DEPARTMENT OF PUBLIC WORKS

CITY OF HAYWARD
HEART OF THE BAY

STANDARD DETAILS
2017
# STANDARD DETAILS 2017

Last updated: April 14, 2017

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NORMAL SEQUENCE OF OPERATIONS FOR CONSTRUCTION OF ROADWAYS

The following will be the normal sequence of operation for the construction of a roadway in the City of Hayward. Each operation will follow only the applicable that precedes it on this list and then only after specific permission of the City Engineer. This list is to be used in coordination with all other project documents.

1. Clearing and Grubbing
2. Common excavation or backfill to grading plane to within 6" of subgrade
3. Install wet utilities (water, sewer, storm drain) and jumpers – Cut sheets required
4. Install dry utilities (telephone, electric, fiber optic, gas, etc.) – Approved plans required prior to installation. Minimum 12" separation must be maintained at crossings between wet and dry utilities.
5. Test utility trenches for compaction – Trenches may be tested for compaction as each utility installed
6. Preliminary tests of sewers and water lines – unofficial
7. Compact subgrade
8. Compaction test on subgrade (written certification with seal by licensed engineer)
9. Grade check of subgrade (written certification with seal by licensed engineer or surveyor)
10. Place, grade, and compact aggregate subbase & aggregate base to curb & gutter grade (written certification with seal required for compaction and grade)
11. Place forms for curb and gutters, and valley gutters – Cut-sheets required
12. Grade check on curb and gutter forms (written certification with seal by licensed civil engineer or surveyor)
13. Place concrete for curbs and gutters
14. Place “back-up” material or concrete sidewalk and driveways against back of curbs
15. Complete placing roadway aggregate subbase and aggregate base
16. Compaction test on base material (written certification with seal by licensed engineer)
17. Grade check of base material (written certification with seal by licensed civil engineer or surveyor)
18. Complete hydrants, water services, and meter boxes to proper position and grade
19. Video of storm lines & sanitary sewer; air & deflection tests on sewers and pressure & leak tests on water lines
20. Disinfection and flushing of water lines
21. Remove jumper and blow off, and perform bacteriological test of water lines
22. Put water lines into service (coordinate with water company)
23. Remove and replace any damaged curbs and gutters or any concrete to abut new Hot Mix Asphalt (HMA)
24. Apply asphalt prime coat (if required)
25. Place first lift of Hot Mix Asphalt (HMA) - (written certification of compaction with seal by licensed engineer – HMA with compaction less than specified must be removed)
26. Place asphalt tack coat between HMA lifts as required by the State Standard Specifications
27. Place second lift of HMA (written certification of compaction with seal by licensed engineer – HMA with compaction less than specified must be removed)
28. Apply asphalt seal coat (if required)
29. Raise all utility structures to grade and install monuments
30. Clean and video storm and sanitary sewers
31. Install street name signs, traffic control signs, striping & pavement markings, barricades, and curb markings
32. Completion of “punch list” items
33. Final “walk-thru” inspection
34. Provide “As-Built” drawings, Engineer’s Final Report, Soils Engineer’s Final Report, and Surveyor’s Final Report
35. Acceptance of Project

In the event of any conflict, the following order will prevail: 1) Special Provisions (City contract only), 2) Project Plans, 3) City Standard Details & Specification, 4) State Standard Plans, 5) State Standard Specifications.

[Signature]
Assistant City Engineer
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**STANDARD STREET & UTILITY CONST. DRAWING SYMBOLS**

**DWG. NO. SD-101**

**FILLED**

**SH. 2 OF 5**
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<td>Post, Pole or Standard</td>
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<td>Electroliter</td>
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<tr>
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<td>Traffic Signal (General)</td>
<td>Traffic Signal (General)</td>
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<td>Cut or Fill Slope</td>
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<td>Centerline of Ditch (arrow indicates direction of flow)</td>
<td>Centerline of Ditch (arrow indicates direction of flow)</td>
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<td>Contour</td>
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<td>All property or right of way lines (on date topography was plotted if different than proposed)</td>
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<td>Work or slope easement line</td>
<td>Work or slope easement line</td>
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<td>BC, EC, or PCR</td>
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<td>Finished Grade</td>
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<td>Water Line or Sanitary Sewer</td>
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<td>Pipe Crossing Construction</td>
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<td>Gate Valve</td>
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<td>Tee or Cross</td>
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<td>Sewer Manhole</td>
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<td>Note: Invert elevations shown are theoretical extensions of pipe inverts to centerline of structure</td>
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<td></td>
<td>Storm Water inlet</td>
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<td></td>
<td>Note: Invert elevations shown are theoretical extensions of pipe invert to centerline of structure</td>
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<td></td>
<td></td>
<td>Riser</td>
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<td></td>
<td>Note: Station and invert elevation are at intersection of centerline of branch and invert of wye</td>
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<td>DESCRIPTION</td>
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<td>Portland Cement Concrete</td>
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<td>Asphalt Concrete</td>
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<td>Earth Surface</td>
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</table>
STANDARD STREETS

NO PARKING ON EITHER SIDE
WITH APPROPRIATE POSTING OF SIGNS.

IF PRIVATE SIDEWALK REQUIRED THEN
4.5' S/W ADJACENT TO CURB
OR 4' S/W MEandering NEARBY
25' P.U.E. REQUIRED
6' P.U.E. MAY BE REQUIRED
BEHIND SIDEWALK

25' RESIDENTIAL – PRIVATE STREET

PARKING ON ONE SIDE ONLY, NO PARKING
SHALL BE POSTED ON OPPOSITE SIDE.

IF PRIVATE SIDEWALK REQUIRED
THEN, 4.5' S/W ADJACENT TO CURB
OR 4' S/W MEandering NEARBY
31' P.U.E. REQUIRED
6' P.U.E. MAY BE REQUIRED
BEHIND SIDEWALK

31' RESIDENTIAL – PRIVATE STREET

NO PARKING ON EITHER SIDE WITH
APPROPRIATE POSTING OF SIGNS.
SIDEWALK MAY BE ELIMINATED
OR LIMITED TO ONE SIDE
6' P.U.E. REQUIRED
BEHIND SIDEWALK

40' RESIDENTIAL – PUBLIC STREET
(NO PARKING)

PARKING ON
ONE SIDE ONLY
SIDEWALK MAY BE ELIMINATED
OR LIMITED TO ONE SIDE
6' P.U.E. REQUIRED
BEHIND SIDEWALK

40' RESIDENTIAL – PUBLIC STREET
(ONE SIDE PARKING)

GENERAL P.U.E. NOTE:
WHENEVER A 4.5' SIDEWALK IS NEXT TO CURB
STREET LIGHT POLES AND
UTILITY POLES MUST BE
PLACED BEHIND THE SIDEWALK IN
P.U.E. OTHERWISE SIDEWALK INCREA-
SED TO 5.5' AND RIGHT OF WAY
INCREASED BY 2'.

NOTE:
THIS 24' CURB TO CURB STREET
SECTION IS TO BE UTILIZED
ONLY FOR VERY SPECIAL SITU-
ATIONS SUCH AS HILLSIDE AREAS
WHEREBY GRADING AND RETAINING
WALLS CAN BE MINIMIZED AND
PROVIDED SUFFICIENT OFF STREET
PARKING CAN BE ACCOMMODATED.

NOTE:
THIS 30' CURB TO CURB
STREET SECTION ALSO IS TO
BE UTILIZED ONLY FOR VERY
SPECIAL SITUATIONS SUCH AS
HILLSIDE AREAS WHEREBY GRADING
AND RETAINING WALLS CAN BE
MINIMIZED PROVIDED SUFFICIENT
OFF STREET PARKING CAN BE ACCOMMODATED.
STANDARD STREETS

46' RESIDENTIAL – PUBLIC STREET
(MINIMUM STANDARD WITH P.U.E.)

48' RESIDENTIAL – PUBLIC STREET
(MINIMUM STANDARD WITHOUT P.U.E.)

56' RESIDENTIAL – PUBLIC STREET
(STANDARD WITH PLANTER STRIP)

56' RESIDENTIAL – PUBLIC STREET
(STANDARD WITHOUT PLANTER STRIP)

NOTE:
USE OF THIS STANDARD IS INTENDED TO ACHIEVE COMPATIBILITY WHEN RECONSTRUCTING OR COMPLETING CONSTRUCTION OF AN EXISTING STREET BUILT PREDOMINANTLY WITH THIS CROSS-SECTION.
COLLECTOR STREETS

50' RESIDENTIAL - PUBLIC STREET
(MINOR COLLECTOR)

60' RESIDENTIAL - PUBLIC STREET
(MINOR COLLECTOR WITH PLANTER STRIP)

60' INDUSTRIAL - PUBLIC STREET
(MAJOR COLLECTOR)

68' RESIDENTIAL - PUBLIC STREET
(MAJOR COLLECTOR WITH PLANTER STRIP)

68' COMMERCIAL - PUBLIC STREET
(MAJOR COLLECTOR)

GENERAL COLLECTOR NOTE:
CITY ENGINEER WILL MAKE
A SPECIFIC DETERMINATION
ON WHICH STREETS ARE TO
BE CONSTRUCTED AS A
MINOR OR MAJOR COLLECTOR.

6' P.U.E. REQUIRED
BEHIND SIDEWALK

THIS STANDARD MAY BE
USED ONLY WHERE SPACE
IS RESTRICTED OR TO MATCH
EXISTING CONDITIONS

6' P.U.E. REQUIRED
BEHIND SIDEWALK

6' P.U.E. REQUIRED
BEHIND SIDEWALK

6' P.U.E. REQUIRED
BEHIND SIDEWALK

6' P.U.E. REQUIRED
BEHIND SIDEWALK

5' x 5' TREE WELLS
ARterial Streets

84' Industrial - Public Street (Arterial)

92' Residential - Public Street (Minor Arterial with Median & Planter Strip)

92' Commercial - Public Street (Arterial)

110' Commercial - Public Street (Arterial with Median)

116' Public Street (Arterial with Median & Planter Strip)

* = 7.5' Preferred, 5.5' Minimum

5' x 5' Tree Wells

Hayward Public Works Dept.

