SAN DIEGO AREA

REGIONAL STANDARD DRAWINGS

STANDARD DRAWINGS FOR AGENCIES IN THE SAN DIEGO REGION

Recommended by the Regional Standards Committee
Maintained and Published by the San Diego County Department of Transportation
December, 1975
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These standard drawings have been prepared and adopted by the San Diego Regional Standards Committee for the benefit of all agencies in the San Diego area. The Regional Standards Committee membership is comprised of the County's thirteen cities, the County of San Diego, various representative water districts and private industry organizations, the Pacific Telephone Company and the San Diego Gas and Electric Company. The San Diego County Department of Transportation is currently providing coordination and staff support for the Regional Standards Committee.

REVISIONS

The Regional Standards Committee will continuously accept proposed revisions and/or proposed new standard drawings for review. They should be submitted to the Regional Standards staff at the County Department of Transportation. The staff will assign the proposed revision a number and make any necessary preparations to ready the revision for presentation to the Regional Standards Committee. The staff will acknowledge receipt of all proposals in writing. Should the proposed revision be very minor in nature, i.e., a grammatical error, etc., the staff will make the necessary change without taking it to the Regional Standard Committee. Once enough proposals have been submitted to warrant a Regional Standards Committee meeting, the staff will prepare an agenda and schedule a meeting.

At the meeting the Committee will take one of three possible actions: approve the change, reject the change or recommend that a subcommittee further study the change and make recommendations to the Committee. The individual or organization who submitted the change will then be notified in writing of the Committee action. After approval of the proposed change by the Regional Standards Committee the staff will print and distribute the change to the governmental agencies within San Diego County.

It is intended that the standard drawing package will be reprinted and distributed periodically incorporating all the changes approved by the Regional Standards Committee since the last printing. The reprinting will take place when the Regional Standards Committee determines enough revisions have been approved to warrant issuance of an updated drawing package.

John P. Snodgrass

Chairman
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SPECIAL NOTE

Concrete consisting of portland cement, concrete aggregate, sand and water is designated in these Standard Drawings by a symbol consisting of a number, a letter and a number; for example, 564-C-3000. The first number is the weight of cement in pounds per cubic yard, the last number is the compressive strength at twenty-eight days and the letter indicates the grading of the aggregate. This designation is in the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, published by the Building News, Incorporated.
CONCRETE STRUCTURES
TYPICAL SECTION over 5' - 4"

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

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>H (max)</th>
<th>T (min)</th>
<th>W (min)</th>
<th>A bars</th>
<th>B bars</th>
<th>C bars</th>
<th>E bars</th>
<th>max soil press. (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3' - 8&quot;</td>
<td>0' - 8&quot;</td>
<td>2' - 4&quot;</td>
<td># 4 @ 32&quot;</td>
<td>——</td>
<td>——</td>
<td># 4 total</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>5' - 4&quot;</td>
<td>0' - 10&quot;</td>
<td>3' - 6&quot;</td>
<td># 4 @ 32&quot;</td>
<td>——</td>
<td>——</td>
<td># 4 total</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>8' - 0&quot;</td>
<td>1' - 0&quot;</td>
<td>5' - 4&quot;</td>
<td># 4 @ 32&quot;</td>
<td>——</td>
<td>——</td>
<td># 6 @ 16&quot;</td>
<td>800</td>
</tr>
</tbody>
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SAN DIEGO REGIONAL STANDARD DRAWING

MASSONRY RETAINING WALL TYPE 1
(LEVEL BACKFILL)
NOTES
1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.
TYPICAL SECTION over 5' - 4"

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

TYPICAL SECTION

PLAN

ELEVATION

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>3' - 8&quot;</th>
<th>5' - 4&quot;</th>
<th>8' - 0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T (min)</td>
<td>0' - 8&quot;</td>
<td>0' - 10&quot;</td>
<td>1' - 0&quot;</td>
</tr>
<tr>
<td>W (min)</td>
<td>2' - 4&quot;</td>
<td>3' - 2&quot;</td>
<td>4' - 9&quot;</td>
</tr>
<tr>
<td>A bars</td>
<td># 4 @ 32&quot;</td>
<td># 4 @ 32&quot;</td>
<td># 4 @ 32&quot;</td>
</tr>
<tr>
<td>B bars</td>
<td></td>
<td># 4 @ 32&quot;</td>
<td># 4 @ 32&quot;</td>
</tr>
<tr>
<td>C bars</td>
<td></td>
<td></td>
<td># 6 @ 16&quot;</td>
</tr>
<tr>
<td>D bars</td>
<td># 4 @ 32&quot;</td>
<td># 4 @ 16&quot;</td>
<td># 6 @ 16&quot;</td>
</tr>
<tr>
<td>E bars</td>
<td># 4 total 4</td>
<td># 4 total 5</td>
<td># 4 total 6</td>
</tr>
<tr>
<td>max. soil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>press. (psf)</td>
<td>1100</td>
<td>1600</td>
<td>2200</td>
</tr>
</tbody>
</table>
1:1/2:1 sloping backfill or 250 psf, live load surcharge

**PLANT**

1. **Bars:**
   - A bars
   - B bars
   - C bars

2. **Key:**
   - A
d

**ELEVATION**

3. **Horizontal reinf. not shown**

**TYPICAL SECTION**

over 3'-8" max.

**NOTES**

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

<table>
<thead>
<tr>
<th>DIMENSIONS AND REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
</tr>
<tr>
<td>T (min)</td>
</tr>
<tr>
<td>W (min)</td>
</tr>
<tr>
<td>A bars</td>
</tr>
<tr>
<td>B bars</td>
</tr>
<tr>
<td>Surcharge</td>
</tr>
<tr>
<td>C bars</td>
</tr>
<tr>
<td>K (min)</td>
</tr>
<tr>
<td>Toe press.</td>
</tr>
</tbody>
</table>

**SAN DIEGO REGIONAL STANDARD DRAWING**

**MASONRY RETAINING WALL TYPE 4**

(LIVE-LOAD SURCHARGE OR SLOPING BACKFILL)
PLAN

TYPICAL SECTION
over 5' - 4''

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

ELEVATION

<table>
<thead>
<tr>
<th>DIMENSIONS AND REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
</tr>
<tr>
<td>T (min)</td>
</tr>
<tr>
<td>W (min)</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>A bars</td>
</tr>
<tr>
<td>B bars</td>
</tr>
<tr>
<td>C bars</td>
</tr>
<tr>
<td>D bars</td>
</tr>
<tr>
<td>E bars</td>
</tr>
<tr>
<td>max soil press. (psf)</td>
</tr>
</tbody>
</table>

SANDIEGO REGIONAL STANDARD DRAWING

MASSONRY RETAINING WALL TYPE 5 (LEVEL BACKFILL)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Coordinator R.C.E. 19807 Date 1975
NOTES
1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

TYPICAL SECTION
over 3'-8''

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>5'-4''</th>
<th>3'-8''</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T (min)</td>
<td>0'-10''</td>
<td>0'-8''</td>
</tr>
<tr>
<td>W (min)</td>
<td>3'-10''</td>
<td>2'-9''</td>
</tr>
<tr>
<td>A bars</td>
<td># 4 @ 16''</td>
<td></td>
</tr>
<tr>
<td>B bars</td>
<td># 6 @ 16''</td>
<td># 4 @ 16''</td>
</tr>
<tr>
<td>Max. Toe</td>
<td>2000</td>
<td>1400</td>
</tr>
<tr>
<td>Press. P.S.F.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DESIGN CONDITIONS
Walls are to be used for the loading conditions
shown for each type wall.
Design H shall not be exceeded.
Footing key is required except as shown
otherwise or when found unnecessary by the
Engineer.
Special footing design is required where
foundation material is incapable of supporting
too pressure listed in table.

DESIGN DATA
Reinforced Concrete:
\[ F_c = 1200 \text{ psi} \quad F'_c = 3000 \text{ psi} \]
\[ F_s = 20,000 \text{ psi} \quad n = 10 \]
Reinforced Masonry:
\[ F'_m = 600 \text{ psi} \quad F_m = 200 \text{ psi} \]
\[ F_s = 20,000 \text{ psi} \quad n = 50 \]
Earth = 120 psf and equivalent fluid
Pressure = 36 psf per foot of height
Walls shown for 1 1/2:1 unlimited sloping
surcharge are designed in accordance with
Rankine's formula for unlimited sloping
surcharge with \( e = 33° \ 42' \)

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

CONCRETE
All concrete shall be 564 \cdot C \cdot 3000.

MASONRY
All reinforced masonry retaining walls shall be
constructed of regular or light weight standard
grade "A" units conforming to ASTM
designation C-90 and manufactured in accordance
with requirements of the Concrete Masonry
Association Specifications. All masonry shall conform
to the regulations of the Uniform Building Code.

MASONRY MORTAR
The mortar shall consist of one (1) part portland
cement to three and one-half (3 1/2) parts graded
mortar sand. Mortar shall be tempered with lime
putty in an amount not exceeding one-quarter to
one-half of the volume of the cement.
Mortar in horizontal joints shall fully cover all face
shell and web members. Vertical joints shall be
buttered to a depth greater than the thickness of
the face shells of the block. Furrowing of mortar
will not be permitted.

GROUT
The grout shall consist of one (1) part portland
cement to three (3) parts clean sand for voids less
than four inches. If desired, grout to be used in
voids of 4" or greater dimensions, may be mixed of
one (1) part portland cement to two (2) parts clean
sand to two (2) parts pea gravel. Pea gravel shall be
graded such that 100% passes 3/8" sieve and not
more than 5% passes the No. 8 sieve. All cells shall
be poured solid with grout.

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%.
No backfill material shall be deposited against masonry
retaining walls until the grout has developed a
strength of 2,000 pounds per square inch in
compression as determined by test 2" cubes, or until
the masonry retaining wall has cured for a minimum
of 14 days.

OPTIONAL MORTAR KEY
Embedment of the first course of block in a poured
footing may be omitted by providing a mortar key.
The key is formed by embedding a flat 2" x 4" flush
with the top of the freshly poured footing. Remove
the 2" x 4" after the concrete has started to harden.
No surcharge loads within this area for level backfill design.

Filter Material, 1" max. crushed aggregate, 4 cu. ft. per 4" dia. drain or 1 cu. ft. per ft. of open head joints.

4" dia. drain with 1/4" galv. wire mesh screen 8'-0" on centers, or one row horizontally of open head joints.

Line of undisturbed natural soil

TYPICAL SECTION

Mortar or cast-in-place concrete
Finished ground line
Vertical reinf.
Grout filled block cells
Horizontal reinf. thru bond beam block

2" x 4" (nominal) key

CAP DETAIL

9" 12' block wall
5 1/4" 8' block wall

Vertical reinf.
Top of footing

KEY DETAIL

NOTE
All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.
TYPE-A WALL
(Applicable for all types of backfill loadings)

TYPE-B WALL

TYPE-C WALL

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

TYPICAL ELEVATION

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

NOTE
See Standard Drawing C-10 for Section A-A, notes and details.
CONCRETE

Concrete shall be 564 - C - 3000.

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<sub>c</sub> = 1200 psi  \quad F'c = 3000 psi
Earth = 120 pcf and equivalent fluid pressure = 36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with γ = 33° 42'.

Note: Maximum toe pressure under wall footing = 1 1/2 tons. Special design required where footing material is incapable of supporting this pressure.

EXCAVATION AND BACKFILL

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

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

No backfill material shall be deposited against concrete retaining walls until the concrete has developed a strength of 2,500 pounds per square inch in compression as determined by test cylinders, or until 28 days after wall has been placed.

TYPICAL DRAINAGE
WHEN H IS GREATER THAN 4' - 0"

1/2" Expansion joint, fill with premolded expansion joint filler. Locate joints at 30' - 0" centers or as directed by the Engineer.

1/2" chamfer

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

SECTION A-A

Embedment 2 3/8" min

RUBBER WATERSTOP

Use only when watertight joint is required.
TYPICAL LAYOUT EXAMPLE

For joints, see Details 3.3 and 3.4, drawing C-8.

Number above each set of bars indicates the number of bars from top of footing to upper end of each set of bars.

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

| Design H | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 1 0 G    | 10  | 12  | 14  | 16  | 18  | 20  | 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  | 42  | 44  | 46  | 48  | 50  | 52  | 54  | 56  | 58  | 60  |

Note:
- Bar cut-offs may be varied in increments of 6".
- For design limits of surcharge and slope, see "Footing Wall Details No. 17, Drawing C-10."}

SPREAD FOOTING SECTION

For details, see "Footing Wall Details No. 17, Drawing C-10." Quantities apply to Design 1 portion and exclude the added portion above "Duster Elevation."
**SPREAD FOOTING SECTION**

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

**TABLE OF REINFORCING STEEL DIMENSIONS AND DATA**

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

### Design Conditions

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

- Design Data:
  - $f_c = 3250$ psi
  - $f_s = 24,000$ psi
  - $n = 10$
  - $E_{mod} = 200$pcf
  - Case A: Equivalent fluid pressure = 36 psf max for determination of toe pressure. 27 psf max for determination of heel pressure.
  - Case B: Earth pressure determined from Rankine's formula with $\phi = 35^\circ - 45^\circ$.

**NOTES**

- Use Reinforcement for $H_6$. 8" 10" Top of Wall
- Bar cut-offs may be varied in increments of $6"$.

