE PLANS.
5. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED).

<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>2&quot; PVC SCH 80 CLOSE NIPPLE &amp; 2-SCH 80 STREET ELL &amp; INSECT SCREEN</td>
<td>9</td>
<td>2&quot; X 1/2&quot; BLACK FOAM SLEEVE</td>
</tr>
<tr>
<td>2</td>
<td>VALVE ENCLOSURE</td>
<td>10</td>
<td>COPPER TUBING OR PE 200 FOR 1 INCH PVC (IRON PIPE SIZE)</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; MIPT X COMPRESSION ADAPTER</td>
<td>11</td>
<td>90° ELL (NO SWEAT JOINTS ALLOWED)</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE</td>
<td>12</td>
<td>2&quot; BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)</td>
</tr>
<tr>
<td>5</td>
<td>1/2&quot; X 3' STAINLESS STEEL DROP-IN ANCHORS (3 EA @120 APART)</td>
<td>13</td>
<td>2&quot; COMP BALL BALVE W/TEE HEAD</td>
</tr>
<tr>
<td>6</td>
<td>4&quot; SDR 35 SEWER PIPE GATE WELL WITH CAP</td>
<td>14</td>
<td>2&quot; 90 BRONZE FIPT X COMP ELL</td>
</tr>
<tr>
<td>7</td>
<td>COLD JOINT STRIP</td>
<td>15</td>
<td>2&quot; BRONZE MIPT X MIPT CORPORATION STOP</td>
</tr>
<tr>
<td>8</td>
<td>3'-4&quot; X 2'-6&quot; X 6&quot; THICK CONCRETE SLAB</td>
<td>16</td>
<td>SIZE X 2&quot; SERVICE SADDLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>VALVE STEM EXTENSION</td>
</tr>
</tbody>
</table>

LEGEND ON PLANS
2'
NOTES:
1) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION
2) LOCATE ENCLOSURE
3) INSTALL WARNING IDENTIFICATION TAPE
4) BREAK-AWAY BOLTS SHALL BE 5/8 x 3" WITH 3/8" HOLE DRILLED IN THE SHAFT OF THE BOLT. INSTALL WITH HEX HEAD ON TOP OF THE FLANGE.
5) AIR & VACUUM VALVES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4&quot; OR 6&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE ASSEMBLY</td>
</tr>
<tr>
<td>2</td>
<td>BREAK-AWAY BOLTS, SEE NOTE 4</td>
</tr>
<tr>
<td>3</td>
<td>4&quot; OR 6&quot; FLANGED 8-BOLT DUCTILE IRON PIPE x REQ'D LENGTH (MAX OF 2 SPOOLS)</td>
</tr>
<tr>
<td>4</td>
<td>5/8&quot; x 3&quot; STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120&quot; APART)</td>
</tr>
<tr>
<td>5</td>
<td>VALVE ENCLOSURE</td>
</tr>
<tr>
<td>6</td>
<td>42&quot; x 42&quot; x 6&quot; THICK CONCRETE SLAB</td>
</tr>
<tr>
<td>7</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>8</td>
<td>CONCRETE THRUST/ANCHOR BLOCK SEE SDW-151</td>
</tr>
<tr>
<td>9</td>
<td>4&quot; OR 6&quot; FLG x MJF'OFLG x FLG TEE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>4&quot; OR 6&quot; C-900 PVC PIPE</td>
</tr>
<tr>
<td>11</td>
<td>GATE WELL WITH CAP</td>
</tr>
<tr>
<td>12</td>
<td>4&quot; OR 6&quot; FLG x MJF'OFLG RWGV</td>
</tr>
<tr>
<td>13</td>
<td>4&quot; OR 6&quot; FLG x MJF'O ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>14</td>
<td>4&quot; OR 6&quot; FLANGE 90° BEND</td>
</tr>
<tr>
<td>15</td>
<td>SIZE X 4&quot; OR 6&quot; MJF'OFLG X FLG TEE</td>
</tr>
<tr>
<td>16</td>
<td>WATER MAIN</td>
</tr>
</tbody>
</table>