STANDARD STREET SECTIONS

SD-102
CONCENTRIC

<table>
<thead>
<tr>
<th>TYPE</th>
<th>R</th>
<th>L</th>
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<tbody>
<tr>
<td>LOCAL RESIDENTIAL—PRIVATE OR PUBLIC STREET</td>
<td>40'</td>
<td>400'</td>
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<tr>
<td>INDUSTRIAL—PUBLIC STREET</td>
<td>50'</td>
<td>700'</td>
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</tbody>
</table>

ECCENTRIC

NOTE:
1. A CUL-DE-SAC IS REQUIRED IF "L" EXCEEDS 150 FEET UNLESS WAIVED BY THE FIRE CHIEF.
2. THE ECCENTRIC CUL-DE-SAC OR A MIRROR IMAGE TO THE RIGHT MAY BE UTILIZED AS TERRAIN AND LOT CONFIGURATION NEEDS DICTATE.
NOTES:
1. THIS ALTERNATIVE OR A MIRROR IMAGE TO THE RIGHT IS TO BE UTILIZED ONLY FOR VERY SPECIAL SITUATIONS SUCH AS HILLSIDE AREAS WHEREBY GRADING AND RETAINING WALLS CAN BE MINIMIZED OR WHERE LOT CONFIGURATION SUPPORTS ITS USE. THE USE OF THIS ALTERNATIVE IS SUBJECT TO THE DISCRETION OF THE FIRE CHIEF AND THE CITY ENGINEER.

2. "NO PARKING" SIGNS SHALL BE POSTED AS DIRECTED BY THE CITY ENGINEER.

HAMMERHEAD CUL-DE-SAC

WHEELCHAIR RAMPS
SEE SD-108 OR STATE PLANS A88A

<table>
<thead>
<tr>
<th>TYPE</th>
<th>R</th>
<th>L</th>
<th>X</th>
<th>Y</th>
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<td>LOCAL RESIDENTIAL,</td>
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<td>400'</td>
<td>30.08</td>
<td>35.92</td>
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<tr>
<td>PRIVATE OR PUBLIC STREET</td>
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<tr>
<td>INDUSTRIAL, PUBLIC STREET</td>
<td>50'</td>
<td>700'</td>
<td>40.85</td>
<td>37.15</td>
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RIGHT ANGLE BEND

GENERAL NOTE: ALL CONSTRUCTION SHALL CONFORM TO SD-107 & SD-108.
MINIMUM SETBACKS

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<tr>
<th>H IN FEET</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
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<tbody>
<tr>
<td>0–10</td>
<td>3'</td>
<td>2'</td>
<td>per</td>
<td>5'</td>
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<tr>
<td>11–25</td>
<td>(H/2)'</td>
<td>3'</td>
<td>zoning</td>
<td>7'</td>
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<tr>
<td>26 AND OVER</td>
<td>13'</td>
<td>3'</td>
<td>ordinance</td>
<td>10'</td>
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</table>

* THE OPEN SPACE AREA SHALL BE MAINTAINED BY THE HOMEOWNERS' ASSOCIATION OR THE CITY OF HAYWARD AS DIRECTED BY THE CITY COUNCIL.

CLASS "C" CONCRETE REINFORCED WITH 6x6-W4.0/W4.0

DETAIL
**L = Length of taper**

<table>
<thead>
<tr>
<th>Distance from beginning of taper</th>
<th>Offset distance for lane width of</th>
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<tbody>
<tr>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>7.5</td>
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<tr>
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<td>55</td>
<td>82.5</td>
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<tr>
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<td>90.0</td>
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**Median Width**

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<th>R</th>
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<tr>
<td>5'</td>
<td>2.5'</td>
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<tr>
<td>6'</td>
<td>3.0'</td>
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**Notes:**

1. Offsets are measured from a base line which is the curb line extended.
2. Distance along the base line is measured from the point of tangency at the beginning of taper.
3. Taper length shall be 120' unless otherwise directed by the Engineer or shown on the plans.
\[ Y = \frac{(W-6)X^2}{L^2} \]

1:10 FLARE OFFSETS

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<th>X</th>
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<th>10</th>
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<th>40</th>
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<th>100</th>
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<tbody>
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<td>0.10</td>
<td>0.40</td>
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<td>8.10</td>
<td>10.00</td>
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<td>18'</td>
<td>X</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
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<td>60</td>
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<td>80</td>
<td>90</td>
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</tr>
<tr>
<td>L = 100'</td>
<td>Y</td>
<td>0.00</td>
<td>0.08</td>
<td>0.33</td>
<td>0.75</td>
<td>1.33</td>
<td>2.08</td>
<td>3.00</td>
<td>4.08</td>
<td>5.33</td>
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<td>8.33</td>
</tr>
<tr>
<td>18'</td>
<td>X</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L = 120'</td>
<td>Y</td>
<td>0.00</td>
<td>0.13</td>
<td>0.50</td>
<td>1.13</td>
<td>2.00</td>
<td>3.13</td>
<td>4.50</td>
<td>6.13</td>
<td>8.00</td>
<td></td>
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</tbody>
</table>

NOTES:
1. All offsets are measured from a base line which is the curb line extended.
2. Distance along the base line is measured from the point of tangency at the beginning of the flare.
These special provisions shall govern over the standard specifications for concrete curb, gutter, sidewalk driveway, and flare construction.

1. Where there is existing concrete to be removed, it shall be cut with a concrete saw to a minimum depth of 1 1/2 inches to lines determined by the City Engineer unless removal can be made to a cold or expansion joint. Curbs, gutters, and sidewalks shall be removed from the entire section.

2. In sidewalk area, Class 2 aggregate subbase shall be placed on a smoothly graded, firm, unyielding plane. The top 6” of subgrade and the aggregate subbase shall be compacted to not less than 90 percent relative density. Sand, gravel, or other fluid material shall not be used.

3. The top 6” of subgrade and aggregate subbase under curb, gutter, and driveways shall be compacted to not less than 95 percent relative density.

4. Where new concrete is to be placed against existing concrete and at construction (cold) joints in new concrete, the two shall be joined by dowels with #3 bars per lengths and depths as shown in SD-108, 108A or 109, @ 3’-0” O.C. maximum, or as directed by the City Engineer. The holes shall be drilled into the existing concrete such that dowels fit snugly into the drilled holes.

5. Expansion joints shall be the bituminous fiber type, 1/8” in thickness, in one pre-molded, full depth piece. The full depth, width, and shape of the expansion joints shall be spaced a maximum of 50’ apart. Expansion joints shall be installed at all structures, curb returns, and driveways. Expansion joint material shall be cast into fresh concrete. "Cut-in" expansion joints will not be accepted.

6. Weakened plane joints shall be constructed to a minimum depth of 1/4 of concrete thickness with a scoring tool, which will leave the corners rounded. Weakened plane joints spacing shall not exceed 10’ unless otherwise directed by the City Engineer. Saw cut scores will not be accepted.

7. Concrete shall be Class “B” (five-sack mix) maximum 4” slump. Concrete shall contain one pound Lampblack or equivalent liquid color per cubic yard.

8. Score marks shall conform to existing adjacent patterns, or shall be placed as directed by the City Engineer. Score marks, expansion joints, and weakened plane joints shall be straight and true.

9. Finished concrete shall be treated with a transparent curing compound at the rate of 200 square feet per gallon in a criss-cross pattern, or water cured, as directed by the City Engineer.

10. Approved forms shall be used for all concrete work unless an extrusion machine is permitted. Forms shall be smooth, rigid, and full dimension. The lower rear edge of the front face form of curbs shall be milled to a 1” radius. Bracing stakes shall be placed at 3’ intervals.

11. Curb ramps shall be constructed at all crosswalks, marked or unmarked.

12. Sidewalks and driveways shall receive a light broom finish and shall be broomed transversely to the line of pedestrian traffic. Curb, gutter and valley gutters shall receive a light brush finish with brush strokes parallel to the line of the curb or gutter. Ramp broom finish shall be per SD-108. Skim coated or "sacked" finishes will not be accepted.

13. Damaged concrete shall be removed and replaced. Patching of chipped, cracked, damaged concrete will not be accepted. Skim coat or "sacked" repairs will not be accepted. Repairs shall be made to the nearest score mark, weakened plane joint, or expansion joint.

14. See SD-113 for pavement tie-in at curb and gutter.
CEMENT CONCRETE CLASSES

The Concrete Class A, B, C and D as specified in these City of Hayward Standard Details are defined as follows:

Class A Concrete (6-sack-mix) shall contain not less than 564 pounds of cementitious material per cubic yard.

Class B Concrete (5-sack-mix) shall contain not less than 470 pounds of cementitious material per cubic yard.

Class C Concrete (4-sack-mix) shall contain not less than 376 pounds of cementitious material per cubic yard.

Class D Concrete (7-sack-mix) shall contain not less than 658 pounds of cementitious material per cubic yard.

Concrete classes other than those defined above shall conform to the requirements specified in Section 90, "Portland Cement Concrete," of the State Standard Specifications.