**TYPICAL LAYOUT EXAMPLE**

For piles required, see Details 3.3 and 3.4, drawing C-15.
**WEAKENED PLANES**

**DETAIL 3-2**

Notes:
A. 4" drains at 25' max. center to center: 1' c.c. for Type 3 and 9.3' c.c. for Type 4 Retaining Walls. For walls adjacent to sidewalks or curbs, provide 4" cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Eased wall drain shall be located 3' above finished grade.
B. 6" square aluminum or galvanized steel wire 4 mesh hardware cloth (Min. wire diameter 0.03") Anchor firmly to backface.
C. One cubic foot pervious backfill material in a burlap sack, securely tied.
D. Pervious backfill material continues behind retaining wall.

**WALL EXPANSION JOINTS**

**AND WEAKENED PLANES**

**DETAIL 3-3**

**WATERSTOP**

**DETAIL 3-6**
DRAINAGE SYSTEMS
NOTES:
2. Types are designated as follows: (no wing) A, (one wing) A-1, (two wings) A-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
Manhole frame and cover see drawing M-2

Transition to normal curb height in 10 ft. on both sides unless otherwise noted.

Galv. steel angle continuous and protection bar. See drawing D-12.

PLAN

SECTION B-B

SECTION C-C

SECTION A-A

NOTES:
1. See Standard Drawings D-11 & D-12 or additional notes and details.
2. Types are designates as follows: (no wing) B, (one wing) B-1, (two wings) B-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tool groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS
15' Type B-1 inlet

15'

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen O. Gipson  Dec. 1975
Coordinating Engineer  R.E. 1980  Dga.

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE B

D-2
NOTES:
2. Types are designated as follows: (no wing) C, (one wing) C-1, (two wings) C-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
10. Where inlet is to be constructed on grade and Standard Drawing D-20 concrete apron is required, lift down-grade end of grate as shown on D-20.
11. When G-1 & G-2 grates are used place 3"-5.7 lb, steel I-beam, 3.5' long.

LEGEND ON PLANS
15" Type C-1 Inlet
15'
DIMENSIONS

T = 8'' if V is less than 8'.
T = 10'' if V is 8'' or more.
V = 5' unless otherwise specified.
V = D + 32'' minimum.
W = 7' unless otherwise specified.
Y = 5' unless otherwise specified.
Width of driveway, W, shall be
10' unless otherwise specified.
Elevation of point N shall be
13'' below point H unless otherwise
specified.

PLANT

TOP SLAB REINFORCING PLAN

WEAKENED PLANE JOINT

SECTION E-E

WEAKENED PLANE JOINT

SECTION C-C

NOTES

1. Steel Plate should be of one continuous
piece with curve portion a circular arc.
Length = Width + 18'' + circular arc.
2. # 4 rebar 30'' long, 1' O.C. shall be
installed in top of walls for ties to top
and gutters.
3. The reinforcing steel in the top slab
shall be # 3 bars 6'' O.C. unless otherwise
specified. Clearance shall be 1 1/2'' from
the bottom of the slab.
4. Concrete for the inlet top to be placed
at the same time as the s/w curb and
gutter.
5. Concrete shall be 564 - C - 3000.
6. Exposed edges of concrete shall be rounded
with a radius of 1/2''.
7. Surface of top slab shall be sidewalk finished
to drain toward street at a slope of 1/4''
per foot.

TABLE A

<table>
<thead>
<tr>
<th>PT</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>K</th>
<th>M</th>
</tr>
</thead>
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<tr>
<td>F.C</td>
<td>4 1/2</td>
<td>5 1/4</td>
<td>6</td>
<td>7 1/2</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>8</td>
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</tbody>
</table>

SECTION A-A

1'' support bolt, see Detail A
on drawing D - 5.

CURB INLET - TYPE D
5/16" X 10" Steel Plate formed as shown.

11/16" R
\( \alpha = 66^\circ \)

1/8" hole in angle

1/4" 

1" x 20" support bolt with hexagonal nuts, see note 5

#4 bar 30" long 1" O.C.

3" R

\( R = 1 1/2 \) min

gutter flow line

NOTES
1. A plain, round steel protection bar 1" in dia. shall be installed. Bar shall be embedded 5" at each end.
2. Leave 8" hole blocked out in bottom placing of concrete for bolts placed at same time as gutter.
3. All exposed metal parts shall be galvanized.
4. All galvanizing damaged by welding shall receive two coats of aluminum paint.
5. Support bolts shall be spaced at not more than 5'-0" O.C.
6. Adjusting nuts to be tightened and secured in place when steel plate is in proper position.

SECTION B-B

# 4 @ 12" O.C. both ways (typ)

SECTION A-A MODIFIED

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE D (DETAILS)
For frame and grate details see drawings D-13, D-14 & D-15.

# 4 @ 12" rounded pipe ends, see drawing D-61

2 - # 4 bars

same slope as gutter

# 4 @ 12" both ways

Slope floor 12:1 toward outlet

# 4 @ 12" both ways

SECTION B-B

NOTES
2. When V exceeds 4', steps shall be installed. See Standard Drawing D-11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2''.
4. Maintain 1 1/2'' clear spacing between reinforcing and surface.
5. Type E inlet to be used only with rolled curb. See Standard Drawing G-4.
6. Transition 10' to curb Section B-B at inlet, both sides.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
CURB INLET - TYPE E

DRAWING NUMBER D=6
#4 @ 6' both ways

SECTION A-A

---

4 - #4 around opening

---

SECTION B-B

---

Rounded pipe ends
See drawing D-61

---

Manhole frame and cover.
See drawing M-2.

---

Elev shown on plans

---

11" unless shown otherwise on plans

---

Slope floor 12:1 towards outlet

---

PLAN

---

NOTES
2. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Openings on both sides unless otherwise shown on plans.
5. Maintain 1 1/2" clear spacing between reinforcing and surface.
NOTES
2. When V exceeds 4", steps shall be installed. See Standard Drawing D-11 for details.
3. Maintain 1 1/2" clear spacing between reinforcing and surface.
4. Increase in allowable depth subject to approval by Agency.
5. Section A--A shows 3 sizes and shall not imply that an interior wall is to be built for the structures with double or triple frame and grate.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

ELEVATION
- #4 @ 12" both ways
- Slope floor 12:1 towards outlet.

SECTION A--A
- #4 @ 12" both ways
- Rounded pipe ends
- See drawing D-61
- Elev shown on plans

LEGEND ON PLANS
#4 Bars placed diagonally

# 4 @ 8"
both ways

Bend Down 15" (Typ.)

PLAN

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PIPE DIA</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
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<tr>
<td>A 4</td>
<td>up to 39&quot;</td>
<td>4'</td>
<td>4'</td>
<td>6'</td>
</tr>
<tr>
<td>A 5</td>
<td>42&quot; to 48&quot;</td>
<td>5'</td>
<td>4'</td>
<td>6'</td>
</tr>
<tr>
<td>A 6</td>
<td>51&quot; to 60&quot;</td>
<td>6'</td>
<td>4'</td>
<td>6'</td>
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<tr>
<td>A 7</td>
<td>63&quot; to 72&quot;</td>
<td>7'</td>
<td>4'</td>
<td>7'</td>
</tr>
<tr>
<td>A 8</td>
<td>75&quot; to 84&quot;</td>
<td>8'</td>
<td>4'</td>
<td>8'</td>
</tr>
</tbody>
</table>

SECTION A-A

NOTES
2. Concrete base shall be 564 - C - 3000.
3. All precast components shall be reinforced with 1/4" diameter steel, wound spirally on 4" centers.
4. All joints shall be set in Class C mortar.
5. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

LEGEND ON PLAN:

---@---

SAN DIEGO REGIONAL STANDARD DRAWING

STORM DRAIN CLEANOUT - TYPE A

DRAWING NUMBER D-9
### NOTES
2. All joints shall be set in Class C mortar.
3. All precast components shall be reinforced with 1/4" diameter steel wound spirally on 4" centers.
4. Maintain 1 1/2" clear spacing between reinforcing and surface.
5. Concrete base shall be 564 - C - 3000.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

### LEGEND ON PLANS
- **---**
- **O---**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**STORM DRAIN CLEANOUT - TYPE B**

---

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

**DRAWING NUMBER**

**STORM DRAIN CLEANOUT - TYPE B**

---

**LEGEND ON PLANS**

- **---**
- **O---**
Vertical reinforcing #4 @ 18" max., for horizontal reinforcing, see table.

1 1/2" clearance typical

TYPICAL BOX SECTION

STEP DETAIL

3/4" ø steel bars, hot dipped galvanized

<table>
<thead>
<tr>
<th>BOX SECTION REINFORCEMENT</th>
<th>MAXIMUM SPAN X or Y</th>
<th>DEPTH V</th>
<th>THICKNESS T</th>
<th>HOR. &amp; FLR. REINF.</th>
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</thead>
<tbody>
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<td>4' - 0&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 18&quot;</td>
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<tr>
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<td>6' - 0&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 12&quot;</td>
<td></td>
</tr>
<tr>
<td>7' - 1&quot; to 8' - 0&quot;</td>
<td>8&quot; - 0&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 8&quot;</td>
<td></td>
</tr>
<tr>
<td>3' - 0&quot; to 4' - 0&quot;</td>
<td>4' - 1&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 18&quot;</td>
<td></td>
</tr>
<tr>
<td>4' - 1&quot; to 5' - 0&quot;</td>
<td>8&quot; - 0&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 8&quot;</td>
<td></td>
</tr>
<tr>
<td>5' - 1&quot; to 6' - 0&quot;</td>
<td>10&quot; - 0&quot;</td>
<td>6&quot;</td>
<td># 4 Ø 6&quot;</td>
<td></td>
</tr>
<tr>
<td>6' - 1&quot; to 8' - 0&quot;</td>
<td>12&quot; - 1&quot;</td>
<td>8&quot;</td>
<td># 4 Ø 12&quot;</td>
<td></td>
</tr>
<tr>
<td>3' - 0&quot; to 4' - 0&quot;</td>
<td>12&quot; - 1&quot;</td>
<td>8&quot;</td>
<td># 4 Ø 12&quot;</td>
<td></td>
</tr>
<tr>
<td>4' - 1&quot; to 5' - 0&quot;</td>
<td>16&quot; - 0&quot;</td>
<td>8&quot;</td>
<td># 4 Ø 8&quot;</td>
<td></td>
</tr>
<tr>
<td>5' - 1&quot; to 6' - 0&quot;</td>
<td>16&quot; - 1&quot;</td>
<td>8&quot;</td>
<td># 4 Ø 8&quot;</td>
<td></td>
</tr>
<tr>
<td>6' - 1&quot; to 7' - 0&quot;</td>
<td>20&quot; - 0&quot;</td>
<td>8&quot;</td>
<td># 4 Ø 6&quot;</td>
<td></td>
</tr>
<tr>
<td>7' - 1&quot; to 8' - 0&quot;</td>
<td>20&quot; - 1&quot;</td>
<td>10&quot;</td>
<td># 4 Ø 12&quot;</td>
<td></td>
</tr>
<tr>
<td>3' - 0&quot; to 4' - 0&quot;</td>
<td>20&quot; - 1&quot;</td>
<td>10&quot;</td>
<td># 4 Ø 12&quot;</td>
<td></td>
</tr>
<tr>
<td>4' - 1&quot; to 5' - 0&quot;</td>
<td>24&quot; - 0&quot;</td>
<td>10&quot;</td>
<td># 4 Ø 8&quot;</td>
<td></td>
</tr>
<tr>
<td>5' - 1&quot; to 6' - 0&quot;</td>
<td>24&quot; - 0&quot;</td>
<td>10&quot;</td>
<td># 4 Ø 6&quot;</td>
<td></td>
</tr>
<tr>
<td>6' - 1&quot; to 7' - 0&quot;</td>
<td>12&quot; - 1&quot;</td>
<td>12&quot;</td>
<td># 5 Ø 8&quot;</td>
<td></td>
</tr>
</tbody>
</table>

NOTES
1. Concrete shall be 564 - C - 3000 unless otherwise noted.
2. Reinforcing steel shall comply with this drawing unless otherwise specified.
3. Reinforcing steel shall be intermediate grade deformed bars conforming to latest ASTM specifications.
4. Bends shall be in accordance with latest ACI code.
5. Minimum splice length for reinforcing shall be 30 diameters.
6. Floor shall have a wooden trowel finish and, except where used as junction boxes, shall have a minimum slope of 1" per foot 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 inch intervals from 15" above floor to within 12 inches of top of structure. Where possible place steps in wall without pipe opening, otherwise over opening of smallest diameter.
NOTES:
1. Face angle shall be cast into structure continuous for the full length "L".
2. All exposed metal parts to be hot-dipped galvanized after fabrication.
3. When curb inlet opening height (H) exceeds 6" install 1" Ø steel protection bar.
4. Install additional bars at 3 1/2" clear spacing above first bar when opening exceeds 13".
5. When curb inlet opening length exceeds 8' install 1" Ø steel support bolts, spaced at not more than 5' o.c.
NOTES:
1. Hot-dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.
3. Type G-1 and G-2 grates are not to be used in areas subject to bicycle traffic.
NOTES:
1. Hot dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.
Punch 1" hole in CSP
Place pipe so bars of
grate will be parallel with
main surface flow

3" x ½" bars

3½" x 1½" bars

Calk Seal (See Note 2)
Continuous
Weld
1½ min

1'-0" min

NOTES
1. Structure shall be galvanized and asphalt dipped.
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 3'-8" or less.
   Where "H" is between 3'-8" and 4'-11" place one step +16" above the floor. If "H" is 5'-0" or more install a ladder placing
   the lowest rung 16" above the floor and the highest rung not
   more than 14" below top of inlet. Place single step or ladder
   in wall without wall opening.
5. Grate to be provided when specified.
6. Modify grate where bicyclists traffic may occur.
OVERSIZE DRAIN

SECTION D-D
GRATE SLOT DETAIL

SECTION E-E
RISER

MIN. WELD LENGTH
1 1/2"; WELD
SIZE 3/16" MIN.
@ EA. CROSS BAR.