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

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 65271

1/31/2012

DRAWING NUMBER: SDW-160
NOTES:
1) REFER TO 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 OTHER STANDARD DRAWINGS.
NOTES:
1) SLURRY SHALL BE CONTROLLED LOW STRENGTH MATERIAL C:SM (100-E-100)
2) SLURRY SHALL BE PLACED ON FIRMLY COMPACTED BACKFILL.
1. Existing 2-Port Fire Hydrant
2. 2 1/2" Port to 2" Adapter Elbow with Threaded Fitting
3. 2" Pipe (Grooved)
4. 2" 90° Elbow with Threaded Joint Fittings
5. 2" Backflow Preventer with Threaded Joint Fittings
6. Snap-Joint Coupling (2-Groove)
7. 2" Tee 90° Elbow w/ Snap-Joint Coupling(s) (2-Groove) w/Directonal Shutoff Valve(s) (Not Shown)
8. Existing Curb & Gutter
9. Existing Roadway
10. Existing Concrete Pads/Sidewalk

2" Fire Hydrant HIGHLINING CONNECTION

CITY OF SAN DIEGO - STANDARD DRAWING

REVISION BY APPROVED DATE
ORIGINAL KA 1/31/2012

SDW-170
1. EXISTING 3-PORT FIRE HYDRANT
2. PORT ADAPTER ELBOW WITH THREADED JOINT FITTINGS
3. PIPE (GROOVED)
4. 90° ELBOW WITH THREADED JOINT FITTINGS
5. 4" BACKFLOW PREVENTER WITH THREADED JOINT FITTINGS
6. 4" SHUTOFF VALVE WITH THREADED JOINT FITTINGS
7. EXISTING CURB & GUTTER
8. SAW CUT ROADWAY, TRENCH, BACKFILL AND TEMPORARY ASPHALT SURFACE
9. EXISTING ROADWAY
10. EXISTING CONCRETE PAD/SIDEWALK

CITY OF SAN DIEGO - STANDARD DRAWING

4" FIRE HYDRANT HIGHLINING CONNECTION

SDW-171
1. GROOVED 2"x2"x1" TEE W/ SNAP-JOINT COUPLING (2-GROOVE)
2. 1" 90° ELBOW W/THREADED JOINT FITTINGS
3. 1" SHUTOFF VALVE W/THREADED JOINT FITTINGS
4. 1" PIPE TO HOSE ADAPTER
5. 1" CONNECTION HOSE
6. 1" 90° ELBOW TO METER THREADS (ADAPTERS MAY BE REQUIRED)
7. EXISTING WATER METER
8. EXISTING WATER METER BOX
9. EXISTING SERVICE CONNECTION FROM WATER MAIN
10. EXISTING ROADWAY
11. EXISTING CURB & GUTTER

RESIDENTIAL USER HIGHLINING CONNECTION

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR R.C.E. 85271
DATE 1/31/2012

DRAWING NUMBER SDW-172
NOTES:
1. SLOPE OF TEMPORARY ASPHALT SHALL BE SMOOTH AND SLOPED TO HAVE A GRADUAL TRANSITION TO THE STREET AND SHALL NOT EXCEED 8.33% CROSS SLOPE OF THE TEMPORARY ASPHALT SHALL MATCH EXISTING GUTTER SLOPE.
2. NO PIPE COUPLING SHALL BE PLACED WITHIN THE CURB RAMP OPENING.
3. MINIMUM ASPHALT COVER ON HIGHLINE PIPE SHALL BE 1".