The Concrete Class A, B, C and D as specified in these City of Hayward Standard Details, project plans, miscellaneous specifications related to the project, and the special provisions, shall be redefined using the State Standard Specifications for portland cement concrete designations as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Class</td>
<td>Min. Cement Content (lb/cy)</td>
</tr>
<tr>
<td>Class A</td>
<td>564</td>
</tr>
<tr>
<td>Class B</td>
<td>470</td>
</tr>
<tr>
<td>Class C</td>
<td>376</td>
</tr>
<tr>
<td>Class D</td>
<td>658</td>
</tr>
</tbody>
</table>

* Varies depending on concrete application and as specified by the City Engineer.
STANDARD/DEPRESSED CURB AND GUTTER

STANDARD MEDIAN/ISLAND CURB

SPILL CURB AND GUTTER

A

#3x10" Dowels at 3'-0" C.C. required if curb, gutter and sidewalk are not poured monolithically.

S=2% Cold joint

R/N

Aggregate subbase

Grading plane of street section

SIDEWALK WITHOUT PLANTER STRIP

R/N

B

C

S=2%

Grading plane of street section

Aggregate subbase

SIDEWALK WITH PLANTER STRIP

SIDEWALK DIMENSIONS

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>10</th>
<th>13</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>4.5</td>
<td>5.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>9.5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>0</td>
<td>7.5</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

1. Construction shall conform to SD-107.
2. Aggregate subbase under curbs and gutters shall extend to the grading plane of the street section but shall in no case be less than 4".
NOTES:

1. All grades and widths to be referred to curb grade and curb line.

2. This rolled curb detail shall be utilized only for private developments.

#3 x 10" dowels at 3'-0" C.C., required if curb, gutter and sidewalk are not poured monolithically.

ROLLED CURB AND GUTTER
(Showing driveway and sidewalk constructed adjacent to curb)

SPILL ROLLED CURB AND GUTTER
(Showing driveway and sidewalk constructed adjacent to curb)

Asphalt Concrete pad for dike

FLOWLINE
Curb grade

3"
5"
3"

As required (3" Max.)
CASE E

RAISED TRUNCATED DOME

GROOVING DETAIL

RAISED TRUNCATED DOME
PATTERN (IN-LINE)
DETECTABLE WARNING SURFACE

See Note 10

RETROFIT DETAIL
Existing curb and sidewalk

SECTION A-A

SECTION B-B
Depress entire sidewalk as required

SECTION C-C

STANDARD SIDEWALK,
CURB AND GUTTER,
ISLAND CURB AND
CURB RAMP SECTIONS

See Sheet 6 of 6 for Notes
If necessary, construct retaining curb at edge of sidewalk

Crosswalk
5'-0" Min
2% Max

Sidewalk
8.33% Max

Detectable warning surface,
See Notes 10 and 11

BC Crosswalk
if provided

Grooving
See Note 7

Weakened plane joint

CASE CM CURB RAMP

Retaining curb if necessary

Gutter flowline

2% Max

T, see Note 12

SECTION D–D

Typical Weakened Plane Joint
See Note 15

1/6"

1/6"

CASE B–2

See Sheet 6 of 6 for Notes
NOTES

1. As site conditions dictate, CASE A through CASE G curb ramps may be used for corner installations similar to those shown in DETAIL A and DETAIL B. The case of curb ramps used in DETAIL A do not have to be the same. CASE A through CASE G curb ramps also may be used at mid block locations, as site conditions dictate.

2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'–0" platform (landing) as shown in CASE A, the sidewalk may be depressed longitudinally as in CASE B, or C or may be widened as in CASE D.

3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for DETAIL B.

4. As site conditions dictate, the retaining curb side and the flared side of the CASE G ramp shall be constructed in reversed position.

5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'–0".

6. Side slope of ramp flares vary uniformly from a maximum of 10% at curb to the conform with longitudinal sidewalk adjacent to top of the ramp, except in CASE C, CASE CM and CASE F.

7. The curb ramp shall be outlined, as shown, with a 12" wide border with ¼" grooves approximately ¾" on center. See GROOVING DETAIL.

8. Transitions from ramps and landing to walks, gutters or streets shall be flush and free of abrupt changes.

9. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'–0" of the top and bottom of the curb ramp.

10. Curb ramps shall have a "Dark Gray" cast–in–place detectable warning surface that extends the full width and 3'–0" depth of the ramp. Detectable warning surfaces shall conform to the details as shown, and the requirements in the Special Provisions.

11. The edge of the detectable warning surface nearest to the street shall be between 6" and 8" from the gutter flowline.

12. Sidewalk and ramp thickness, shall be 4". All new handicap ramp installations shall be constructed on a 4" thick layer of aggregate subbase compacted to 90% relative compaction.

13. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp shall be relocated or adjusted to grade prior to, or in conjunction with curb ramp construction.

14. For retro-fit conditions, removal and replacement of curb apron (gutter) will be at the Contractor’s option, unless shown on project plans.

⚠️ 15. Construction shall conform to SD–107.

⚠️ 16. Contractor shall verify all existing site conditions and if any maximum allowable slope cannot be met due to existing site conditions, contact the Supervising Construction Inspector for direction before proceeding with construction.
NOTES:
1. Construction shall conform to SD-107.
2. See SD-109 & SD-110 for all other applicable driveway details.
TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>A</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>4'</td>
<td>4'</td>
<td>4'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>4'</td>
<td>5'</td>
<td>6'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1. Construction shall conform to SD-107.
2. See SD-108A for Plans & Section when dimension "A" is less than 8'.

PLAN

Min. = 12', Max. = 20'
5' min. to curb return
2' min. to P/L or 25' to 2nd D/W on same property

ELEVATION

Standard curb and gutter See SD-108
1" Radius

SECTION

STANDARD DRIVEWAY
LOCAL & COLLECTOR STREETS
NON-COMMERCIAL & NON-INDUSTRIAL
MINIMUM DRIVEWAY WIDTH AND PROPERTY REQUIREMENTS FOR SINGLE FLAG LOT

MINIMUM COMMON DRIVEWAY WIDTH AND PROPERTY REQUIREMENTS FOR TWO ADJACENT FLAG LOTS
FOR DRIVeways LESS THAN 30' FROM R/W OR BACK OF WALK TO GARAGE

FOR DRIVeways 30' OR MORE FROM R/W OR BACK OF WALK TO GARAGE

* MINIMUM DIMENSION
** STEEPER GRADES SUBJECT TO APPROVAL BY THE CITY ENGINEER

NOTE:
1. IF DRIVeway EXCEEDS 100’, APPROVAL IS SUBJECT TO ANY
CONDITION MANDATED BY THE FIRE MARSHAL.
2. A VERTICAL CURVE ACCEPTABLE TO THE CITY ENGINEER
SHALL BE PROVIDED AT ALL GRADE BREAKS.

DRIVeway GRADES
TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>A</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
<th>13'</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>See Note 2</td>
<td>4'</td>
<td>4'</td>
<td>4'</td>
<td>5'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>4'</td>
<td>5'</td>
<td>6'</td>
<td>8'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1. Construction shall conform to SD-107.
2. See SD-108A for Plans and Section when "A" is less than 8'
TABLE OF \( W_{en} \) WITH VARIOUS \( R_{en} \) AND OFFSETS

<table>
<thead>
<tr>
<th>( R_{en} )</th>
<th>( 1' )</th>
<th>( 2' )</th>
<th>( 3' )</th>
<th>( 4' )</th>
<th>( 5' )</th>
<th>( 6' )</th>
</tr>
</thead>
<tbody>
<tr>
<td>25'</td>
<td>22'</td>
<td>19'</td>
<td>17'</td>
<td>15'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>23'</td>
<td>20'</td>
<td>18'</td>
<td>15'</td>
<td>14'</td>
<td>12'</td>
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<tr>
<td>35'</td>
<td>20'</td>
<td>18'</td>
<td>16'</td>
<td>14'</td>
<td>13'</td>
<td>12'</td>
</tr>
<tr>
<td>40'</td>
<td>18'</td>
<td>15'</td>
<td>14'</td>
<td>12'</td>
<td>12'</td>
<td>12'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( R_{en} )</th>
<th>( X' )</th>
<th>( Y' )</th>
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<tbody>
<tr>
<td>25'</td>
<td>22.51'</td>
<td>24.88'</td>
</tr>
<tr>
<td>30'</td>
<td>27.01'</td>
<td>29.85'</td>
</tr>
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<td>35'</td>
<td>31.52'</td>
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</tr>
<tr>
<td>40'</td>
<td>36.02'</td>
<td>39.80'</td>
</tr>
</tbody>
</table>

**SPECIAL ALLEY OR DRIVEWAY APRON**

**NOTES:**

1. THIS ENTRANCE/EXIT IS TO BE UTILIZED FOR COMMERCIAL OR INDUSTRIAL DEVELOPMENT ALONG ARTERIAL OR COLLECTOR STREETS AT THE DISCRETION OF THE CITY ENGINEER.

2. \( W_{en} \) SHALL BE MEASURED PARALLEL TO STREET WHERE \( R_{en} \) BECOMES TANGENT TO EDGE OF DRIVEWAY.