NOTES
1. Drain seams may be riveted or resistance spotwelded at equal centers, continuous helical lock seam or helical welded seam.
2. Each drain section shall be assembled with standard coupling bands.
3. Cross bar spacer of grate shall be pressure fusion or plug welded to bearing bars in such a manner as to develop the strength of the cross bar spacer.
4. Cross bar spacer (Section E-E) may differ from that shown provided section area is equal or greater.
5. Grate material shall be a weldable grade of steel complying to the requirements of ASTM A 36.
6. The maximum variance from a straight line from the extreme top corners of the bearing bar shall be 1/2" in 20 feet.
7. Installation lengths shall be 10 feet 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.
CATCH BASIN

C.S.P. Slotted Drain

6"

6" min

Square Wall, Concrete Plug, Metal Cap, or Band Plug.

Grate

SECTION A--A

C.S.P. INLET

Grate

4" max

1" ± max

See note 1

C.S.P. Slotted Drain

D + 6"

6"

B

45° elbow

Square Wall, Band Plug or Metal Cap.

B

SECTION B--B

ALTERNATE SECTION B--B

INLETS

NOTES
1. Either field joint 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 SS1 emulsified asphalt), or continuous weld.
2. See Standard Drawing D - 18 for additional notes and details.
NOTES:
1. Curb and apron to be placed monolithically.
2. Use of false header at valleys and slopes break line is optional.
3. Extend vertical steel from inlet structure into concrete apron as required.
4. Screed Direction
5. Concrete shall be 517-C-2500.
NOTES
1. Fit curb to the face of inlet wall.
2. For use with Type C inlet only. See Standard Drawing D-3 for details.
NOTE
Cross-sectional area of ditch may be rounded, or trapezoidal.

ALTERNATE SECTION B-B

LEGEND ON PLANS
sag cond.
NOTES
1. Downdrain flume may be used where fill slope is
   1 1/2 : 1 or flatter.
2. Use 10' min length of gutter transition on each side
   of downdrain in sag location.
3. All metal parts to be galvanized after fabrication.
### ENTRANCE TAPER AND DOWNDRAIN PIPE

**SECTION A–A**

**PLATE DETAIL**

Dimensions to be as tabulated below for Assembly:

<table>
<thead>
<tr>
<th>Dia</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>L</th>
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<tr>
<td>8&quot;</td>
<td>18&quot;</td>
<td>25 1/2&quot;</td>
<td>15&quot;</td>
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<td>3/4&quot;</td>
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<td>6&quot;</td>
<td>12&quot;</td>
<td>24&quot;</td>
<td>25&quot;</td>
</tr>
</tbody>
</table>

**NOTES**

1. All metal parts for anchor assemblies shall be galvanized after fabrication.
2. One anchor assembly required per length of pipe. When final length exceeds 10 ft, two anchors shall be required.
# 4 @ 3" C.C.

# 4 bars continuous

Dimensions shown on plans

PLAN

Elev. shown on plans

May be Open Channel

3"x 3" Construction Joint

3 @ 6" C.C.

SECTION B-B

3 - #3

1/12th

2" 1/4th

3 - 0" 3/8th

3/8th

SECTION A-A

# 3 @ 3" C.C.

Manhole frame and cover, see drawing M-2

4" min.

# 3 @ 3" C.C. total 4

For construction through existing curb—Existing Gutter

For all new construction—Monolithic Gutter

Elev. shown on plans

For construction through existing curb—Existing Gutter

NOTES

1. Concrete shall be 564-C-3000.
2. D-inside diameter of pipe or depth of channel.
3. Section to be stepped 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.

SANDiego REGIONal STANDarD DRAWing

CURB OUTLET - TYPE A

RECOMMENDED BY THE SANDIEGO REGIONal STANDarDS COMMITTEE

Coordinator: R.C.E. 1987  Date

REV.  D-25
NOTES
1. Not to be used in sidewalk areas.
2. Concrete shall be 517-C-2500.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
CURB OUTLET - TYPE B
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 517-C-2500.
4. Pipe shall be circular asbestos cement, cast iron or rigid plastic.
**ELEVATION DOUBLE HEADWALL**

**ELEVATION SINGLE HEADWALL**

**SECTION**

Rounded pipe ends, see drawing D-61.

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>SINGLE</th>
<th>L</th>
<th>Steel Lbs</th>
<th>Conc C.Y.</th>
<th>DOUBLE</th>
<th>L</th>
<th>Steel Lbs</th>
<th>Conc C.Y.</th>
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<tbody>
<tr>
<td>12&quot;</td>
<td>2'-8&quot;</td>
<td>5'-0&quot;</td>
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<td>0.94</td>
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<td>15&quot;</td>
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<td>9'-6&quot;</td>
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<td>4'-5&quot;</td>
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<td>16'-0&quot;</td>
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<td>2.42</td>
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<td></td>
</tr>
<tr>
<td>36&quot;</td>
<td>4'-8&quot;</td>
<td>12'-0&quot;</td>
<td>105</td>
<td>1.95</td>
<td>17'-0&quot;</td>
<td>145</td>
<td>2.65</td>
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<tr>
<td>39&quot;</td>
<td>4'-11&quot;</td>
<td>12'-6&quot;</td>
<td>130</td>
<td>2.09</td>
<td>18'-0&quot;</td>
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<td>2.88</td>
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<tr>
<td>42&quot;</td>
<td>5'-2&quot;</td>
<td>13'-6&quot;</td>
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<td>2.34</td>
<td>19'-0&quot;</td>
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<td>3.13</td>
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<td>5'-5&quot;</td>
<td>14'-6&quot;</td>
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<td>20'-0&quot;</td>
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<td>3.38</td>
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<td>3.64</td>
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<td>3.03</td>
<td>22'-6&quot;</td>
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<td>190</td>
<td>3.31</td>
<td>23'-6&quot;</td>
<td>240</td>
<td>4.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

1. Concrete shall be 564-C-3000.
2. All reinforcing steel #4 bars. All vertical and horizontal tie bars 18" maximum spacing.

**LEGEND ON PLANS**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**STRAIGHT HEADWALL - TYPE A**

(CIRCULAR PIPE)
ELEVATION DOUBLE HEADWALL

ELEVATION SINGLE HEADWALL

SECTION

<table>
<thead>
<tr>
<th>C.S.P. ARCH SIZE</th>
<th>SINGLE</th>
<th>DOUBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>Steel Lbs</td>
</tr>
<tr>
<td>18&quot; x 11&quot;</td>
<td>2' - 7&quot;</td>
<td>5' - 6&quot;</td>
</tr>
<tr>
<td>21&quot; x 15&quot;</td>
<td>2' - 11&quot;</td>
<td>6' - 6&quot;</td>
</tr>
<tr>
<td>24&quot; x 18&quot;</td>
<td>3' - 2&quot;</td>
<td>7' - 6&quot;</td>
</tr>
<tr>
<td>28&quot; x 20&quot;</td>
<td>3' - 4&quot;</td>
<td>8' - 6&quot;</td>
</tr>
<tr>
<td>35&quot; x 24&quot;</td>
<td>3' - 8&quot;</td>
<td>10' - 6&quot;</td>
</tr>
<tr>
<td>42&quot; x 29&quot;</td>
<td>4' - 1&quot;</td>
<td>12' - 6&quot;</td>
</tr>
<tr>
<td>49&quot; x 33&quot;</td>
<td>4' - 5&quot;</td>
<td>14' - 6&quot;</td>
</tr>
<tr>
<td>57&quot; x 38&quot;</td>
<td>4' - 10&quot;</td>
<td>17' - 0&quot;</td>
</tr>
<tr>
<td>64&quot; x 43&quot;</td>
<td>5' - 3&quot;</td>
<td>19' - 0&quot;</td>
</tr>
<tr>
<td>71&quot; x 47&quot;</td>
<td>5' - 7&quot;</td>
<td>21' - 0&quot;</td>
</tr>
</tbody>
</table>

NOTES
1. Concrete shall be 564-C-3000.
2. All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

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

DRAWING NUMBER D-31
NOTES
1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL - TYPE B
(CIRCULAR PIPE)

DRAWING NUMBER D-32
**NOTES**

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

**LEGEND ON PLANS**

```
[Diagram]
```
**ELEVATION**

**SECTION B-B**

<table>
<thead>
<tr>
<th>DIA OF PIPE</th>
<th>DIMENSIONS</th>
<th>SINGLE PIPE</th>
<th>DOUBLE PIPE</th>
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</thead>
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<tr>
<td></td>
<td>L</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2.0&quot;</td>
<td>3.1/8&quot;</td>
<td>1.3&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3.0&quot;</td>
<td>1.7/8&quot;</td>
<td>1.9&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>4.0&quot;</td>
<td>0.5/8&quot;</td>
<td>2.3&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4.1&quot;</td>
<td>1.1/2&quot;</td>
<td>2.8&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".
3. Multiple pipes to be set a distance of D/2, with a 1" minimum between outside diameters of pipes.
4. Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
5. Skewed pipes: Dimension W to be increased in width or length due to skew or multiple pipes.
6. For pipe wall thickness greater than 3" use alternate Detail C.

**LEGEND ON PLANS**

==<c>==

**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS**

**FOR 12" TO 36" PIPES**
### NOTES

1. Skewed Pipes: Dimension W to be increased to take care of increased width or length due to skew of multiple pipes.

2. Tops of headwalls, on grade culverts, shall be placed parallel to profile grade when the grades are 3% or more.

3. Concrete shall be C64-C3000.

4. Exposed corners shall be chamfered 3/4".

5. Multiple pipes shall be set a distance of D/2, with a 1' minimum, between outside diameters of pipes.

6. For pipe wall thickness greater than 3" use Alternate Detail-C.

<table>
<thead>
<tr>
<th>DIAM. OF PIPE</th>
<th>DIMENSIONS</th>
<th>SINGLE PIPE</th>
<th>DOUBLE PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>3' - 7 1/4&quot;</td>
<td>2' - 0&quot;</td>
<td>3' - 0&quot;</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4' - 9&quot;</td>
<td>2' - 6&quot;</td>
<td>3' - 9&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>5' - 4 7/8&quot;</td>
<td>3' - 0&quot;</td>
<td>4' - 6&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>6' - 3 3/4&quot;</td>
<td>3' - 6&quot;</td>
<td>5' - 3&quot;</td>
</tr>
<tr>
<td>66&quot;</td>
<td>7' - 2 1/2&quot;</td>
<td>4' - 0&quot;</td>
<td>6' - 0&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>8' - 1 3/8&quot;</td>
<td>4' - 6&quot;</td>
<td>6' - 6&quot;</td>
</tr>
<tr>
<td>78&quot;</td>
<td>9' - 0&quot;</td>
<td>5' - 0&quot;</td>
<td>7' - 6&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>9' - 10 3/4&quot;</td>
<td>5' - 6&quot;</td>
<td>8' - 3&quot;</td>
</tr>
</tbody>
</table>

**LEGEND ON PLANS**

- **-**
- **-**
ELEVATION  
SECTION

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>L/2</th>
<th>LENGTH OF W</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3'-4''</td>
</tr>
<tr>
<td>12''</td>
<td></td>
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<td>50</td>
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<tr>
<td>15''</td>
<td>2''</td>
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<td>18''</td>
<td>2''</td>
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<td>21''</td>
<td>3''</td>
<td>6''</td>
<td>75</td>
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<td>24''</td>
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<td>6''</td>
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<td>105</td>
</tr>
<tr>
<td>33''</td>
<td>4''</td>
<td>5''</td>
<td>105</td>
</tr>
<tr>
<td>36''</td>
<td>4''</td>
<td>8''</td>
<td>110</td>
</tr>
<tr>
<td>39''</td>
<td>5''</td>
<td>2''</td>
<td>150</td>
</tr>
<tr>
<td>42''</td>
<td>5''</td>
<td>2''</td>
<td>150</td>
</tr>
<tr>
<td>45''</td>
<td>5''</td>
<td>3''</td>
<td>150</td>
</tr>
<tr>
<td>48''</td>
<td>5''</td>
<td>3''</td>
<td>150</td>
</tr>
<tr>
<td>51''</td>
<td>6''</td>
<td>2''</td>
<td>220</td>
</tr>
<tr>
<td>54''</td>
<td>6''</td>
<td>2''</td>
<td>235</td>
</tr>
</tbody>
</table>

NOTES
1. Concrete shall be 564 - C - 3000.
2. All reinforcing steel #4 bars. All vertical and horizontal tie bars 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be D/2 (1' min.). Dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

LEGEND ON PLANS

S AN D I GO REGIONAL STANDARD DRAWING
L TYPE HEADWALLS
CIRCULAR-PIPES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