1. EXISTING CURB RAMP
2. HIGHLINE PIPING
3. DRAIN PIPING
4. TEMPORARY ASPHALT (COLD MIX)
5. EXISTING ROADWAY
6. EXISTING DRIVEWAY
7. EXISTING CURB & GUTTER
8. EXISTING SIDEWALK
9. HIGHLINE PIPING AND SNAP COUPLING (2 GROOVE)
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) SET TOP OF METER BOX 50mm (2") ABOVE FINISH GRADE
3) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
4) THE CONSTRUCTION OF A TEMPORARY BLOW-OFF FOR THE USE OF TESTING AND FLUSHING OF NEW MAINS ONLY
5) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

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

LEGEND ON PLANS

 TEMP 50mm (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 6.4mm (1/4") PROOF COIL CHAIN GALVANIZED STEEL. WELD 4-LINK SEGMENT TO POST AND 3-LINK SEGMENT TO SLEEVE
3) TYPE "A" AND TYPE "B" PROTECTION POSTS SHALL BE COATED USING SAFETY YELLOW IN ACCORDANCE WITH AGENCY'S STANDARDS
CUT 300 mm (12") HOLE IN TOP OF PIPE AND PLUG 600 mm (24") OF PIPE WITH CONCRETE SEE NOTE 2 BELOW

MIDDLE OF EXIST MAIN

CUT 450 mm (18") HOLE IN END OF CONCRETE PLUG

END OF EXIST MAIN

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) WATER AND RECYCLED WATER MAINS AND SEWER LATERALS 100 mm (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 61 m (200') OR AS DIRECTED BY THE ENGINEER
4) EXISTING MAINS 400 mm (16") AND LARGER REQUIRE THE ENTIRE LENGTH OF THE PIPE TO BE FILLED BY PRESSURE GROUTING OR BY BLOWN SAND
5) EXISTING VALVES SHALL BE TURNED TO THE CLOSED POSITION. REMOVE GATE WELL AND REPLACE WITH COMPACTED BACKFILL
6) FOR ABANDONMENT OF MANHOLES SEE SM-08
7) PRIOR AGENCY APPROVAL REQUIRED FOR CUTTING AND PLUGGING
SLOPE PROTECTION FOR GRADES 20% TO 50%

WATER OR SEWER MAIN
TRENCH BOTTOM

150mm (6") MIN

CONCRETE Poured AGAINST TRENCH SLOT
200mm (8") CONCRETE WALL SEE NOTE 2

WALL SECTION 'A' ELEVATION

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITE BLANKET PLACED OVER THE PIPELINE ALIGNMENT
5) 100mm (4") GUNITE BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) FOR USE AS TRENCH BACKFILL STABILIZATION IN TRAVELED AREAS
3) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS
   REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND
   APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
4) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm
   (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED
   WITH GROUT SEE SPECIFICATIONS
5) FOR GRADES OVER 50% SEE WP-05/SP-05

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

CUT-OFF WALL INSTALLATION IN
TRAVELED AREAS

WP-07

August 2009
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) STAMP OR CHISEL A 50mm (2") HIGH 'W' IN CURB FACE TO IDENTIFY POTABLE WATER SERVICE LOCATION
3) STAMP OR CHISEL A 50mm (2") HIGH 'RW' IN CURB FACE TO IDENTIFY RECYCLED WATER SERVICE LOCATION
4) METER BOXES ARE NOT TO BE INSTALLED IN DRIVEWAYS, SIDEWALKS OR WITHIN PAVED ROADWAYS
5) MULTIPLE METER BOXES SHALL BE INSTALLED WITH A MINIMUM OF 225mm (9") BETWEEN BOXES
6) METER BOX SHALL BE INSTALLED 225mm (9") FROM THE BACK OF BERM, CURB, OR SIDEWALK (TYP)
7) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF METER BOX
8) METER BOXES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
100mm (4") OR 150mm (6")
FIRELINE/MASTER METER INSTALLATION
FOR DRAWING OF THE METER INSTALLATION SEE WS-04 (SHEET 1 OF 2)