3. SEE SD-110A FOR VALLEY GUTTER AND APRON DETAIL.

4. SEE SD-108 FOR CURB RAMP.
PLAN VIEW OF VALLEY GUTTER AND APRON

\[\text{C of Street}\]

\[\text{4'} \quad \text{5.5'} \quad \text{4'} \quad \text{1'}\]

NOTE:
Dashed lines with arrows indicate flow lines.

\[R=30'' \text{ (Typ.)}\]

\[\text{Apron}\]

\[\text{Keyed Joint (see details)}\]

\[\frac{1}{2}'' \text{ Expansion joint material}\]

\[\#6 \times 18'' \text{ dowels @ 18'' O.C.}\]

SECTION A-A

\[\text{8'' Class "B" Concrete}\]

\[4'' \text{ min aggregate base compacted to 95\% relative density}\]

\[\#4 \text{ Rebars @ 12'' O.C.}\]

\[\#4 \text{ Rebars @ 18'' O.C.}\]

SECTION B-B

\[\text{KEYED JOINT DETAIL}\]

NOTES:
1. THIS DETAIL MAY BE UTILIZED FOR PRIVATE STREET INTERSECTION SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.

\[\triangle 2. \text{ SEE SD-108 FOR CURB RAMP LOCATION AND DETAILS.}\]
STANDARD CAR

<table>
<thead>
<tr>
<th>ANGLE DEGREES</th>
<th>STALL WIDTH</th>
<th>STALL DEPTH</th>
<th>AISLE WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>D</td>
<td>A(a)</td>
</tr>
<tr>
<td>0</td>
<td>23.0</td>
<td>8.0</td>
<td>12.0</td>
</tr>
<tr>
<td>45</td>
<td>12.7</td>
<td>18.5</td>
<td>12.0</td>
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<tr>
<td>60</td>
<td>10.4</td>
<td>20.0</td>
<td>17.0</td>
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<tr>
<td>75</td>
<td>9.3</td>
<td>19.0</td>
<td>23.0</td>
</tr>
<tr>
<td>90</td>
<td>9.0</td>
<td>19.0</td>
<td>26.0</td>
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COMPACT CAR

<table>
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<th>ANGLE DEGREES</th>
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<th>STALL DEPTH</th>
<th>AISLE WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
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<td>L</td>
<td>D</td>
<td>A(a)</td>
</tr>
<tr>
<td>45</td>
<td>11.3</td>
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<tr>
<td>90</td>
<td>8.0</td>
<td>15.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

NOTES:

1. ALTERNATE DESIGNS FOR ANGLED PARKING MAY BE USED IF APPROVED BY THE PLANNING DIRECTOR.
2. IF THE PARKING ANGLE IS LESS THAN 90°, PARKING AISLE SHALL BE DESIGNED FOR ONE-WAY CIRCULATION.
3. PARKING SLOPE: 5% MAXIMUM, 2% MINIMUM OR AS APPROVED BY THE CITY ENGINEER.
4. FOR 90° PARKING, 2 FEET OF THE STALL DEPTH MAY BE USED FOR COMPACT VEHICLE OVERHANG; 2 1/2 FEET OF STALL DEPTH MAY BE USED FOR STANDARD-SIZED VEHICLE OVERHANG.
5. PARKING SPACES FOR THE HANDICAPPED SHALL HAVE MINIMUM 5 FEET WIDE LOADING AREA AT TYPICAL STALL AND 8 FEET WIDE LOADING AREA AT VAN-ACCESSIBLE STALL.

STANDARD
OFF-STREET PARKING

MINIMUM STALL AND AISLE DIMENSIONS

SIDEWALK

STREET
DESIGN AND CONSTRUCTION SPECIFICATIONS

1. The material for construction of the pad shall be 3 to 4 inch fractured stone.
2. The thickness of the pad shall not be less than 8 inches.
3. Place geotextile liner under stone pad.
4. The width of the pad shall not be less than the full width of all points of ingress or egress.
5. The length of the pad shall be as required, but not less than 50 feet.
6. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand, and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way shall be removed immediately.
7. When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch or watercourse through use of sand bags, gravel, board or other approved methods.
NOTES:
1. Flare section shall be poured monolithic with curb.
2. Construction shall conform to SD-107.

PLAN

Gutter flare at straight curb

Gutter flare at curb returns

SECTION A-A
Inlet at normal curb

SECTION A-A
Inlet in Driveway
(See SD-405 for SWI details)

STANDARD GUTTER FLARE AT INLET
CASE A: TIE-IN PAVEMENT SECTION

New curb & gutter see SD-108, sht. 1 of 6

2

\( \frac{3}{8} \)" lip after asphalt concrete is compacted for paving or tie-in work. See Detail 1

E.P.

Plane existing pavement to provide 0.10' minimum asphalt concrete thickness

Conform point

0.10' min.

Existing Pavement

See Note 3

New asphalt concrete

Aggregate Subbase

Aggregate Base

Aggregate Subbase

Varies

Varies

CASE B: TIE-IN PAVEMENT SECTION

NOTES:

1. Tie-in pavement section shall be approved by the City Engineer.

2. Conform point shall be determined by the City Engineer and may occur anywhere between the edge of pavement and the centerline.

3. Tie-in asphalt concrete shall extend to at least the bottom of existing asphalt concrete unless otherwise approved by the City Engineer.

4. Tie-in pavement section shall be designed according to the R-value and Traffic index and can be full-depth asphalt concrete.

STANDARD TIE-IN PAVEMENT

SD-113
NOTES:

1. OVERALL LENGTH OF BARRICADE SHALL BE WITHIN THE STREET R/W AND TERMINAL SECTIONS OF THE BARRICADE SHALL EXTEND TO R/W LINE. CUT AND FIT END SECTIONS AS NECESSARY.

2. A 3” CENTER MOUNT AMBER ACRYLIC PLASTIC REFLECTOR IN AN ALUMINUM BEzel HOUSING SHALL BE INSTALLED ON EACH POST AS SHOWN.

3. A 24”x24” W31 YELLOW DIAMOND "END" SIGN UTILIZING REFLECTIVE SHEETING SHALL BE MOUNTED ON A 4”x4”x7’-6” REDWOOD POST WITH THE BOTTOM OF THE SIGN ON TOP OF THE GUARD RAIL. THIS SIGN SHALL BE LOCATED AT THE CENTERLINE OF A STREET END.

4. THE SIGN SHALL BE 0.08” THICK, 24”x24” ALUMINUM.
NOTES:

1. GUARD RAIL POSTS SHALL BE CONSTRUCTION GRADE DOUGLAS FIR. DOUGLAS FIR SHALL BE PRESSURE TREATED.

2. THE GUARD RAIL SHALL BE GALVANIZED. SEE STANDARD SPECIFICATIONS.
NOTES:
1. R.E. or L.S. No. and year shall be stamped on plate.
2. Monument mark shall be a 1/8" diameter drilled hole or well defined punch mark and cross placed within the clear center area of the plate.
3. See Sht. 3 for monument box detail.

CAST BRASS SURVEY MONUMENT PLATE

Form with 3/32" wax impregnated paper which may be left in place. Metal form shall not be used.

Set brass plate in fresh concrete

Pour against undisturbed earth in drilled hole

#4 Rebar, 2' long

CLASS "C" concrete

FINISHED GRADE

2'-0" DIAMETER CIRCLE

3'-6" min. into undisturbed earth

2'-6" min. into drilled hole

STANDARD STREET MONUMENT INSTALLATION

STANDARD MONUMENT

Hayward Public Works Dept.

Dwg. No. SD-116

Hayward, CA 94545

510-783-5700

English Bros. Patterns and Foundry
2188 American Ave.

Indented letters as manufactured by:

City of Hayward

REV DATE BY
CITY ENGINEER
DwL PUBLIC WORKS

FILED

SHT 1 OF 4
Install Marker Post SD222

Standard City of Hayward Brass Monument Plate
See Shl. 1.

1" to 3"

3'-0"

2'-6"

Class "C" Concrete

30" No.4 Reinforcing Bar
8" V.C.P. or Schedule 40 PVC

Backfill around VCP or PVC with sand.

4" x 4" x 5' Redwood Post

5'-0"

STANDARD MONUMENT INSTALLATION IN MARSH OR UNSTABLE SOIL
TABLE OF APPROXIMATE DIMENSIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>APPROX. WT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHRISTY G05T</td>
<td>13 (\frac{3}{16})&quot;</td>
<td>11 (\frac{3}{16})&quot;</td>
<td>10 (\frac{3}{8})&quot;</td>
<td>1 (\frac{3}{8})&quot;</td>
<td>12&quot;</td>
<td>72 lbs</td>
</tr>
<tr>
<td>BROOKS 3-RT</td>
<td>12 (\frac{1}{2})&quot;</td>
<td>-</td>
<td>10&quot;</td>
<td>2&quot;</td>
<td>12&quot;</td>
<td>66 lbs</td>
</tr>
</tbody>
</table>

STANDARD MONUMENT BOX
1. REDWOOD PLUG WITH NAIL AND R.E. OR L.S. TAG.
2. LEAD OR CONCRETE PLUG WITH PIN AND R.E. OR L.S. TAG.
3. PLASTIC PLUG WITH R.E. OR L.S. NUMBER.
4. GALVANIZED IRON PIPE CAP STAMPED WITH R.E. OR L.S. NUMBER.
5. PUNCH MARK WITH R.E. OR L.S. TAG ATTACHED.
6. ALUMINUM PLUG WITH R.E. OR L.S. NUMBER.

NOTES:

2. MAXIMUM SPACING BETWEEN EXTERIOR BOUNDARY MONUMENT SHALL BE 300 METERS.
3. MONUMENTS SHALL BE SET SO THAT THEY ARE INTERVISIBLE WITH AT LEAST TWO OTHER MONUMENTS.

ALTERNATE No. 1

ALTERNATE No. 2

ALTERNATE No. 3

ALTERNATE No. 4

STANDARD MONUMENT
STANDARD STREET NAMES SIGN

Signs, Letters and Brackets shall conform to City of Hayward Requirements. see sheets 3 & 4.

2" Std. Galvanized Iron Pipe

Finish grade

Face of curb

NOTES:
1. Bottom portion of pipe shall be flattened to 1" thick to prevent turning and aid in stability.
2. The location of street name signs shall be as shown on the plans or as directed by the City Engineer.
3. Pipe caps required on all sign posts.
4. If a stop sign R1 is mounted on the same pipe below the name sign, the vertical clearance from the bottom of the sign and the sidewalk shall be 7'-0".