ALFRED D. HENKEL Dec 1975

CONFIRMPED R.E.E. 1967 DNW

DRAWING NUMBER D-36

Revised By Approved Date

---
NOTES

1. Concrete shall be 564 · C · 3000.
2. All reinforcing steel ≠ 4 bars. All vertical and horizontal tie bars 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be S/2 (1" min.). The dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

LEGEND ON PLANS

---
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 584-C-3000.
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
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<tbody>
<tr>
<td>12&quot; to 24&quot;</td>
<td>1'</td>
<td>0'</td>
<td>10&quot;</td>
</tr>
<tr>
<td>21&quot; to 36&quot;</td>
<td>1'</td>
<td>6&quot;</td>
<td>12&quot;</td>
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<tr>
<td>39&quot; to 48&quot;</td>
<td>2'</td>
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<td>12&quot;</td>
</tr>
<tr>
<td>51&quot; to 60&quot;</td>
<td>2'</td>
<td>6&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>63&quot; &amp; Larger</td>
<td>3'</td>
<td>0&quot;</td>
<td>14&quot;</td>
</tr>
</tbody>
</table>

LEGEND ON PLANS

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RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

SAN DIEGO REGIONAL STANDARD DRAWING
CURTAIN WALL

DRAWING NUMBER D-38
NOTES
1. When more than one pipe is used the profile view shown shall hold for the distance across all pipe openings. Sections A-A and B-B shall be from the outermost pipe. The distance between pipes shall be D/2 for round and Span/3 for arch pipe. (12" minimum)
2. Culvert shall be cut off even with apron surface when required by the Agency.
3. Use Inlet Apron only where a flared end section can not be utilized.
4. Place weep holes when required by the Agency.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

INLET APRON FOR CULVERTS
UP TO 42" DIAMETER

DRAWING NUMBER D-39
D = Pipe Diameter
W = Bottom Width of Channel
P = Wetted Perimeter of Channel

SELECTION OF RIP RAP

<table>
<thead>
<tr>
<th>Design Velocity (ft./sec.)</th>
<th>Rock Classification</th>
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<tbody>
<tr>
<td>6 - 10</td>
<td>No. 2 Backing</td>
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<tr>
<td>10 - 12</td>
<td>1/4 Ton</td>
</tr>
<tr>
<td>12 - 14</td>
<td>1/2 Ton</td>
</tr>
<tr>
<td>14 - 16</td>
<td>1 Ton</td>
</tr>
<tr>
<td>16 - 18</td>
<td>2 Ton</td>
</tr>
</tbody>
</table>

NOTES

1. Type of Rip Rap
   a. Regular Quarry Stone
   b. Rounded Cobblestone
   c. Broken Concrete (only allowed upon approval of the Agency)

2. Placement
   a. Minimum depth = 1 1/2 times average stone size.
   b. Rocks shall be placed so as to provide a minimum of voids.
   c. Surface rocks or concrete shall protrude to at least 1/2 their vertical dimension.
   d. Rip Rap is to be placed over a natural bedding, or it may be grouted or placed over a gravel bedding when required by the Agency.
NOTES

1. Design:
   Equivalent Fluid Pressure = 60 p.c.f.
   Maximum Outlet Velocity = 39 1.p.s.
2. Concrete shall be 564 - C- 3000.
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 ends shall be fabricated with standard hooks.
7. Five foot high chain link fencing, embed post 18" deep in walls and encase with Class B mortar.
8. In Sandy and Silty soil:
   a) Riprap and aggregate base cutoff wall required at the end of rock apron.
   b) Filter cloth (Polyfilter X or equivalent) shall be installed on native soil and base, minimum of 1 ft. overlaps at joints.

<table>
<thead>
<tr>
<th>Pipe Dia (in)</th>
<th>18</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>42</th>
<th>48</th>
<th>54</th>
<th>60</th>
<th>72</th>
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<tbody>
<tr>
<td>Area (sq.ft.)</td>
<td>1.77</td>
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<td>9.62</td>
<td>12.57</td>
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<tr>
<td>Max. Q (cf/s)</td>
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<td>151</td>
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<td>W</td>
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<td>9' - 3&quot;</td>
<td>10' - 8&quot;</td>
<td>11' - 9&quot;</td>
<td>13' - 0&quot;</td>
<td>14' - 3&quot;</td>
<td>16' - 6&quot;</td>
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<td>5' - 3&quot;</td>
<td>6' - 3&quot;</td>
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<td>10' - 9&quot;</td>
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</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>7' - 4&quot;</td>
<td>8' - 0&quot;</td>
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<tr>
<td>b</td>
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<td>5' - 1&quot;</td>
<td>6' - 1&quot;</td>
<td>7' - 1&quot;</td>
<td>8' - 0&quot;</td>
<td>8' - 11&quot;</td>
<td>10' - 0&quot;</td>
<td>11' - 0&quot;</td>
<td>12' - 9&quot;</td>
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<td>3' - 4&quot;</td>
<td>3' - 10&quot;</td>
<td>4' - 5&quot;</td>
<td>4' - 11&quot;</td>
<td>5' - 5&quot;</td>
<td>5' - 11&quot;</td>
<td>6' - 11&quot;</td>
</tr>
<tr>
<td>d</td>
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<td>1' - 4&quot;</td>
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<td>1' - 9&quot;</td>
<td>2' - 0&quot;</td>
<td>2' - 2&quot;</td>
<td>2' - 5&quot;</td>
<td>2' - 9&quot;</td>
</tr>
<tr>
<td>e</td>
<td>0' - 6&quot;</td>
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<td>0' - 8&quot;</td>
<td>0' - 8&quot;</td>
<td>0' - 10&quot;</td>
<td>0' - 10&quot;</td>
<td>1' - 0&quot;</td>
<td>1' - 0&quot;</td>
<td>1' - 3&quot;</td>
</tr>
<tr>
<td>f</td>
<td>1' - 6&quot;</td>
<td>2' - 0&quot;</td>
<td>2' - 8&quot;</td>
<td>3' - 0&quot;</td>
<td>3' - 0&quot;</td>
<td>3' - 0&quot;</td>
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<td>3' - 0&quot;</td>
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</tr>
<tr>
<td>g</td>
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<td>2' - 6&quot;</td>
<td>3' - 0&quot;</td>
<td>3' - 6&quot;</td>
<td>3' - 11&quot;</td>
<td>4' - 5&quot;</td>
<td>4' - 11&quot;</td>
<td>5' - 4&quot;</td>
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<td>17 1/2&quot;</td>
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<td>13 1/2&quot;</td>
<td>15 1/2&quot;</td>
<td>17 1/2&quot;</td>
<td>19 1/2&quot;</td>
</tr>
</tbody>
</table>

**SAN DIEGO REGIONAL STANDARD DRAWING**

CONCRETE ENERGY DISSIPATOR

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

**DRAWING NUMBER** D-41
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 2'' concrete cover, unless noted otherwise.
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.
SECTION

NOTES
1. For trenching on improved streets see Standard Drawing G - 24 or G - 25 for resurfacing details.
2. (*) indicates minimum relative compaction.
Face of drainage structure
Concrete pipe

BELL END

Face of drainage structure
Concrete pipe

SPIGOT END

Face of drainage structure
Concrete pipe

CUT END

R = Thickness of pipe

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

Face of drainage structure
Corrugated steel pipe

R = Inside diameter of pipe
\[
\frac{6''}{10}
\]
NOTES:
1. Pipe collar does not have to be finished if covered, but must have a minimum of 6" of concrete around joint.
2. Concrete shall be 564 - C - 3000

LEGEND ON PLANS

---
TYPICAL SECTION

564 - C - 3000 Concrete or Air Placed Concrete. Reinforced with 6"x 6"-10/10 gage w.w.f.

When depth exceeds 3' - 0" weep holes must be added at 10' on centers. (see detail)

8' - 0" max. see note 5

WEAKENED PLANE JOINT

3/16" premolded joint material or 1/8" sawed joint filled with mastic

EXPANSION JOINT

1" max. graded filter material placed a minimum of 18" each side of weep hole.

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

LEGEND ON PLANS

MINOR DRAINAGE CHANNEL

SAN DIEGO REGIONAL STANDARD DRAWING
TYPICAL SECTION

4" dia. plastic weep holes @ 10' C.C.

20" Radius

Optional Construction Joint

1 ft. min.
1/4" max. graded filter material

1/4" galv. wire mesh screen

4" dia. plastic weep holes @ 10' C.C.

Open Butt Joint

1" max. graded filter material

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

WEAKENED PLANE JOINT

EXPANSION JOINT

NOTES
1. A.C. or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 12' to 15'. Expansion joints shall be placed at all changes of section and at ends of curves.
3. Cutoff walls shall be constructed at each end of the channel along the full width of section. See Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. Reinforcement shown is minimum.
NOTES
1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cutoff wall shall be the same as that required in channel.
3. Concrete shall be 564-C-3000.
NOTES
1. Concrete shall be 564-C-3000.
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.

GROUND LINE
1:1 Bevel
2" min

DRAIN PIPE
Rounded pipe ends, see drawing D-61
12" min
1:1 Bevel

ELEVATION

SAN DIEGO REGIONAL STANDARD DRAWING

PIECE TO CHANNEL CONNECTION

DRAWING NUMBER D-73
NOTE
The following shall be as required by Agency:
   a) Low flow channel
   b) Filter blanket
   c) Cutoff wall
   d) Fence

TYPICAL SECTION

SELECTED ROCK SLOPE PROTECTION per Agency requirements
BROW DITCH

3" 470-C-2000 Concrete
or 3" Air Placed Concrete

TERRACE DITCH

3" 470-C-2000 Concrete
or 3" Air Placed Concrete

NOTES
1. Longitudinal slope of lined ditch shall be 2% minimum.
2. Reinforcing, when required by Agency, shall be 1 1/2" x 1 1/2"
   17 gage stucco netting.
3. Over slope down ditches shall employ 6" thickened edge section
   at both sides of ditch.

LEGEND ON PLANS

Recommending by The San Diego Regional Standards Committee

Coordinator: R.C.E., 1980

SAN DIEGO REGIONAL STANDARD DRAWING

DRAINAGE DITCHES

DRAWING NUMBER D-75
### SPAN HEIGHT

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5'</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>6'</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>G</td>
<td>H</td>
<td>I</td>
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</table>

### STRENGTH CLASSIFICATION

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<thead>
<tr>
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<th>2'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
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</thead>
<tbody>
<tr>
<td>4'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5'</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>6'</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>G</td>
<td>H</td>
<td>I</td>
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</table>

### MAX FILL OVER TOP

<table>
<thead>
<tr>
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<th>2'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5'</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>D</td>
<td>E</td>
<td>F</td>
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<tr>
<td>6'</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

### FIRE BAR

- Length: 2' 4' 5' 6' 7' 8'
- Material: A  B  C  D  E  F

### SPECIAL LAYERS

- Top: 2' 4' 5' 6' 7' 8'
- Bottom: A B C D E F

### OVER THE STOP-TOP NO.

<table>
<thead>
<tr>
<th>Top</th>
<th>2'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
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</thead>
<tbody>
<tr>
<td>4'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5'</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>6'</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

### SIZE BAR

- Top: 2' 4' 5' 6' 7' 8'
- Bottom: A B C D E F

### NOTE

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

Number of "d" bars in table is slab total for both cells.

### TYPICAL SECTION

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

---

For exposed top, extend "c" bars full length, top slab only, provide additional 4 spacers φ18s and adjust quantities.

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

Reinforcement for interior walls under 8".
DESIGN NOTES

SPECIFICATIONS:

DESIGN: A.A.S.H.O., DATED 1972 WITH REVISIONS AND AS SUPPLEMENTED
BY STATE OF CALIFORNIA SPECIFICATIONS AND DESIGN MANUAL.

SECTIONS DESIGNING FOR CULVERT IN A TRENCH OR ELONGATED FOUNDATION OR CULVERTS INVOLVED INych Yielding Foundation for Culverts on Pile or Rock Foundations, Special Design Will Be Required.

LOADING:

LIVE LOAD—FOR LEGAL HIGHWAY LOADS, USE HS20-44 OR ALTERNATIVE,
WITH 30% IMPACT FOR ALL COVER DEPTHS NO IMPACT ON INVERT.
COVER LESS THAN 2'—WEIGHT DISTRIBUTION ON THE TOP SLAB IS
ACTUAL LOAD DISTRIBUTION FOR THE COVERED AREA, MULTIPLIED BY
A FACTOR OF 1.8 ALONG THE PERIMETER AND 1.5 IN THE CENTER OF
THE COVERED AREA. THE COVERED AREA SHALL BE 4 TIMES THE
DEPTH OF COVER BUT NOT LESS THAN 3 TIMES THE DEPTH OF COVER.
COVER OVER 2'—WEIGHT DISTRIBUTION ON THE TOP SLAB IS
ACTUAL LOAD DISTRIBUTION FOR THE COVERED AREA, MULTIPLIED BY
A FACTOR OF 1.8 ALONG THE PERIMETER AND 1.5 IN THE CENTER OF
THE COVERED AREA. THE COVERED AREA SHALL BE 4 TIMES THE
DEPTH OF COVER BUT NOT LESS THAN 3 TIMES THE DEPTH OF COVER.

DEAD LOAD—EARTH LOADS DEPEND ON THE TYPE OF MATERIAL AND
THE DEPTH OF COVER.