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) TO BE USED WHERE BOTH DOMESTIC SERVICE AND FIRE PROTECTION ARE INSTALLED ON THE SAME PRIVATE SYSTEM
3) LOCATION OF METER SHALL BE APPROVED BY THE DISTRICT ENGINEER PRIOR TO INSTALLATION IN ACCORDANCE WITH STANDARD DWG WS-06
4) 200mm (8") OR 250mm (10") METERS TO BE DESIGNED BY AN ENGINEER AND SUBMITTED FOR AGENCY'S APPROVAL AS NEEDED ON A CASE-BY-CASE BASIS
5) JOINT RESTRAINT SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
6) METERS SHALL BE FURNISHED AND INSTALLED BY THE AGENCY OF JURISDICTION
7) 100mm (4") METER REQUIRES A 1200mm x 1500mm (48" x 60") VAULT
   150mm (6") METER REQUIRES A 1200mm x 1800mm (48" x 72") VAULT
8) IN AREAS WHERE GROUND WATER IS PRESENT THE AGENCY'S ENGINEER MAY REQUIRE A SEALED SUMP TO BE CONSTRUCTED
9) CONNECTIONS TO STEEL WATER MAINS SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
10) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>50mm (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>
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<tr>
<td>2</td>
<td>50mm (2&quot;) BRONZE CORPORATION STOP</td>
<td>12</td>
<td>300mm (12&quot;) DIAMETER x 150mm (6&quot;) LONG PVC PIPE</td>
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<tr>
<td>3</td>
<td>LINE SIZE x 50mm (2&quot;) SERVICE SADDLE</td>
<td>13</td>
<td>50mm (2&quot;) 90° COMPRESSION ELL (TYPICAL)</td>
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<tr>
<td>4</td>
<td>100mm (4&quot;) OR 150mm (6&quot;) PVC PIPE</td>
<td>14</td>
<td>LINE SIZE x 600mm (24&quot;) LONG FLANGED DUCTILE-IRON SPOOL</td>
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<tr>
<td>5</td>
<td>100mm (4&quot;) OR 150mm (6&quot;) FLG x MJ RWGV MECHANICALLY RESTRAINED, SEE NOTE 5</td>
<td>15</td>
<td>200mm (8&quot;) GATE WELL SEE WV-01 &amp; WV-02</td>
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<tr>
<td>6</td>
<td>LINE SIZE x 150mm (6&quot;) LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>16</td>
<td>HINGED VAULT ACCESS DOOR</td>
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<tr>
<td>7</td>
<td>50mm (2&quot;) COMPRESSION, LOCKABLE BALL VALVE</td>
<td>17</td>
<td>ADJUSTABLE PIPE SUPPORT (TYPICAL)</td>
</tr>
<tr>
<td>8</td>
<td>100mm (4&quot;) OR 150mm (6&quot;) FLEXIBLE COUPLING</td>
<td>18</td>
<td>150mm (6&quot;) CLASS &quot;B&quot; CONCRETE FLOOR WITH #3 BARS @ 300mm (12&quot;) C.C.</td>
</tr>
<tr>
<td>9</td>
<td>LINE SIZE x 750mm (30&quot;) LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>19</td>
<td>150mm (6&quot;) DG BASE COMPACTED TO 90%</td>
</tr>
<tr>
<td>10</td>
<td>100mm (4&quot;) OR 150mm (6&quot;) FIRELINE METER SEE NOTE 6</td>
<td>20</td>
<td>300mm (12&quot;) DIAMETER x 300mm (12&quot;) DEEP, 19mm (&quot;) GRAVEL SUMP, SEE NOTE 8</td>
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</tbody>
</table>

August 2009
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) EXTENSION STEMS SHALL BE ROUND STEEL TUBING OF SOLID DESIGN (NO PINNED COUPLINGS PERMITTED)
3) VALVES DEEPER THAN 1.5m (5') AND 2" AIR VALVES REQUIRE A VALVE STEM EXTENSION OR AS REQUIRED BY THE AGENCY OF JURISDICTION
4) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT OF THE VALVE
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

SAN DIEGO REGIONAL STANDARD DRAWING

STEEL VALVE STEM EXTENSION FOR VALVES 50mm (2") AND SMALLER

DETAIL "A"