CITY OF HAYWARD ENGINEERING DIVISION

STANDARD STREET SIGNAGE REQUIREMENTS

DWG. NO. SD-117

FILED

SHT. 1 of 5
CONSTRUCTION, WARNING, AND REGULATORY SIGN POST

STATE OF CALIFORNIA UNIFORM STANDARD CONSTRUCTION, WARNING, OR REGULATORY SIGN

NOTES:
1. SIGN POST SHALL BE MANUFACTURED BY UNISTRUT CORPORATION. PART NO. 16D12 (1½"x1¾") 14 GA. GALV. POST OR APPROVED EQUAL, POST LENGTH = 10’ OR 12’, OR AS DIRECTED BY THE CITY ENGINEER.

2. DISTRIBUTION BY ZUMAR INDUSTRIES, INC. 6371 RANDOLPH STREET, LOS ANGELES, CA 90040.

3. GALVANIZED FINISH TO CONFORM TO ASTM A525 G90 COATING.

4. SLEEVE SHALL BE A653 (2¼"x2¾"x12") 12 GA. GALV. STEEL.

5. BASE SHALL BE (2"x2"x24") 12 CA. GALV. STEEL.

6. THE LOCATION OF STANDARD SIGNS SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE CITY ENGINEER.

1½" SQUARE PERFORATED GALVANIZED STEEL TUBING, POWDER COATED GREEN

1' - 0"

2' - 0"

2¾" SQUARE SLEEVE

2" SQUARE BASE

CLASS "B" PORTLAND CEMENT CONCRETE

FACE OF CURB

SECTION A-A

1¾"

SECTION B-B

2¼" SQUARE SLEEVE

2" SQUARE BASE

1¾" TUBE

STREET SIGNAGE REQUIREMENTS

DRAWN BY: HGM
CHECKED BY: A.L.
DATE: 07/14/14
SCALE: 1"=1'
APPROVED BY:
CITY ENGINEER
A.DR. PUBLIC WORKS

DWG. NO. SD-117
SHT. 2 OF 5
TYPICAL ALPHABET STREET NAME PLATE

C Street
With Suffix

West C Street
With Prefix and Suffix

TYPE "A" STREET NAME SIGN FACE DETAIL

TYPICAL ALPHABET STREET NAME PLATE

C Street
With Suffix

West C Street
With Prefix and Suffix

TYPE "B" STREET NAME SIGN FACE DETAIL

STANDARD STREET SIGNAGE REQUIREMENTS
SPECIFICATIONS FOR STREET NAME SIGNS

Street name signs shall be composed of SILVER reflectorized legend on Interstate GREEN reflectorized sheeting background material adhered to an aluminum plate. All signs shall be double-face, except as noted.

Face background shall be Interstate GREEN, engineer grade reflectorized sheeting material, conforming to the STATE OF CALIFORNIA, DIVISION OF HIGHWAYS, "SPECIFICATION FOR REFLECTIVE SHEETING ON ALUMINUM HIGHWAY SIGNS."

Faces shall be adhered to plates using the vacuum applicator method of fabrication.

Borders shall be three-eighths (3/8) inch SILVER reflective strips, placed horizontally across top and bottom of face, no margin, running the full length of face.

Corner of plates shall be rounded to one-half (1/2) inch radius. Number of holes and hole sizes are as shown on SD-117 Sheet 3 of 5.

Finish sign faces shall be free from blemishes, blisters, cracks, etc. Any signs not complying with these specifications shall be remade by the manufacturer at no additional cost to the City of Hayward.

Type A sign shall be reflectorized SILVER and street names shall be composed of four (4) inch upper case, Series "C", and three (3) inch, Series "C" lower case letters. Suffix's shall be two (2) inch upper case and one and one-fourth (1-¼) inch lower case, Series "C". Block numbers shall be two (2) inch, Series "C". Standard abbreviations shall be used. Prefix or suffix of compass direction to these street names shall be four (4) inch upper case letters, except for ALPHABET street names, the prefix of compass direction and street names suffix shall be two (2) inch upper case and one and one-fourth (1-¼) inch lower case, Series "C", placed horizontally on left and right center, respectively, as indicated on SD-117 Sheet 3 of 5.

Type B sign shall be reflectorized SILVER and street names shall be composed of five (5) inch upper case, Series "C", and three and three-quarter (3-¾) inch, Series "C", lower case letters. Suffix's shall be two and one-half (2-½) inch upper case and one and seven-eighths (1-7/8) inch lower case, Series "C". Block numbers shall be two (2) inch, Series "C". Standard abbreviations shall be used. Prefix or suffix of compass direction to these street names shall be five (5) inch upper case letters, except for ALPHABET street names, the prefix of compass direction and street name suffix shall be two and one-half (2-½) inch upper case and one and seven-eighths (1-7/8) inch lower case, Series "C", placed horizontally on left and right center, respectively, as indicated on SD-117 Sheet 3 of 5.

Series "C" letter and number styles and spacing shall be in accordance with United States Federal Highway Specifications Manual.

Plates shall be 0.080 gauge, aluminum alloy, conforming to the State of California Specifications, six (6) inches high (vertical) for Type A signs and ten (10) inches high (vertical) for Type B signs, and no less than twenty-four (24) inches in length. Depending upon the length of the legend, plates may be increased in lengths at six (6) inch increments to a maximum of forty-eight (48) inches. In case of plates which have to exceed the maximum, prior approval must be obtained from the City Engineer, or his representative.
NOTES:

1. Type "A" street name sign shall be installed on all standard streets within the City of Hayward as shown on sketch #1 and #2.

2. Type "B" street name sign shall be installed on all Collector or Arterial streets within the City of Hayward as shown on sketch #3 thru #6 and described as follows:
   a. When cross street is 56’ wide or more but less than 92’, sign shall be located at the far side of each approach to the intersection as shown on sketch #3.
   b. However, when the cross street is 92’ wide or more, it should be installed on the near right intersection as shown on sketch #4.
   c. In most cases, place the street sign on the same post with a stop sign (both signs facing the same direction) refer to sheet 1 of 5, even if a new longer post is required for the stop sign. Type "B" street name signs should never be installed on the near left side of the intersection, and may only be installed on the far left side when the street name to the left is different from the street name to the right.

3. Care should be taken to consolidate these street name signs with stop signs. Do not install an excess amount of posts. When stop signs, luminaire standards, or any other standard sign posts exist, these should be used for the mounting of these street-name signs. Care also should be taken to insure that signs are not mounted in the line of sight of motorist or pedestrian.

4. The following sketches give typical installation examples:

   [Diagrams of sketch #1 to #6 showing various street configurations and sign placements]
4" x 4" x 1/2" welded wire fabric in sidewalk. 36" minimum width each duct
2 - #3 x 24" rebar in curb
18 Ga. Galvanized metal duct 1" Clear

**METAL DUCT SECTION**

<table>
<thead>
<tr>
<th>Dimension D</th>
<th>Maximum Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>0.57 Cubic feet per second</td>
</tr>
<tr>
<td>9&quot;</td>
<td>0.94 Cubic feet per second</td>
</tr>
<tr>
<td>12&quot; Max.</td>
<td>1.29 Cubic feet per second</td>
</tr>
</tbody>
</table>

Metal duct form shall be supported from distortion during pour of concrete by filling with sand, temporary support wedged in place or other suitable means. This also applies to plastic pipes.

4" x 4" x 1/2" welded wire fabric in sidewalk. 36" minimum width each pipe
2 - #3 x 24" rebar in curb
Schedule 40 plastic pipe

**PLASTIC PIPE SECTION**

<table>
<thead>
<tr>
<th>Size</th>
<th>Maximum Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot; ø</td>
<td>0.15 Cubic ft. per second</td>
</tr>
<tr>
<td>4&quot; ø</td>
<td>0.32 Cubic ft. per second</td>
</tr>
<tr>
<td>2 1/2&quot; x 3&quot;</td>
<td>0.41 Cubic ft. per second</td>
</tr>
<tr>
<td>3&quot; x 4&quot;</td>
<td>0.94 Cubic ft. per second</td>
</tr>
</tbody>
</table>

**RECTANGULAR PIPE SECTION**

Concrete thickness, 2" min.
For box details, see sh. 2.
If no box, see sh. 3.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Maximum Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>W</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
</tr>
</tbody>
</table>

Welded wire fabric, 1/2" x 5/8" Rebar
S/W 2" min.
For box details, see sh. 2.
If no box, see sh. 3.

**LONGITUDINAL SECTION**

The concrete base and cover for duct and plastic pipe drains shall extend continuously from property line to back of curb.

**LONGITUDINAL SECTION WITH PLANTER AREA**

No pipe joints shall be made within the sidewalk or curb.

**STANDARD AREA DRAIN**

CITY OF HAYWARD
PUBLIC WORKS DEPT.

DRAIN BY: HGM DATE 01/04/12
CHECKED BY: AL APPD. BY:
REV DATE BY: CITY ENGINEER

SD-118

PLFD
SHT. 1 OF 5
NOTES:
1. Grate capacity = 1 c.f.s. with 2" head unclogged.
2. See sheet 3 for alternate installation without area drain box.
3. Products manufactured by Christy Concrete Products Inc., Brooks Product Inc. or Santa Rosa Cast Products Co. or equal may be utilized if approved by the City Engineer.
NOTES:

1. This installation to be used only when existing ground is too low for use of area drain box shown on Sheet 2.
**ROOF LEADER DRAIN**

**NOTES:**

1. All roof leaders must drain to the street or to an existing watercourse at the rear of the property with an appropriate energy dissipator provided prior to discharge into the watercourse.

2. The rainwater shall be treated prior to discharge to the street or watercourse subject to approval of the City Engineer.