UNIT STRESSES:

\[ f_x = \frac{20,000}{s} \times 1,200 \text{ PSF} \]

REINFORCEMENT EMBRACED S IN 3 CLEAR MIN. AND IN 4 INCREMENTS
EXCEPT AS NOTED.

DISTRIBUTION "X" BARS EXPRESSED AS A % OF MAIN POSITIVE REINFORCEMENT.

CLASSIFICATION: "X" TOP SLAB = 25%, MAX. 50% TENSILE STRENGTH
LONGITUDINAL.

BOTTOM SLAB = 50% B/MAX.

GENERAL NOTES

QUANTITIES: QUANTITIES ARE FOR THE SLOPED INVERT SLAB AND DO NOT
INCLUDE SPACES IN LONGITUDINAL BARS. NO CONCRETE REINFORCEMENT
REQUIRED FOR EXPOSED TOP CULVERT OR CONCRETE ON SECTIONS OR FOR PARAPETS ON CULVERT WALLS.

SPECIAL CONSIDERATIONS: FOR STANDARD PLANS ARE NOT TO BE USED FOR CULVERTS IN A SOIL OF CONSIDERABLE FRICTION WHERE THERE IS A SEVERE ABRASIVE PLOW CONSTRUCTION.

DESIGNATION: SHOW ON PLANS AS DRAWN HIGH — STRENGTH CLASSIFICATION.
LENGTH MUST BE 4 X MAX. FOLLOWED BY ALTERNATIVES.

ALTERNATIVES: "X" INVERT SLAB (SLOPED) OR 1/4 INVERT (PLATE). LAY PLATE INVERT OR "X" INVERT IS INCLUDED IN DESIGN. END OF CULVERT WILL BE COMPLETELY CAST IN PLACE. PARAPETS WILL BE AS SHOWN UNLESS OTHERWISE SPECIFIED IN PLANS. SEE SECTIONS FOR EXPLANATION OF LAYOUT AND THE END."X" INVERT.

REIN. PLACEMENT: MAIN REINFORCEMENT IS PLACED TRANSVERSE TO THE CULVERT AXES, WITHIN THE DETAILS. THE END GEYSER IS PLACED ALONG THE "X" INVERT.

CONSTRUCTION NOTES

EXPANSION JOINTS: BOTTOM SLAB — NO EXPANSION JOINTS SHALL BE PLACED UNDER SLAB. WHEN COVER LESS THAN SLAB LENGTH, PLACE OF EXPANSION JOINT FALLS AT 30' CENTERS OUTSIDE THE UNDERSIDE OF SLAB AND PLACE BEYOND DETAIL 'S.' AT
SLAB LENGTHS OR MORE, PLACE AT 15' CENTER TO CENTER. WHEN COVER IS MORE THAN SLAB LENGTH, PLACE OF EXPANSION JOINT FALLS AT 30' CENTERS AND PLACEMENT OF JOINTS WILL BE DIFFERENT FROM PLATE AND JOINTS.

CONSTRUCTION JOINTS:

NOT PERMITTED UNTIL CONCRETE HAS REACHED A STRENGTH OF 3,000 PSI OR AGE OF 28 DAYS, WHICHER OCCURS FIRST, AND IN SOIL PLANS DETAILED BY CONTRACTOR TO THE ENGINEER, AND APPROVED.

CONSTRUCTION JOINTS:

TEMPORARY JOINTS MAY BE PLACED AT 8% OR 30% IN LONG ITUDINAL DIRECTION OF PLATE, AND 4% IN TRANSVERSE DIRECTION OF PLATE. JOINTS VARIOUS WIDTHS AND LOCATIONS AND ADDRESSING JOINTS AT PLACEMENT OF JOINTS MAY BE VARYING, DEPENDING ON CONSTRUCTION PARAMETER.

BROADE DETAIL 5-2

See Standard Drawing C-5.

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT MISCELLANEOUS DETAILS

DRAWING NUMBER D-81

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

ALLISON WHEELER Oct 979

COORDINATOR R.S.C. 1987 DATE
ELECTRICAL SYSTEMS
STEEL CONDUIT

NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION

See Detail A

STEEL CONDUIT

NON-METALLIC CONDUIT

ANCHOR BASE FOUNDATION

1. 3/4"x8' copper covered steel ground rod.
2. Alternate Ground: 15' no. 4 bare stranded copper wire, coiled.
3. Approved non-metallic conduit.
4. Steel conduit.

DETAIL A

1/2" Rigid steel Conduit

Attach ground wire under anchor nut

Steel Conduit

Anchor Rods
ELEVATION PEDESTRIAN PUSH BUTTON POST

NOTES
1. Standards shall be 10' - 0" ± 2" for vehicular signals and 7' - 0"
   ± 2" for pedestrian signals unless otherwise noted on plans.
2. Top of Standards shall be 4 1/2" O.D.
3. Conduits shall extend 2' max above finished surface of foundation
   and for Type 1-A and 1-C Standards shall be sloped toward handhole.
4. Anchor Bolts shall be bonded to conduit.
5. Conduit between standard and adjacent pull box shall be 2" size min.

BASE PLATE

NOTE: Conduit shall protrude 2" max above finished surface foundation

BASE PLATE

2 1/2" standard galv. steel pipe

5/8" x 12" anchor bolts, total 4

PEDESTRIAN PUSH BUTTON POST

SECTION

Pipe

5/8" x 18" anchor bolts thread 6", with 2 nuts and 2 washers each.
Length does not include 2" or 4" 90° bend, total 4.

BASE PLATE

NOTE

4" galv steel pipe or conduit (thread both end).

4" galv cast iron pipe flange F and D

7 1/2" BC

8 1/2" BC

TYPE 1-A STANDARD

TYPE 1-B STANDARD

TYPE 1-C STANDARD

TYPE 1 SIGNAL STANDARDS

COMBINED STREET SIGN PEDESTRIAN PUSH BUTTON POST
BASE PLATE DETAILS

5/8" x 11 NC x 1 1/2" long
HS cap screws, total 3, tap
pole plate.

DETAIL-R
LUMINAIRE ARM CONNECTION

### LUMINAIRE ARM DATA

<table>
<thead>
<tr>
<th>M Projected Length</th>
<th>N Rise</th>
<th>Min OD At Pole</th>
<th>Thickness</th>
<th>P Mounting Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>6' - 0&quot;</td>
<td>2' - 0&quot;</td>
<td>3 1/4&quot;</td>
<td>0.1345&quot;</td>
<td>30' - 0&quot;</td>
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<tr>
<td>8' - 0&quot;</td>
<td>2' - 6&quot;</td>
<td>3 1/2&quot;</td>
<td>0.1345&quot;</td>
<td>30' - 6&quot;</td>
</tr>
<tr>
<td>10' - 0&quot;</td>
<td>3' - 3&quot;</td>
<td>3 7/8&quot;</td>
<td>0.1345&quot;</td>
<td>31' - 3&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>4' - 3&quot;</td>
<td>3 7/8&quot;</td>
<td>0.1345&quot;</td>
<td>32' - 3&quot;</td>
</tr>
<tr>
<td>15' - 0&quot;</td>
<td>4' - 11&quot;</td>
<td>4 1/4&quot;</td>
<td>0.1345&quot;</td>
<td>32' - 9&quot;</td>
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### BASE PLATE DATA

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<th>A Height</th>
<th>Min Q.D.</th>
<th>Thickness</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Anchor Bolts</th>
<th>Luminaire Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>28' - 6&quot;</td>
<td>7 3/4&quot;</td>
<td>3 7/8&quot;</td>
<td>0.1345&quot;</td>
<td>11 1/2&quot;</td>
<td>1&quot;</td>
<td>1&quot; x 36&quot; x 4&quot; or 1&quot; x 34&quot; x 6&quot;</td>
<td>6' - 15&quot;</td>
</tr>
</tbody>
</table>

### NOTES
2. See Standard Drawing E-17 for foundation details.
3. Luminaire arm projected length to be 12" unless otherwise shown on plans.
PLATE WASHER

NOTES
1. All new material shall be galvanized after fabrication.
2. The 7/8" HS slip base bolts shall be torqued to the following values:
   - Front Bolts: 84 foot-pounds
   - Rear Bolt: 110 foot-pounds
3. All slots shall be filled with mastic.
4. Plates shall conform to ASTM A-36, except as noted.
5. Cast option shall conform to ASTM A-27 Grade 70-40.
6. Flat washer shall conform to ASTM A-325.

SAN DIEGO REGIONAL STANDARD DRAWING
SLIP BASE INSERT FOR TYPE 15
TRAFFIC SIGNAL &
STREET LIGHTING STANDARD

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER E-5
DETAIL A-TYPE 30

3/4" - 10NC x 2 1/2" lag.
HS cap screws, tot. 4
Tap pole plate
Provide removable raintight cap.
Chased outlet for electrical conductors

DETAIL A-TYPE 31

5/8" - 11NC x 1 1/2" lag.
HS cap screws, tot. 3
Tap pole plate
Provide removable raintight cap.
Chased outlet for electrical conductors

Luminaire Arm Data

<table>
<thead>
<tr>
<th>Projected Length</th>
<th>Thickness</th>
<th>Minimum O.D. @ Pole</th>
<th>Mounting Height</th>
</tr>
</thead>
<tbody>
<tr>
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<td>36' - 9&quot; ±</td>
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<td>3 1/2&quot;</td>
<td>37' - 3&quot; ±</td>
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<td>10' - 0&quot;</td>
<td>0.1345&quot;</td>
<td>3 3/4&quot;</td>
<td>38' - 0&quot; ±</td>
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<tr>
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<td>3 3/4&quot;</td>
<td>38' - 0&quot; ±</td>
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<td>5&quot;</td>
<td>37' - 0&quot; ±</td>
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<td>0.1733&quot;</td>
<td>5 3/4&quot;</td>
<td>38' - 6&quot; ±</td>
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<tr>
<td>30' - 0&quot;</td>
<td>0.1733&quot;</td>
<td>6 1/2&quot;</td>
<td>40' - 0&quot; ±</td>
</tr>
</tbody>
</table>

Type 30 - Arm Length 6' - 15' max.
Type 31 - Arm Length 20' - 30'

NOTES
1. Sheet and plate thickness shown is nominal thickness.
2. For details not shown, see Standard Drawing E-17.
3. Plates shall conform to ASTM A-36, except as noted.
4. In lieu of the torque requirements for HS bolts, cap screws shall be tightened by the turn-of-nut method 1/8 turn from snug tight condition. No washer will be required.
5. See Standard Drawing E-7 for base plate details.

SAN DIEGO REGIONAL STANDARD DRAWING

STREET LIGHTING STANDARDS

TYPES 30 AND 31
NOTES
1. Cast option shall conform to ASTM A-27, Grade 70-40.
2. The 7/8" HS slip base bolts shall be torqued to the following values: Front Bolts—84 foot-pounds; Rear Bolt—110 foot-pounds.
3. 7/8" HS anchor bars, wrench tighten, torque requirements waived.
4. HS bolts, flat washers and nuts and washers for HS anchor bars shall conform to ASTM A-325.
5. A slip base is to be furnished unless the plans or special provisions specify a non-slip base.

SAN DIEGO REGIONAL STANDARD DRAWING
BASE PLATE DETAILS
TYPES 30 AND 31
STREET LIGHTING STANDARDS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Alfred D. Kaufland, Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER E-7
NOTES
1. See Standard Drawings E-16 and E-17 for details.
2. (* ) indicates dimension shown on details.
NOTES
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

<table>
<thead>
<tr>
<th>Luminaire Arm Data</th>
<th>E</th>
<th>End O.D. X Base O.D. X Thick</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td>4' - 0&quot;</td>
<td>2 3/8&quot; X 3&quot; X 0.1345&quot;</td>
<td>9&quot;</td>
<td></td>
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<tr>
<td>6' - 0&quot;</td>
<td>2 3/8&quot; X 3 3/8&quot; X 0.1345&quot;</td>
<td>1' - 6&quot;</td>
<td></td>
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<tr>
<td>8' - 0&quot;</td>
<td>2 3/8&quot; X 3 11/16&quot; X 0.1345&quot;</td>
<td>2' - 3&quot;</td>
<td></td>
</tr>
<tr>
<td>10' - 0&quot;</td>
<td>2 3/8&quot; X 3 7/8&quot; X 0.1345&quot;</td>
<td>2' - 6&quot;</td>
<td></td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>2 3/8&quot; X 4 5/16&quot; X 0.1345&quot;</td>
<td>3' - 9&quot;</td>
<td></td>
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<tr>
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<td>2 3/8&quot; X 4 3/4&quot; X 0.1345&quot;</td>
<td>4' - 3&quot;</td>
<td></td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>2 3/8&quot; X 4 3/4&quot; X 0.1345&quot;</td>
<td>5' - 3&quot;</td>
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<table>
<thead>
<tr>
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<th>F</th>
<th>End O.D. X Base O.D. X Thick</th>
<th>G</th>
<th>H</th>
<th>I'*</th>
<th>J*</th>
<th>K*</th>
<th>L*</th>
<th>M*</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3 7/8&quot; X 5 15/16&quot; X 0.1345&quot;</td>
<td>16' - 0&quot;</td>
<td>20' - 0&quot;</td>
<td>8 1/2&quot;</td>
<td>9&quot;</td>
<td>1&quot; - 8NC X 2 1/2&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>3 7/8&quot; X 6 3/8&quot; X 0.1345&quot;</td>
<td>16' - 0&quot;</td>
<td>20' - 6&quot;</td>
<td>8 1/2&quot;</td>
<td>9&quot;</td>
<td>1&quot; - 8NC X 2 1/2&quot;</td>
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<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>20' - 0&quot;</td>
<td>3 7/8&quot; X 6 5/8&quot; X 0.1345&quot;</td>
<td>16' - 0&quot;</td>
<td>20' - 9&quot;</td>
<td>8 1/2&quot;</td>
<td>9&quot;</td>
<td>1&quot; - 8NC X 2 1/2&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>25' - 0&quot;</td>
<td>3&quot; X 6 5/8&quot; X 0.1345&quot;</td>
<td>16' - 0&quot;</td>
<td>22' - 6&quot;</td>
<td>8 1/2&quot;</td>
<td>9&quot;</td>
<td>1&quot; - 8NC X 2 1/2&quot;</td>
<td>1&quot;</td>
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<table>
<thead>
<tr>
<th>Pole Type</th>
<th>Pole Data</th>
<th>Anchor Bolt</th>
<th>Luminaire Arm</th>
<th>Signal Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>30' - 0&quot;</td>
<td>5 1/4&quot; X 9 3/8&quot; X 0.1345&quot;</td>
<td>16&quot;</td>
<td>15&quot;</td>
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<tr>
<td>102</td>
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<td>4 1/2&quot; X 9 3/8&quot; X 0.1345&quot;</td>
<td>16&quot;</td>
<td>15&quot;</td>
</tr>
</tbody>
</table>

Revised by the San Diego Regional Standard Committee
Coordinator: R.C.E. 18607 Date
### Pole Data

<table>
<thead>
<tr>
<th>Pole Type</th>
<th>Pole Data</th>
<th>Anchor Bolt</th>
<th>Signal Arm Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top O.D. x Base O.D. x Thick</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>103</td>
<td>7/16&quot; x 10 3/4&quot; x 0.1793&quot;</td>
<td>16&quot;</td>
<td>15&quot;</td>
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<tr>
<td>104</td>
<td>7/16&quot; x 10 3/4&quot; x 0.1793&quot;</td>
<td>16&quot;</td>
<td>15&quot;</td>
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<tr>
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### Signal Arm Data

<table>
<thead>
<tr>
<th>F</th>
<th>End O.D. x Base O.D. x Thick</th>
<th>G</th>
<th>H</th>
<th>I*</th>
<th>J*</th>
<th>K*</th>
<th>L*</th>
<th>M*</th>
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</thead>
<tbody>
<tr>
<td>25' - 0&quot;</td>
<td>7/8&quot; x 7 5/16&quot; x 0.1793&quot;</td>
<td>16&quot;</td>
<td>22&quot;</td>
<td>6&quot;</td>
<td>10 1/2&quot;</td>
<td>11&quot;</td>
<td>1 1/4 NC x 2 1/2&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>30' - 0&quot;</td>
<td>7/8&quot; x 8&quot;</td>
<td>16&quot;</td>
<td>23&quot;</td>
<td>0&quot;</td>
<td>10 1/2&quot;</td>
<td>11&quot;</td>
<td>1 1/4 NC x 2 1/2&quot;</td>
<td>1&quot;</td>
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<tr>
<td>35' - 0&quot;</td>
<td>7/8&quot; x 8 11/16&quot; x 0.1793&quot;</td>
<td>15&quot;</td>
<td>23&quot;</td>
<td>0&quot;</td>
<td>12&quot;</td>
<td>12&quot;</td>
<td>1 1/4&quot; - 7NC x 3&quot;</td>
<td>11/4&quot;</td>
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### Notes
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.
### Luminaire Arm Data

<table>
<thead>
<tr>
<th>E</th>
<th>End O.D.</th>
<th>Base O.D.</th>
<th>X Thick</th>
<th>N</th>
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<td>X 3&quot;</td>
<td>X 0.1345&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>6' - 0&quot;</td>
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<td>X 3 3/8&quot;</td>
<td>X 0.1345&quot;</td>
<td>1' - 6&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>2 3/8&quot;</td>
<td>X 3 1/16&quot;</td>
<td>X 0.1345&quot;</td>
<td>2' - 3&quot;</td>
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<td>X 3 7/8&quot;</td>
<td>X 0.1345&quot;</td>
<td>2' - 6&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
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<td>X 0.1345&quot;</td>
<td>3' - 9&quot;</td>
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<tr>
<td>15' - 0&quot;</td>
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<td>X 4 3/4&quot;</td>
<td>X 0.1345&quot;</td>
<td>4' - 11&quot;</td>
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<tr>
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<td>2 3/8&quot;</td>
<td>X 4 3/4&quot;</td>
<td>X 0.1345&quot;</td>
<td>5' - 3&quot;</td>
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### Pole Data

<table>
<thead>
<tr>
<th>Pole Type</th>
<th>A</th>
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<th>C*</th>
<th>D*</th>
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<tr>
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<td>X 10 3/4&quot;</td>
<td>X 0.1793&quot;</td>
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<tr>
<td>107</td>
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<td>6 5/8&quot;</td>
<td>X 10 3/4&quot;</td>
<td>X 0.1793&quot;</td>
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<tr>
<td>108</td>
<td>30' - 0&quot;</td>
<td>6 5/8&quot;</td>
<td>X 10 3/4&quot;</td>
<td>X 0.25&quot;</td>
</tr>
</tbody>
</table>

### Anchor Bolt

- E 1 1/2" X 54" X 6" Thru 18" 25' - 0"
- E 1 1/2" X 54" X 6" Thru 18" 30' - 0"
- E 1 1/2" X 54" X 6" Thru 18" 35' - 0"

### Signal Arm Data

<table>
<thead>
<tr>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I*</th>
<th>J*</th>
<th>K*</th>
<th>L*</th>
<th>M*</th>
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<tbody>
<tr>
<td>25' - 0&quot;</td>
<td>3 7/8&quot;</td>
<td>X 7 5/16&quot;</td>
<td>X 0.1793&quot;</td>
<td>16' - 0&quot;</td>
<td>22' - 6&quot;</td>
<td>10 1/2&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>30' - 0&quot;</td>
<td>3 7/8&quot;</td>
<td>X 8&quot;</td>
<td>X 0.1793&quot;</td>
<td>16' - 0&quot;</td>
<td>23' - 0&quot;</td>
<td>10 1/2&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>35' - 0&quot;</td>
<td>3 7/8&quot;</td>
<td>X 11/16&quot;</td>
<td>X 0.1793&quot;</td>
<td>15' - 2&quot;</td>
<td>23' - 0&quot;</td>
<td>12&quot;</td>
<td>1 1/4&quot; - 7NC X 3&quot;</td>
</tr>
</tbody>
</table>

**Notes**
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.
NOTES
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.
NOTES
1. See Standard Drawings E - 16 and E - 17 for details.
2. (*) indicates dimension shown on details.

<table>
<thead>
<tr>
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<td>4' - 0&quot;</td>
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<td>6' - 0&quot;</td>
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<tr>
<td>8' - 0&quot;</td>
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<td>12' - 0&quot;</td>
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<tr>
<td>15' - 0&quot;</td>
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<tr>
<td>18' - 0&quot;</td>
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<table>
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<th>Pole Type</th>
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<th>Anchor Bolt</th>
<th>Luminaria Arm</th>
<th>Signal Arm</th>
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<tbody>
<tr>
<td>A</td>
<td>Top O.D. x Base O.D. x Thick</td>
<td>B*</td>
<td>C*</td>
<td>D*</td>
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<tr>
<td>111</td>
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<td>8&quot; x 12 1/8&quot; x 0.25&quot;</td>
<td>18&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>112</td>
<td>30' - 0&quot;</td>
<td>8&quot; x 12 1/8&quot; x 0.25&quot;</td>
<td>18&quot;</td>
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<table>
<thead>
<tr>
<th>Signal Arm Data</th>
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<td>F</td>
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<td>----</td>
</tr>
<tr>
<td>35' - 0&quot;</td>
</tr>
<tr>
<td>40' - 0&quot;</td>
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SAN DIEGO REGIONAL STANDARD DRAWING
TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 111 AND 112
DRAWING NUMBER E-13
SIGNAL ARM CONNECTION

<table>
<thead>
<tr>
<th>Pole Type</th>
<th>Pole Data</th>
<th>Anchor Bolt</th>
<th>Signal Arm</th>
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<tbody>
<tr>
<td>A</td>
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<td>B*</td>
<td>C*</td>
</tr>
<tr>
<td>113</td>
<td>16&quot; - 2&quot; 9 15/16&quot; X 12 1/8&quot; X 0.25&quot;</td>
<td>18&quot;</td>
<td>17&quot;</td>
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Signal Arm Data

<table>
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<tr>
<th>F</th>
<th>G</th>
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<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
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</thead>
<tbody>
<tr>
<td>45' - 0&quot;</td>
<td>3 7/8&quot; X 10 1/16&quot; X 0.25&quot;</td>
<td>15' - 2&quot;</td>
<td>22' - 6&quot;</td>
<td>13&quot;</td>
<td>13&quot;</td>
<td>1 1/4&quot; - 7NC X 3&quot;</td>
<td>1 1/4&quot;</td>
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</table>

NOTES
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimensions shown on details.
### Luminaire Arm Data

<table>
<thead>
<tr>
<th>E</th>
<th>O.D. X Base O.D. X Thick</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>4' - 0&quot;</td>
<td>2 3/8&quot; X 3&quot; X 0.1345&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>6' - 0&quot;</td>
<td>2 3/8&quot; X 3 3/8&quot; X 0.1345&quot;</td>
<td>1' - 6&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>2 3/8&quot; X 3 11/16&quot; X 0.1345&quot;</td>
<td>2' - 3&quot;</td>
</tr>
<tr>
<td>10' - 0&quot;</td>
<td>2 3/8&quot; X 3 7/8&quot; X 0.1345&quot;</td>
<td>2' - 5&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>2 3/8&quot; X 4 5/16&quot; X 0.1345&quot;</td>
<td>3' - 9&quot;</td>
</tr>
<tr>
<td>15' - 0&quot;</td>
<td>2 3/8&quot; X 4 3/4&quot; X 0.1345&quot;</td>
<td>4' - 3&quot;</td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>2 3/8&quot; X 4 3/4&quot; X 0.1345&quot;</td>
<td>5' - 3&quot;</td>
</tr>
</tbody>
</table>

### Signal Arm Connection

- **1/4" X 1" Back-Up Ring**
- **2" Sch. 40 Pipe** (Break sharp edges for wire protection)
- **2" Tenon Detail T**
- **20’ - 0” of thickness specified in table**
- **Signal Arm Mounting Height H**
- **Pole Size A**

### Signal Arm Data

<table>
<thead>
<tr>
<th>F</th>
<th>End O.D. X Base O.D. X Thick</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
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<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>45' - 0&quot;</td>
<td>3 7/8&quot; X 10 1/16&quot; X 0.25&quot;</td>
<td>15' - 2&quot;</td>
<td>22' - 6&quot;</td>
<td>13&quot;</td>
<td>1 1/4&quot; - 7NC X 3&quot;</td>
<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### Notes
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

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**SAN DIEGO REGIONAL STANDARD DRAWING**

**TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 114 AND 115**

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

**Coordinator R.C.E. 19507**

**DRAWING NUMBER** E-15
NOTES
1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section 2 3/8" O.D. for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
2. Signal arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot. Extensions of 2" standard pipe about 4" long may be added to accommodate signal mounting hardware.
3. Sheet and plate thickness shown is nominal thickness.
4. Handhole reinforcement ring to be 1/4" X 1 1/2" for 0.1345" to 0.2500" poles, 3/8" X 2" for 0.3125".
5. In lieu of the torque requirements for H.S. bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from a snug tight condition. No washer will be required.
6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.
ELEVATION
CAST-IN-DRILLED HOLE PILE FOUNDATION

SECTION H-H

ELEVATION
STANDARD FOUNDATION

4" x 5 1/2" handhole reinforced with ring welded to outside of pole. See Note 4. 0.1345" cover plate
Located in same quadrant as mast arm.

Anchor bolt - thread top
8" and galvanize 1' - 0"

Bar 6" x 1" tot 2,
parallel to axis of arm.

5/16 V 3"
3" 1/4 V

Formed head, hex nut or weld.

HANDHOLE AND ANCHORAGE DETAILS

POLE TOP DETAILS

PHOTO ELECTRIC CONTROL UNIT

STANDARD TOP
MOUNTING ADAPTER FOR

NOTES
1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section, 2 3/8" O.D., for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
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6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.

SAN DIEGO REGIONAL STANDARD DRAWING
TRAFFIC SIGNAL AND STREET LIGHTING DETAILS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

REVISION HISTORY

Drawing Number E-17

Date
NOTES
1. For sodium vapor luminaires 2 meters required.
2. Use ground fault interrupter for receptacle outlet.
TYPES OF SERVICE (TYPICAL)

Type I: Service Equipment Cabinet mounted on Pedestal Type Wiring Gutter.
Type II: Service Equipment Cabinet mounted on side of a Controller Type Cabinet.
Type III & II A: Complete Free-Standing Service Equipment Cabinet.
Type IV: Service Disconnect mounted inside a Controller Type Cabinet.