3. If a water course is unavailable, a 6" diameter perforated pipe may be installed in a trench backfilled with minimum 12" Class 2 permeable material and 18" Bioretention Soil Mix, designed and approved by a Soils Engineer.

4. Bioretention Soil Mix shall consist of 60-70% sand and 30-40% compost.
NOTE:

Positive grade away from entire building perimeter shall have a minimum gradient of 2% towards the swale in accordance with Excavation, Grading and Fill of the California Building Code under Sec. 1804A.3 Site Grading. The swale should be continuous from high point to area drain grate or pipe.
Upper end to be reamed on inside and deburred on outside. Meters to be installed by others.

NOTES:

1. Posts shall be installed vertically and in line with other meter posts in the area.

2. If posts are to be installed in a planting area rather than PCC sidewalk, a 6" thick pad shall be poured as shown below to connect post with curb.

TYPICAL SECTION OF POST IN SIDEWALK AREA

Parallel parking line

Face of curb

6" Class "B" concrete slab

PLAN VIEW OF POST IN PLANTING AREA

6" standard galvanized pipe

Two 1/8" holes for ventilation (one side only); one on top & one at bottom.

5" minimum ID metal sleeve to be installed while pouring sidewalk and installing post.

Sidewalk area

Class "C" concrete

Lower portion of pipe to be partially flattened to avoid twisting.
INTEGRAL PHOTOELECTRICAL CONTROL

"M"

TAPERED ARM
GALVANIZED STEEL
(MATCH POLE)

LED LUMINAIRE
SEE NOTE 4 ON SHEET 3

GALVANIZED STEEL ELECTROLIER
TYPE 15 OR 21 PER STATE PLANS ES-6A

POLE NUMBER:
- 9' ABOVE THE FINISHED GRADE
- 45' ANGLE FROM THE STREET AND FACING TRAFFIC
- POLES IN MEDIAN ISLANDS WILL HAVE NUMBER
  FACING TRAFFIC IN BOTH DIRECTIONS.

CENTERLINE OF POLE:
- 1'-3" BEHIND SIDEWALK IN P.U.E. WITH MONOLITHIC
  SIDEWALK 5' WIDE OR LESS (INCLUDING THE CURB)
- 2' BEHIND FACE OF CURB WITH MONOLITHIC SIDEWALK
  6' WIDE OR MORE (INCLUDING THE CURB)
- 2' BEHIND FACE OF CURB IN PLANTER STRIP
- CENTERLINE OF MEDIAN ISLANDS
- 5' FROM TOP OF DRIVeway FLARE (MINIMUM)

HAND HOLE WITH COVER. MINIMUM SIZE: 4" x 6½"
LOCATE 90° TO MAST ARM

BASE COVER

ELECTROLIER SHALL BE OF THE TYPE AND SIZE
AS SHOWN IN THE TABLE ON SHEET 3 (unless
otherwise specified)
ANCHOR BOLTS, NUTS, AND WASHERS
GALVANIZED AND CONFORMING
TO STATE PLAN ES–7M

2" MIN. TO 3" MAX. GROUT
UNDER BASE PLATE AFTER
LEVELING POLE PER STATE
PLAN ES–7M

1"±¼"

4" X 6 ½"
HANDHOLE REINFORCED
PER STATE PLAN ES–7M
GROUND LUG: ½" x 13 UNC HEX HAND NUT
BASE COVER
S/W. IF NO S/W, CONSTRUCT
CONCRETE PAD 4" x 36" x 36".

CLASS "A"
CONCRETE
TO PULL BOX
2" SCH 40 PVC

MINIMUM RADIUS (SEE NOTE 3):
18" UNDER SIDEWALK
24" IN PLANTER STRIP
36" UNDER PAVEMENT
42" ARTERIAL STREET

20' OF #4 AWG BARE COPPER ELECTRODE
(GROUND WIRE) COILED AT THE BOTTOM OF
THE FOUNDATION AND ENCASED BY 2" OF
CONCRETE. THE #4 AWG GROUND WIRE
SHALL BE OF SUFFICIENT LENGTH TO BE
CONTINUOUS AND TERMINATED TO THE
ELECTROLIER GROUND LUG WITH 20'
LENGTH COILED AT THE BOTTOM OF THE
FOUNDATION.

NOTES:
1. STANDARD STREET LIGHTING POLE, INCLUDING CAST-IN-DRILLED HOLE PILE FOUNDATION,
SHALL CONFORM TO STATE PLANS ES–6A, ES–7M, AND ES–7N.
2. CONCRETE SHALL SET AT LEAST 7 DAYS BEFORE POLE IS ERECTED.
3. MINIMUM RADIUS ALSO APPLIES TO PULL BOX STRUCTURES.
### ELECTROLIERS

<table>
<thead>
<tr>
<th>POLE TYPE</th>
<th>POLE DATA</th>
<th>BASE PLATE DATA</th>
<th>LUMINAIRE ARM DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Height</td>
<td>Min OD</td>
<td>Wall Thickness</td>
</tr>
<tr>
<td></td>
<td>Base</td>
<td>Top</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>30'</td>
<td>8&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>21</td>
<td>35'</td>
<td>8½&quot;</td>
<td>3/8&quot;</td>
</tr>
</tbody>
</table>

### LUMINAIRE ARM DATA

<table>
<thead>
<tr>
<th>M Projected Length</th>
<th>N Rise</th>
<th>Min OD At Pole</th>
<th>Nominal Thickness</th>
<th>P Type</th>
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</thead>
<tbody>
<tr>
<td>6'–0&quot;</td>
<td>2'-0&quot;±</td>
<td>3¼&quot;</td>
<td>0.1196&quot;</td>
<td>Type 15</td>
</tr>
<tr>
<td>8'–0&quot;</td>
<td>2'-6&quot;±</td>
<td>3½&quot;</td>
<td>0.1196&quot;</td>
<td>Type 21</td>
</tr>
</tbody>
</table>

### LUMINAIRE REQUIREMENTS

- **Nominal Color Temperature**: 4300K, +/-300K
- **Color Rendering Index (CRI)**: 70 CRI
- **Light Distribution**: Type 2 & Type 3 Distribution, full cut-off
- **Luminaire Efficacy**: >69 lumens per watt (LPW)
- **Operating Temperature**: °C -20 to +50
- **IESNA Luminaire Classification**: Using TM-15: B3, U1, G3
- **Lumen Depreciation of LED Light sources**: LED module shall deliver 70% of initial lumens, when installed for a minimum of 110,000 hours
- **Off-state power consumption, max.**: 0.50
- **On-state power consumption, max., excluding control device**: ≤Traditional Application Wattage

### POWER SUPPLY/DRIVER REQUIREMENTS

- **Operation Voltage**: 120–277V
- **Power Factor, min.**: 0.90
- **Transient Protection**: 10kV
- **Interference**: FCC 47 CFR part 15/18, Class A
- **Driver Output Current Range**: 350mA–530mA–700mA

### NOTES:

1. LED fixture should have a field installable house side shield option to take care of light trespass concerns. This shield should be unobtrusive and not hang below the fixture.

2. LED fixture should have power door design with all electrical components mounted on door with quick disconnect for easy access.

3. LED fixture should have NEMA twist-lock receptacle that can be rotated and aimed north without the use of any tools.

4. LED luminaire type and size to be installed shall be determined by City Traffic Engineer.
DESIGN CRITERIA FOR ROADWAY LIGHTING

1. AVERAGE MAINTAINED ILLUMINANCE VALUES ($E_{AVG}$) IN FOOTCANDLES (FC)

<table>
<thead>
<tr>
<th>ROAD AND AREA CLASSIFICATION</th>
<th>$E_{AVG}$ (FC)</th>
<th>UNIFORMITY RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTERIALS:</td>
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</tr>
<tr>
<td>HIGH</td>
<td>1.7</td>
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<tr>
<td>MEDIUM</td>
<td>1.3</td>
<td>3 TO 1</td>
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<tr>
<td>LOW</td>
<td>0.9</td>
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<td>COLLECTOR:</td>
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<tr>
<td>HIGH</td>
<td>1.2</td>
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<td>0.9</td>
<td>4 TO 1</td>
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<tr>
<td>LOW</td>
<td>0.6</td>
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</tr>
<tr>
<td>LOCAL:</td>
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</tr>
<tr>
<td>HIGH</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>MEDIUM</td>
<td>0.7</td>
<td>6 TO 1</td>
</tr>
<tr>
<td>LOW</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>RURAL:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STREETLIGHTS ARE TO BE INSTALLED AT:

1. INTERSECTIONS
2. TRAFFIC CONFLICT LOCATIONS
   (NARROW BRIDGES, R/R CROSSINGS, ETC.)
3. OTHER LOCATIONS AT THE DISCRETION OF THE CITY TRAFFIC ENGINEER.
LUMINAIRE SPECIFICATIONS

STYLE: WASHINGTON - 199 (2 PIECE) GLOBE WITH PAINTED GOLD-ALUMINUM BAND
HEIGHT: 37 3/4"
WIDTH: 17 1/8"
MATERIAL: CAST ALUMINUM
GLOBE: STIPPLED POLYCARBONATE
FINISH: PRIME PAINT, SHERWIN WILLIAMS 2 PART RECOATABLE EPOXY
PRIMER (B679S - PART C AND B679V - PART H) THEN
FINISH PAINT - CEDAR GREEN
LAMPI NG: 175W MH (METAL HALIDE)
VOLTAGE: M/T 120V, 240V, 208V, 277V
SOCKET: PORCELAIN MODUL
DISTRIBUTION: ASYMMETRIC TYPE III
WIRE TYPE: 18 AWG TYPE UF/N
INTERNAL P.E.C.