EQUIPMENT ENCLOSURES NOTES

1. Service Equipment Enclosures shall meet the requirements of the serving utility.
2. Service Equipment Cabinets shall be pre-wired and conform to NEMA Standards.
3. All Control Wiring shall be No. 14 TW 19-Strand Machine Tool Wire unless otherwise noted.
4. Each Service Equipment Cabinet shall be provided with engraved phenolic name plate on the Dead Front Panel for each Breaker installed and the Service Point Number and Voltage on the Front Exterior.
5. A Plastic Coated Wiring Diagram shall be provided and attached to the inside of Front Door.
6. All Service Equipment Cabinets shall be NEMA 3-R Construction and shall be provided with Dead Front Panel and provisions for padlocking.
7. All equipment supplied shall be a currently manufactured item.
8. Type I and II Service Equipment Cabinets shall be provided with Dead Front Panels and Outside Top-Hinged Raintight Covers removable without the use of tools.
9. Service conductors installed within a Controller Cabinet (Type II or IV) shall be encased in flexible conduit. Grounding shall be similar to that shown for Type III.
10. When the Utility provides both metered and unmetered circuits, the Service Cabinet shall be provided with a separate box for each circuit.
11. In unpaved areas, a raised RCC pad of 24" x 48" x width of foundation shall be placed in front of Type I and III Service.
12. Circuit Breakers with Ratings shown on the Plans (and the 15-amp Breaker for the Photovoltaic Control, if required) shall be installed in each Service Cabinet.
13. At least 8 standard pole circuit breaker spaces (3/4" nominal) shall be provided in Type III and III-A service cabinets. This shall include silver plated copper busing and mounting hardware. Busing shall be rated at 125 amp minimum.
14. Type III-A Service Equipment Cabinet shall have at least 1 sq. ft. of combined net area of ventilation openings.

SEALABLE BOLT DETAIL

TOP PLATE DETAIL (TYPICAL)

LEGEND ON PLANS

Service Cabinet Type
Wiring Diagram Number
SECTION A-A

2" Conduit knockout with Removable Cover Plate. Provide Bushing when Meter Section is not required or when Meter is bypassed.

SECTION B-B

Removable Rain Cap, with Neoprene Gasket to be used for top of "Service Section" when Meter is not required. Weld 1/4" x 1/2" bolts to bottom of Rain Cap and bolt Cap to Service Can or Meter Section.

SECTION D-D

TYPE III & III-A SERVICE
(Type III Shown)

SECTION C-C

3/4" Flange

DIMENSION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>H1</th>
<th>H2</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
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<td>17&quot;</td>
<td>9&quot;</td>
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</table>

NOTE
See Standard Drawing E-20 for notes.
PEDESTRIAN SIGNALS

TOP MOUNTINGS

SIDE MOUNTINGS

VEHICULAR SIGNALS

MAST ARM MOUNTINGS

LEFT TURN MOUNTINGS

NOTE
See Standard Drawing E-23 for notes and additional details.
LEFT TURN LANE SIGNALS (LT)
Type 1A, 1B or 1C standard as indicated on the plans

ADVANCE FLASHING BEACON INSTALLATION
Type 1A, 1B or 1C standard as indicated on the plans

TOP MOUNTED SIGNALS (TV)
Type 1A, 1B or 1C standard as indicated on the plans

SIDE MOUNTED SIGNALS (SV & SP)
Normally used on standards with luminaire and/or signal mast arm

TYPICAL SIGNAL INSTALLATIONS

ABBREVIATIONS
TV  Top mounted Vehicular signals
TP  Top mounted Pedestrian signals
SV  Side mounted Vehicular signals
SP  Side mounted Pedestrian signals
MAT Mast Arm mounted vehicular signals
    Top attachment
MAS Mast Arm mounted vehicular signals
    Side attachment
LT  Left Turn signals
T  Terminal compartment
1,2,3,4 Number of signal faces (3-section unless otherwise indicated)

NOTES
1. Mountings shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. Pedestrian signals shall be positioned on the side of standard nearest crosswalk controlled.
3. Bracket arms shall be long enough to permit proper alignment of signals and backplate installation.
MAST ARM MOUNTING - TYPE "MAT"
For 2" pipe - See Note 1

1 to 4 openings as required
For one-way mounting
For multiple mountings

TOP MOUNTING
For 4" pipe - See Note 2

3 Cadmium plated steel set screws

3/8" Bolt through mast arm
See Note 1 on this sheet

Stop

Signal housing

Lock ring, Seal with gasket
sealing compound

1 1/2" Nipple

Shake proof lock washer

MAST ARM MOUNTING
TYPE "MAS"
For 2" pipe - See Note 1

3 Cadmium plated steel set screws

3/8" Bolt, See Note 1 on this sheet

SIGNAL SLIP-FITTERS

1 1/2" pipe thread

SERRATIONS

5/16" x 3/16" Pin

Brass ring to match flange on signal housing or fitting

LOCK RING

Use where locking ring is not integral with signal housing or fitting

SPECIAL 90° ELBOW

One for each face, except those with special slip-fitter mounting

MISCELLANEOUS MOUNTING HARDWARE

FOR COMBINATION 8" & 12" SECTIONS

8" + 1/2" for 8" sections
5 1/2" + 1/2" for 12" sections

5 1/2" + 1/2"

Drill signal face and attach backplate with 6 10-24 or 10-32 self-tapping and locking stainless steel machine screws

FOR 8" & 12" SECTIONS

2"r.

BACKPLATE

0.061" gage or heavier 3003-14 aluminum sheet

NOTES
1. After mast arm signal has been plumbed and secured, drill 7/8" hole through mast arm in line with slip-fitter hole. Place a 5/8" galvanized bolt with washer under bolt head through hole and secure with nut and lock nut.
2. (a) Threaded top mounted slip fitter openings shall be 1 1/2" I.P.S.
   (b) SERRATIONS in fittings shall match those on bottom of signal heads or in lock ring.
   (c) Top opening shall be offset when backplate is used.
**TOP MOUNTING**

- 3 1/2" Drill and top min.
- 4 1/2" slip-filter
- Two rows of 3 set screws.

**SIDE MOUNTING**

- Drill and top for 1 1/2" std pipe thread
- Cover 3/2".
- Cable guide
- CURVED WASHER, see Detail C, and Lock Washer.

**TERMINAL COMPARTMENTS**

- Signal Standard
- Curved to fit standard
- Washer curved to fit standard

**SECTION A-A**

- Cable guide - Omit on upper plate
- 5/16" Flat Washer
- 1 1/2" Pipe Thread
- Flat Washer
- 1/2" Lockwasher
- 1/2" Standard bolt
- cadmium plated or galvanized

**POLE PLATE**

For Side Mountings

**SECTION B-B**

**PEDESTRIAN SIGNAL FACE**

**MESSAGES**

**DONT WALK**

Std 4 1/2" Series D letters with a 5/8" stroke width. Except as shown.

**SECTION A-A**

**FRONT VIEW**

**DIRECTIONAL LOUVER**

**NOTE**

Directional louvers shall be oriented as directed by the Engineer and secured in place with one plated brass machine screw and nut.
PLAN VIEW SHOWING
2 POSITION DOOR STOP

POLICE PANEL

NOTE
See Standard Drawing E-28 for additional notes and details.
NOTES – CONTROLLER CABINETS

1. All cabinet dimensions are nominal.
2. Foundations shall be located to provide 2'-6" minimum clearance between face of curb and back of cabinet.
3. All anchor bolts shall be bonded to conduit.
4. Where telephone interconnect equipment is specified, a minimum of 5 inches clear vertical space shall be provided inside the cabinet for the equipment.
5. Telephone interconnect conduits shall be enclosed in a 3/4" or larger conduit through the cabinet foundation. Flexible metal conduit shall be used to separate the lower and the upper portions of the cabinet.
6. In unpaved areas, the raised PCC shall be placed in front of each control cabinet. Red shall be 3'-6" x 5'-0" x 6'-0" thick. In paved areas, the raised PCC shall be 3'-0" x 5'-0" x 6'-0" high.
7. In unpaved areas, the top of foundation for Type G, P, R and S cabinets shall be 5'-0" above surrounding grade. Top of foundation for Type M cabinet shall be 6'-0" above surrounding grade.
8. In sidewalks and other paved areas, the top of foundation for Type G cabinet shall be 5'-0" above surrounding grade. Top of foundation for Type M cabinet shall be 6'-0" above surrounding grade.
9. All doors shall be provided through the foundation of the Type M cabinet. Door p(a) shall be of doors.
10. The floor of each cabinet shall be at the same level as shown for the C-1 standard. Pedestal shall be 2'-0" x 2'-0" in length.
11. Provide 2-1/2' diameter or larger in the bottom of the Type G cabinet.
12. Type G cabinet shall be provided with skylight to permit mounting of 4'-0" O.D. pedestal. Skylight shall be bolted to bottom of the cabinet.
13. All cabinet shall be removable and adjustable for vertical spacing Type M, P, R and S cabinets shall be provided with minimum of 2 shelves.
14. Anchor bolts for Type M, P, R and S cabinets shall be 5'-0" x 6'-0" x 6'-0" x 6'-0" long. Four bolts required per cabinet. Anchor bolts may be inside or outside of cabinet.
16. Controller units, wall mounted equipment and all mounted equipment shall be located to permit easy and safe removal or replacement. All plug mounted equipment shall be located so as to permit its replacement without removing any other piece of equipment.
17. Main Breaker shall be rated for 50 amperes in Type G and M cabinets. It shall be rated at 60 amperes in Type P and S cabinets.
The solid-state switching devices shall intermate with a CINCH-JONES Socket S-2412-SB or equal connected as follows:

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Circuit</th>
<th>Pin No.</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC +</td>
<td>7</td>
<td>Green or Walk Output</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>8</td>
<td>Yellow Input</td>
</tr>
<tr>
<td>3</td>
<td>Red or Don't Walk Output</td>
<td>9</td>
<td>DC+ (15 to 24 volts)</td>
</tr>
<tr>
<td>4</td>
<td>Not Used</td>
<td>10</td>
<td>Green or Walk Input</td>
</tr>
<tr>
<td>5</td>
<td>Yellow Output</td>
<td>11</td>
<td>AC-</td>
</tr>
<tr>
<td>6</td>
<td>Red or Don't Walk Input</td>
<td>12</td>
<td>Not Used</td>
</tr>
</tbody>
</table>

Contacts shall be rated at 15 amperes min.

**CONNECTOR SOCKET**

**SOLID STATE SWITCHING DEVICE**

The Flash Transfer Relay shall intermate with a CINCH-JONES Socket S-400-SB or equal connected as follows:

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Circuit</th>
<th>Pin No.</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coil</td>
<td>5</td>
<td>Common, Circuit #1</td>
</tr>
<tr>
<td>2</td>
<td>Coil</td>
<td>6</td>
<td>Common, Circuit #2</td>
</tr>
<tr>
<td>3</td>
<td>N.C. Circuit #1</td>
<td>7</td>
<td>NO Circuit #1</td>
</tr>
<tr>
<td>4</td>
<td>N.O. Circuit #2</td>
<td>8</td>
<td>NO Circuit #2</td>
</tr>
</tbody>
</table>

Contacts shall be rated at 15 amperes min.

**CONNECTOR SOCKET**

**FLASH TRANSFER RELAY**

**TYPICAL BANDING OF CONDUCTOR ENDS**

The FLASHER shall intermate with a CINCH-JONES Socket S-400-SB or equal connected as follows:

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Load, Ckt. #1</td>
</tr>
<tr>
<td>8</td>
<td>Load, Ckt. #2</td>
</tr>
<tr>
<td>9</td>
<td>Chassis Ground</td>
</tr>
</tbody>
</table>

**CONNECTOR SOCKET**

**SOLID STATE FLASHER UNIT**
LOOP WINDING PATTERNS
Conductors identification shall include the following:
1. Sensor number and phase
2. Loop number
3. Start (S) or finish (F) position
   (Typical identification: D-4 - CI - LOOP 2-S)

DETECTOR LAYOUTS AND DIMENSIONS

TYPE A LEFT TURN LANE INSTALLATION

TYPE B INSTALLATION
TYPICAL ONE AND TWO LANE LEFT TURN DETECTORS PLACEMENT DETAILS
(Use only when specified)

SECTION B-B
DIAGONAL SLOT AT CORNERS

PLAN VIEW OF

SLOT DETAILS

LOOP INSTALLATION PROCEDURE
1. Saw slots in pavement for loop conductors as shown in details. Blow out and dry thoroughly with compressed air.
2. Install pull box in pull box, number 2.
3. Install #14 AWG loop conductor in slots using a 3/16" to 1/4" thick wood paddle (see "Loop Winding Patterns"). Allow additional length for run to termination pull box plus 5 feet of slack in pull box. This additional length of conductor for each loop circuit shall be twisted together into a pair (at least 2 turns per foot) before being run to pull box.
4. Identify loop circuits by sensor unit designation. Identify start of conductor.
5. Splice loop conductor to lead-in cable (where required) or tape ends of conductor (after taping) to prevent entrance of moisture. All splices shall be soldered using resin core solder.
6. Test each loop circuit at controller cabinet (or if these are not installed, test at termination pull box) before filling slots. Perform a resistance test between circuit and between each circuit and ground. Insulation resistance shall not be less than 100 megohms.
7. Test each loop circuit for continuity; loop circuit resistance shall not exceed 0.5 ohms plus 0.35 ohms per 100 feet of lead-in cable.
8. Fill slots as shown in details.
9. No more than four loop detector conductors shall be installed in one saw slot.
10. Lead-in cable shall not be spliced between the termination pull box and the controller cabinet.
11. Distance between side of loop and lead-in saw cut shall be 2" - 6" minimum. Distance between lead-in cuts shall be 6".
12. The Engineer shall have the authority to suspend epoxy fill operations due to unsuitable weather.