LAMP POST SPECIFICATIONS

STYLE: THE WASHINGTON 12P
HEIGHT: 12'
LIGHT CENTER: 14'
BASE: 17" DIAMETER
MATERIAL: 1 PIECE, HEAVY WALL CAST ALUMINUM
ALLOY SR 319 PER A.S.T.M. B26-80
FINISH: PRIME PAINT, SHERWIN WILLIAMS 2 PART RECOATABLE EPOXY
PRIMER (B679S - PART C AND B679V - PART H) THEN
FINISH PAINT - CEDAR GREEN
ACCESS DOOR: LOCATED IN BASE
GROUND STUD PROVISIONS DRILL AND TAP INSIDE WALL OF BASE OPPOSITE ACCESS DOOR TO
ACCOMMODATE A 1/2" - 20 GROUND STUD (GROUND STUD SUPPLIED BY OTHERS)
ANCHOR BOLTS: (4) 3/4" X 24" + 3" HOOK (FULLY GALVANIZED WITH
1 GALVANIZED NUT AND 1 GALVANIZED WASHER PER BOLT)
BOLT PROJECTION: 3" REQUIRED
TENON: 3 1/2" DIA. X 3" HIGH
3" REQUIRED
3 1/2" DIA. X 3" HIGH
SPACING: 100" (O.C.)
CONFIGURATION: STAGGERED

ILLUMINATION STANDARDS

ILLUMINANCE (Fx) = 0.5
UNIFORMITY RATIO = 4:1

ONLY FOR DOWNTOWN LIGHTING
DETAIL WASHINGTON CASING WITH 199 GLOBE LUMINAIRE

ONLY FOR DOWNTOWN LIGHTING

CITY OF HAYWARD
ENGINEERING DIVISION

DRAWN BY: F. MORALES
DATE: MARCH 27, 1997

CHECKED BY: H.B.D.
SCALE: NONE

APPROVED
CITY ENGINEER

REV DATE BY
SD-120A
FILED: 9-25-02
SHT. 2 OF 5

STANDARD
ORNAMENTAL
STREET LIGHTING

SPRING CITY ELECTRICAL Mfg. Co.
Phone (610) 948-4000
Fax (610) 948-9577
HALL & MAIN STREETS
P.O. Box Drawer A SPRING CITY, PA 19475
PLAN VIEW

ANCHOR BOLTS, NUTS, AND WASHERS TO BE GALVANIZED ANCHOR BOLTS TO PROTRUDE 3" ABOVE FOUNDATION

CLASS "B" CONCRETE PAD 4" x 36" x 36" or s/w

TO PULL BOX 1.5" SCH 40 PVC

4-3/4" x 34" x 3"
ANCHOR BOLTS, AS SPECIFIED BY MANUFACTURER

CLASS "A" CONCRETE
CONCRETE SHALL SET AT LEAST 7 DAYS BEFORE POLE IS ERECTED.

MINIMUM RADIUS: **
18" UNDER SIDEWALK
24" IN PLANTER STRIP
36" UNDER PAVEMENT
42" ARTERIAL STREET

5/8" x 8' COPPER GROUND ROD OR 20' #4 BARE COPPER GROUND WIRE COIL. SECURE TO ELECTROLIER GROUND NUT.

WIRE COIL ENCASED BY 2" OF CONCRETE

SECTION A-A

** = MINIMUM RADIUS ALSO APPLIES TO PULL BOX STRUCTURES
ORNAMENTAL LAMP POST SPECIFICATION:

1. Post shall be Spring city Manufacturing Company "Washington" Series or approved equal.

2. The lamp post shall be integrally cast at one piece and shall be cast aluminum per ASTM B26, Alloy 319.

3. The castings shall be true to pattern with 16 flutes of uniform sections. The sections shall be formed by the use of loose pattern pieces to ensure that the flutes have constant dimensions around the circumference of the pole.

4. The post shall be cast tapered as shown below, with no welding or bolting together of structural members of the lamp post.
   
   Column at Base 5 IN. (12.7cm) O.D.
   Column at top 3-1/4IN. (8.26cm) O.D.
   Base at Base 17 IN. (43.18cm) O.D.

5. The base shall have four (4) one inch wide slots on a 12-1/2 inch (31.75cm) diameter bolt circle.

6. A handhole secured with stainless steel machine screws shall be provided in the base of the lamp post.

7. Each post shall be supplied with four(4) 3/4 inch (19mm) diameter by 24 inch (60.96 cm) long hot dipped galvanized steel anchor bolts with a 3 inch (7.62cm.) hook on one end. Each bolt shall have one galvanized nut and one washer to fasten down the post.

8. Anchor bolts shall be installed according to the template supplied by the manufacturer.

9. The anchor bolts shall protrude three inches above the foundation to allow for clearance for the washers and nuts.

10. All castings shall be prime painted with etching type Zinc Chromate primer.

11. The post shall be manufactured in accordance with the AASHTO "Standard specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."

ONLY FOR DOWNTOWN LIGHTING
ORNAMENTAL LUMINAIRE SPECIFICATION:

1. Luminaires shall be Spring City Electrical Manufacturing Company "Washington" Series or approved equal.

2. The globe shall be made of polycarbonate and have a glass-like appearance to maintain historic relevance.

3. The casing shall be made of cast aluminum and shall have provisions for an internally mounted photocell to switch the light on and off. The photocell switch shall be supplied by the casing manufacturer.

4. The luminaire shall be fitted with a 175W MH (metal halide) lamp, a downward reflector, and a house-side shield. Ballast shall be multi-tap 120V, 208V, 240V, 277V.

5. Luminaries shall maintain a Type III distribution.

6. Luminaires shall be UL or CSA labeled.

7. The globe shall be fitted with a decorative painted gold aluminum ring and brass finial as specified on sheet 2

ONLY FOR DOWNTOWN LIGHTING
NOTES:

1. Boxes shall be Christy N30 Electrical Box or approved equal. Lids shall be Christy TL Style Locking Lids or approved equal, see NOTE 5.

2. If extension is used, it shall be grouted to the pullbox on the inside.

3. Where pullboxes are installed in concrete areas, the box and lid shall be flush with sidewalk surface.

4. Where pullboxes are not installed in concrete areas, a 18" Wide x 6" Thick concrete band shall be placed around the box.

5. Security Bolts shall be keyed for City of Hayward. Lid color shall be Beige or Gray to match the color of the top of box. Lid to be marked COH-SL with 1" high letters on upper right corner of lid.

6. Locking lids shall be bonded to equipment ground conductor. Bond wire shall be the same wire gauge as equipment ground/bond jumper and shall be bonded with listed grounding termination.

7. Bond wire shall be stranded and of sufficient length to allow the lid to be removed and set aside the pull box.

8. Conductors shall have a minimum of 24" and a maximum of 36" total in box slack from conduit end.

9. Dual in-line fuse holder with approved fuse shall be installed in pullbox.

10. Conduit ends shall have 6" to 8" clearance from the bottom of the lid. Extension or deeper boxes shall be used as necessary to maintain this clearance and to provide space for conductors and connections.

11. PVC conduits shall have bell ends.

12. Steel conduits shall have listed bonding bushings.

13. Ends of all conduits shall be sealed with duct seal.
STANDARD MONITORING WELL INSTALLATION

NOTES:

1. REFER TO SD-116 STANDARD MONUMENT BOX FOR DETAILS, EXCEPT THAT THE INSCRIPTION ON THE LID SHALL READ 'MONITORING WELL' INSTEAD OF 'MONUMENT'.

2. DIMENSION SHALL BE PROVIDED BY THE APPLICANT'S ENGINEER.
**Plan View**

Set lower tie 1/2 distance between top tie and finished grade.

Height of stakes as required to hold tree upright & straight.

Do not remove low side branches.

Set rootball 2" above finished grade.

2 tree bubblers per tree 1" +/- above wood chips.

4" min. (Typ.)

Two 3" diameter pressure treated lodgepole pine stakes. Remove nursery stakes before staking. Do not place stake in rootball.

Top of stake to be 2" below the main branching structure of the tree and shall not extend into the main branches.

One 1" x 4" cross brace secured to stakes with galvanized screws.

Minimum 3" organic recycled chipped wood.

4" water basin

Backfill with clean native soil and soil amendment as necessary. Soil amendment shall be organic compost or as directed by Soils Lab.

Excavate plant pit a minimum of 2x diameter of root ball.

Set stakes 12" minimum into undisturbed soil.

**Tree Staking**

15 Gallon or 24" Box Tree

**Organic fertilizers per Soils Lab.**

Two 4" diameter PVC perforated drain pipes with slotted cover, min. 30" deep. Fill in and around pipe with drain rock.

**Scarify sides and bottom of plant hole. Lightly score sides and bottom of root ball just prior to planting.**
STREET TREE PLANTING SPECIFICATIONS:

1. Tree shall be healthy, disease and insect–free, well rooted, and properly trained with a straight trunk that can stand upright without support. Tree shall exhibit a central leader, or a main branch that can be trained as a central leader. Branches shall be well–developed and shall be evenly and radially distributed around the trunk. Root ball shall not exhibit kinked or circling roots.

2. Tree shall comply with federal and state laws requiring inspection for plant diseases and pest infestation. Clearance from the county agricultural commissioner, as required by law, shall be obtained before planting trees delivered from outside the county.

3. Prior to planting tree, determine the location of existing or future underground utilities. Locate tree a minimum of 5 feet from lateral service lines and driveways. Locate tree a minimum of 15 feet from a light pole, and a minimum of 30 feet from the face of a traffic signal, or as otherwise specified by the City.

4. Tree pit shall be tested for proper drainage prior to planting tree. Fill pit with water; if water remains after a 24–hour period, auger three 4"–diameter by 3–foot deep holes at the bottom of the tree pit. Backfill with drain rock.