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

COORDINATOR R.C.E. 19307 - Date

DRAWING NUMBER E-30
CROSS SECTION

PLAN VIEW

SHOULDER TERMINATION DETAIL

1. Non-metallic bushing shall be used at roadway end of conduit.
2. Tape wire 3 inches each side of roadway bushing.
3. Install duct seal compound to each end of roadway conduit before installing epoxy.
4. Round all sharp edges where wire has to pass.
5. End of roadway conduit shall be 2 inches below roadway.
6. Install 1" conduit minimum. Install 2" conduit for more than 4-92 loop conductors or 3 magnetometer cables.

CURB TERMINATION DETAIL

TYPE A

PEDESTRIAN PUSHBUTTON SIGNS

Signs shall be porcelain enameled. Black letters on White background.

TYPE A
(Use Only When Specified)

TYPE B

TYPE C
(Use Only When Specified)

PEDESTRIAN PUSH BUTTONS

1. Shape back of casting to fit curvature of post.
2. Provide cover fitting for top of post, when PPB is mounted on pedestrian push button post.
3. Install pushbutton on crosswalk side of standard.

SAN DIEGO REGIONAL STANDARD DRAWING

DETECTORS - CURB TERMINATION AND PUSH BUTTON DETAILS

DRAWING NUMBER E-31
NON-DIRECTIONAL MAGNETIC VEHICLE DETECTOR
INSTALLATION DETAILS

MAGNETOMETER SENSING ELEMENT
INSTALLATION DETAILS

MAGNETOMETER DETECTOR INSTALLATION PROCEDURE:
1. Prepare holes for sensing elements and saw slots in pavement for connecting cables as shown in details. Blow out and dry thoroughly with compressed air.
2. Install termination pull box. See termination details.
3. Install heads in holes and install cables in slots using a 3/16" to 1/4" thick wood paddle and run to adjacent pull box allowing 5 feet of slack at the pull box.
4. Identify cables by lane or sensor unit designation (traffic signal systems).
5. Splice sensing element cables to lead-in cables. All splices shall be soldered using rosin core solder.
6. Test each sensing element circuit at controller or count station cabinet before filling holes and slots. Excitation circuits shall have a resistance of 50 ohms* per head and detection circuits shall have a resistance of 300 ohms* per head. Measurements shall be made with a low range ohm-meter.
7. Fill slots and sensing element holes as shown in details.
8. Lead-in cable shall not be spliced between the termination pull box and the controller cabinet.

*Or other resistance per manufacturers' specifications
GENERAL SURFACE IMPROVEMENTS
NOTES:
1. Concrete shall be 517 - C - 2500.
NOTES:
1. Concrete shall be 517 - C - 2500.
NOTES
1. Concrete shall be 517-C-2500.
3. Monolithic curb, gutter and sidewalk is to be used
   with Agency approval only.
CURB AREA
(2.33 sq. ft.)

NOTES
1. Transition to type G curb at all curb returns, except where sidewalk ramps are provided, and at all cul-de-sacs with drainage structures.
2. See Standard Drawing D-6 for Rolled Curb Inlet.
3. Concrete shall be 517 - C - 2500.
NOTES
1. Dike is to be placed on a minimum 2" of A.C. road surfacing, extending throughout the width of the dike.
2. AR-8000 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.

LEGEND ON PLANS
Type A Dike
NOTES
1. Concrete shall be 517-C-2500.
3. Extruded type B-3 curb shall be anchored to existing pavement by placing steel dowels and reinforcing steel as shown or by using an approved adhesive.

LEGEND ON PLANS
Type B-2 Curb and Gutter
Type B-1, B-3, B-4 Curb
NOTES
1. Concrete shall be 517 - C - 2500.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

SIDEWALK - TYPICAL SECTIONS
NOTES
1. Ramp shall be centered on or directly opposite the bisector of the curb return or as directed by the Agency.
2. In the ramp area, the slope shall not exceed 12:1 (8.33%). Any deviation must be approved by the Agency.
3. Texture to be heavy broom finish transverse to axis of ramp.
4. Concrete shall be 517-C-2500.
NOTES
1. Expansion Joints ———— at curb returns, and adjacent to structures.
   (See Standard Drawing G-10).
2. Weakened Plane Joints ———— at mid point of curb return, when required,
   and at 15' intervals from P.C.R.'s (See Standard Drawing G-10).
3. 1/4" grooves ———— with 1/4" radius edges at 5' intervals.
NOTE
When distance from "Area to be removed", to existing joint, edge or score mark is less than minimum shown, "Area to be removed", shall be extended to that joint, edge or score mark.
NOTES
1. Concrete shall be 517 - C - 2500.
2. = Weakened plane joints.
3. = Typical flowlines.
4. O = Elevations to be shown on plans.
5. Return segments to be 6" thick.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

CROSS GUTTER
DRAINAGE SLOT DETAIL

NOTES
1. Cross gutter to be constructed where the drainage is carried across street.
2. Minimum allowable cross slope is 0.5%.
3. Concrete shall be 517 - C - 2500.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

MID-BLOCK CROSS GUTTER

DRAWING NUMBER G-13
NOTES
1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 517-C-2500.
3. Weakened plane joints required on driveway C for driveways 12 ft. to 24 ft. wide, driveways wider than 24 ft. to 30 ft. wide shall have two weakened plane joints evenly spaced.
4. See standard drawings G-15 and G-16 for width and location requirements.
**REQUIREMENT 1**
No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb 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 25' or less, as shown by arc B.

**REQUIREMENT 3**
On all curb returns where the radius is 25' or more, curb openings may encroach upon each end of the return a distance equal to 12 1/2% or 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.
ALLEY

3' min. from any driveway

6' min. from Alley or Drainage Outlet

Residential Driveway Width - 12' min., 30' max.

Residential: 20' min. between curb openings serving same parcel.
Commercial: 4' min. to 10' max. between curb openings serving same parcel. If over 10', minimum of 26' required.

Commercial Driveway Width - 12' min., 30' max.

STREET

Curb

Obstruction

Obstruction

Curb radius

Curb radius

NOTES

1. Curb openings, except for joint-use driveways and drive ways on lots having 21'-foot frontage or less, shall be located at least 3 feet 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 25 feet or less are entitled to one 12 foot driveway (18 foot curb opening).

3. All driveways and curb openings shall be a minimum of 3 feet from any obstruction, i.e., poles, hydrants, etc.

4. No portion of any driveway shall be allowed across a line extending normal to the roadway from the front corner of the property, except that joint-use driveways may be permitted in special instances where written approval of both property owners is filed with the Agency.
TYPICAL PLAN

Q SECTION

NOTES
1. Sidewalk Ramps shall be installed as required by Agency.
2. D = distance shown on plans.
3. R = radius shown on plans (3 ft. minimum).
4. O = elevations shown on plans (top of curb, and gutter elev.).

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

ALLEY APRON
NOTES
1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.
NOTES
1. Concrete shall be 564-C-3000.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.
NOTES
1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.
TYPICAL SECTION

Pavement Width = 40' or less

Contact Joint required for pavement width greater than 20'

1/2" R

TYPICAL PLAN

Weakened Plane Joints

15'

Contact Joints

15'

Transverse Contact Joints shall be constructed at end of pour

Expansion Joints shall be constructed at locations shown on plans

NOTES
1. Concrete shall be 564: C: 3000.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.
NOTES
1. Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.
2. Base material to be replaced to depth of existing base. A.C. may be substituted for base material.
3. A tack coat of asphaltic emulsion or paving asphalt shall be applied to existing A.C. at all contact surfaces, prior to resurfacing.
4. Asphaltic Concrete Resurfacing:
   a) Minimum total thickness shall be one inch greater than existing A.C.
   b) A.C. shall be hot plant mix.
   c) Finish course for Type B resurfacing shall be laid down using a spreader box.
5. All A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.
6. Type B not to be used on lateral crossings.
GENERAL NOTES
1. Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.

NOTES TYPE-C
1. Concrete shall be colored black. Method to be specified by Agency.
2. Minimum concrete thickness:
   - Alleys and local residential streets .................. 5 inches
   - Major streets and highways .......................... 7 inches

NOTES TYPE-D
1. A.C. shall be hot plant mix.
2. A tack coat of asphaltic emulsion or paving asphalt shall be applied to the existing A.C. at all contact surfaces and to the portland concrete prior to placing the new A.C.
3. A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand.
   Chip sealing shall be applied as required by Agency.
SPRINKLER IRRIGATION SYSTEMS
PLANT VIEW

1. Teflon tape, 3/4" wide, shall be used on all threaded connections.
2. Close nipples shall not be used.

LEGEND ON PLANS

SHOW A NUMBER TO INDICATE TYPE HEAD.
NOTES
1. All fittings shall be P.V.C. Sch. 40.
2. Teflon tape, 3/4" wide, shall be used on all threaded connections.
3. Short nipples shall not be used.

LEGEND ON PLANS
Show a number to indicate type head.
NOTES:
1. Apron, where required by Agency, shall be 4" thick (470-C-2000) concrete.
2. When distance from hydrant to the top or toe of slope is less than 2' - 0", special hydrant installation will be required by Agency.
3. Where hydrant is not protected by a vertical face curb protective posts are required. See Standard Drawing W-16 for details.
4. Hydrant shall be located 5' from curb return, 3' min from driveway, on property line extension, or as shown on plans.
Valve
8" Asbestos Cement Pipe, Class 150
8" Valve Well Cap with 4" Skirt

NOTES
1. Provide clamp or felt to hold pipe sections (item 2) together during backfill.
2. Pipe shall be saw or machine cut on each end, no beveled sections will be permitted.
3. The final adjustment to finish grade may be made with an asbestos cement ring of 1" minimum height.

Valve
8" O.D. Steel Pipe, or 10 Ga. Asphalt Coated and Lined.
8 5/8" O.D. Steel Pipe or 10 Ga. Asphalt Coated and Lined.
8" Valve Well Cap with 4" Skirt

NOTE
Pipe sections shall be tack welded together.

Valve
8" Corrugated Steel Pipe, 16 Gage
8" Valve Well Cap with 4" Skirt

GENERAL NOTES
1. Clearance around cover shall permit lifting by hand without damage to pipe.
   Maximum clearance shall be 3/16".
NOTES
1. Extension to be used when top of valve nut is 5' or more below finish grade.
2. Paint all finished surfaces with asphalt varnish.
3/16" Steel Cover continuous weld to Cylinder
5 - 1/2" dia holes

2 1/2" x 2 1/2" Angle (3 places) weld to Cylinder

PLAN

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Dia</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; &amp; 2&quot;</td>
<td>14&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>14&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>16&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

TYPE A

3/8" Anchor Bolts and Nuts (3 places)

TYPE B

Steel enclosure, paint as specified by Agency.

TYPE C

2" x 2" pad, 470 - C - 2000 Concrete

Meter box, see Standard Drawing W-15 for location.
TYPE A1
WITH OR WITHOUT COMMERCIAL OR RESIDENTIAL SIDEWALK

Curb or asphalt berm
Meter Box
Sidewalk

TYPE A2
CONTIGUOUS SIDEWALK

Curb
Sidewalk
Meter Box

TYPE B
NON-CONTIGUOUS SIDEWALK

Curb
Meter Box
Sidewalk

TYPE C
NO CURB

Road Surface
Meter Box

TYPE D
NO CURB

Road Surface
Meter Box

Slope up
Slope down

* Agency to determine alternate
4" steel pipe filled with 470 - C - 2000 concrete and painted in accordance with Agency requirements.
TEES, HORIZONTAL OR VERTICAL BENDS, AND WYES

CROSS BLOCKING

STEEL PIPE PLAN

A.C. PIPE ELEVATION

DEAD END BLOCKING

NOTES
1. Concrete shall be 470°C: 2000.
2. See Standard Drawing W-18 for bearing areas.
NOTES
1. Based on 225 psi test pressure and bearing values of dry soils.
2. Values from curves are for tees and deadends, i.e.; straight line thrust.
   For 90° bend: 1.4 value from curve.
   For 45° bend: 0.8 value from curve.
   For 22 1/2° bend: 0.4 value from curve.
3. For conditions not covered by curves, special thrust blocks must be computed and approved.
NOTE
Concrete shall be 470-C-2000.
Concrete shall be 470-C-2000.

Pipe
Nominal Dia

<table>
<thead>
<tr>
<th>Pipe Nominal Dia</th>
<th>45°</th>
<th>22 1/2°</th>
<th>11 1/4°</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>7</td>
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<td>6</td>
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</tr>
<tr>
<td>12</td>
<td>**</td>
<td>**</td>
<td>16</td>
</tr>
</tbody>
</table>

* Increase volumes shown in proportion to pressures existing when pressure testing pipeline.

* Special design required.
NOTES
1. For trenching on improved streets see standard drawing G-24 or G-25 for resurfacing details.
2. (*) indicates minimum relative compaction.