5. Set tree in an upright and plumb position. As much as possible, tree shall be positioned such that dominant branches are parallel to the roadway and are oriented away from potential conflicts.

6. If required by the City, a pressure–compensating bubbler, or drip emitters, shall be provided to each tree.

7. Depending on the planter strip width, or the tree well size and the tree species being planted, a 24" deep root–barrier may be required by the City to be placed between the root–ball and the curb and/or sidewalk. Length of strip barrier or size of the box barrier will be specified by the City.

8. Stakes are to be removed when the tree diameter meets or exceeds the diameter of the stake.
NOTES:

1. SEE SPEED LUMP LAYOUT TABLE ON SHEET 4.
2. MATERIAL IS COMPRESSION MOLDED 100% RECYCLED RUBBER AND POLYURETHANE COMPOSITE (TRAFFIC LOGIX OR EQUAL.)

STREET WIDTH ≤ 37'
STANDARD SPEED LUMP

NOTE: SEE NOTES ON SHEET 1.
<table>
<thead>
<tr>
<th>LAYOUT TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE: DIMENSIONS SHOWN ARE BASED ON 18&quot; MODULAR SECTIONS.</td>
</tr>
</tbody>
</table>
SPEED LUMP SIGN

WARNING SIGN AT LUMP

SPEED HUMP

24"

SPEED HUMP AHEAD

30"

15 MPH

24"

WARNING SIGN IN ADVANCE OF LUMPS

CURB, GUTTER AND SIDEWALK

18"

SIGN INSTALLATION IN SIDEWALK AREAS

SIDEWALK

12"

SIGN INSTALLATION BEHIND SIDEWALK

NOTES:
1. SIGNS SHALL BE BLACK ON YELLOW.

2. SIGNS SHALL BE INSTALLED TO MAINTAIN A MINIMUM VERTICAL CLEARANCE OF 7 FEET FOR THE SINGLE "HUMP" SIGN, AND 6 FEET FOR THE "HUMPS AHEAD" AND ADVISORY SPEED PLATE SIGNS.

3. SEE SD–117 FOR OTHER STANDARD SIGN INSTALLATION REQUIREMENTS.
NOTES:

1. The minimum diameter "D" of the opening in the wall shall be defined by the formula 
   \[ D = \text{Pipe O.D.} + 6d + 3'' \], where \( d \) = the diameter of the existing wall reinforcing bars.

2. The areas of the planned opening shall be drilled and carefully broken out in order to determine the location of the existing horizontal and vertical reinforcements. The concrete shall be removed in such a manner so as to preclude shattering or spalling of the adjacent wall and damage to the exposed bars. A minimum of 4 bars shall be single cut, as shown in Section A-A, and bent out into the area of the collar, using a minimum bend radius of 3d and a minimum cover of \( 1\frac{1}{2}'' \) inch. The spacing between the upstanding legs of the bent bars shall be approximately equal.

3. All cracks in the opening shall be grouted, using a portland cement paste per Section 51–1.13 of the Caltrans Standard Specifications, and surface cleaned, prior to the placement of the pipe in the opening. The pipe shall be precut so as to be flush with the inside surface of the structure. After positioning the pipe to the required flow line elevation, the pipe shall be grouted in place using coarse pea gravel. The grout shall be cured for at least 3 days, keeping surfaces continually damp, prior to pouring the PCC collar around the pipe. The interior wall surface around the opening shall be finished, using mortar per Section 51–1.135 of the Caltrans Standard Specifications, as required.
NOTES:

1. The diameter "D" of the opening in the wall shall be equal to pipe O.D. plus 6 inches.

2. The pipe opening shall be carefully cut and the concrete removed in such a manner so as to preclude shattering or spalling of the adjacent wall. No. 4 (#4) radial L-clips shall be installed at 12 inches O.C. in the center of the wall thickness shown in Section A-A. The clips shall be grouted in place per Section 51-1.13 of the Caltrans Standard Specifications, or epoxy cemented using material per Section 95-2.01 and installed per Section 95-1.04.

3. The pipe shall be precut so as to be flush with the inside surface of the structure. After positioning of the pipe to the required flow line elevation, the pipe shall be grouted in place using coarse pea gravel grout. The grout shall be cured for at least 3 days, keeping the surfaces continuously damp, prior to pouring the PCC collar around the pipe. The interior wall surface around the opening shall be finished, using mortar per Section 51-1.135 of the Caltrans Standard Specifications, as required.
NOTES:

1. Minimum bedding class for all trenches within existing and new street rights-of-way and all existing or new off-street traffic areas (parking lots) shall be class B-1 (load factor 1.9). Load factors and bedding class shall be determined using the American Society of Civil Engineers Manual No. 37, "Design and Construction of Sanitary and Storm Sewer".

2. Sand bedding and sand backfill may only be used when required by the California Public Utilities Commission regulations (gas, electric, telephone and cable television). Wet conditions may require Class 2 Aggregate Base (for rigid conduit only).

3. Drain rock may be used only when wet trench conditions require pumping.

4. Native material used in new streets or new off street traffic areas shall be used only when specifically authorized by the City Engineer and approved by the Soils Engineer. Native material used as backfill material, where allowed, shall contain no rocks or clods greater than 4" in greatest dimension and shall be free of organic material and other deleterious material.

5. Alternate Trench will be allowed only in unimproved areas and in new subdivisions currently under construction.

6. Unimproved areas are those areas outside the street right-of-way which are not intended for future street right-of-way or for future paved areas intended for pedestrian and vehicular traffic. Unimproved areas include existing or proposed landscaped areas.

7. Trench shoring shall conform to Cal OSHA Excavation and Trench Safety Orders.

8. Water jetting of trench is not allowed.

9. Trench widths shall not be changed without the written approval of the City Engineer.

10. Type A Asphalt Concrete, Class 2 Aggregate Base and Class 2 Aggregate Subbase shall conform to the Standard Specifications.

11. Material in Location 2, 3, and 6 shall be placed and compacted in lifts not to exceed 1.0 feet in thickness.

12. For water main and fire hydrant construction, recycled material shall not be used in the pipe zone.
Bore Pit at Centerline

Bore Pit at Travel Lane

Trench Before Centerline

Trench Across Centerline

Diagonal Trench

Trench Along Travel Lane

Legend
- - - - - - Bore Pit
- - - - - - Utility Trench
- - - - - - Slurry or Grind & 2" Overlay as directed by the City Inspector, depending on smoothness and quality of the patch job.

Abbreviations
C/L Street Centerline
L/L Lane Line or Edge of Pavement

Notes:
1. Slurry Seal shall be Polymer/Latex Modified Type II for Residential Streets; and Type III for Collector and Arterial Streets, meeting City Standard Specifications.
2. HMA shall be 3/8-inch Type A and shall meet City Standard Specifications. Additional mitigation work may be required by the City Engineer if necessary to maintain the integrity of the pavement.

Standard Pavement Mitigation for Streets on Moratorium
FOR FIRE SERVICES AND WATER SERVICES WHERE REQUIRED BY CCR, TITLE 17, § 7604

*SEE SD-204 FOR ADDITIONAL REQUIREMENTS ON FIRE SERVICES 3" AND LARGER

FROM WATER METER OR FIRE SERVICE

PVC SLEEVE (SEE NOTE 4)

6" MIN

EDGE OF CONCRETE PAD

DOUBLE CHECK VALVE ASSEMBLY (SEE NOTE 1)

SHUTOFF VALVES

12" MIN

TO CUSTOMER

COLD JOINT AT BACK OF SIDEWALK (SEE NOTE 2)

12" MIN 36" MAX

SLOPE PAD TO DRAIN

CONCRETE PAD (SEE NOTE 3)

TEST COCKS

8" MIN

8" MIN

8" MIN

PROTECTIVE ENCLOSURE FOR ASSEMBLIES SMALLER THAN 2.5" (SEE NOTE 8)

WHERE THRUST SLAB USED, EMBED VALVE SETTER FITTING OR TWO (2) 3/8" ZINC COATED THREADED RODS (BOLTED TO PIPE FLANGES, 1 EA SIDE) IN SLAB, MIN. COVERAGE 2" ALL SIDES

FOR ASSEMBLIES 4" & LARGER, THRUST BLOCKS OR SLAB PER SD-207 (TREAT 4" PIPE SAME AS 6")

NOTES:

1. ALLOWED BACKFLOW ASSEMBLIES AND THEIR ORIENTATIONS SHALL BE LIMITED TO THOSE SPECIFIED ON THE "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES," BY THE UNIVERSITY OF SOUTHERN CALIFORNIA'S FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH, 2010 OR LATEST REVISION.

2. THE BACKFLOW DEVICE SHALL BE LOCATED: (A) A MAXIMUM OF 5' FROM BACK OF SIDEWALK (TYP); (B) WHERE SCREENING IS REQUIRED, A MAXIMUM OF 30' FROM BACK OF SIDEWALK; OR (C) AT A LOCATION DETERMINED BY THE WATER DISTRIBUTION CROSS CONNECTION PERSONNEL IN THE FIELD.

3. CONCRETE PAD SHALL BE CLASS B CONCRETE, 4" MINIMUM THICKNESS, REINFORCED WITH WELDED WIRE MESH.

4. WHERE SERVICE LINES SMALLER THAN 4" PASS UNDER A SIDEWALK, THEY SHALL BE INSTALLED IN A PVC CASING/SLEEVE AT LEAST 1" LARGER THAN THE SERVICE LINE AND EXTENDS AT LEAST 6" BEYOND THE EDGES OF THE SIDEWALK.

5. METAL PIPES EXPOSED TO SOIL OR CONCRETE SHALL BE COATED WITH 3M SCOTCHWRAP PIPE PRIMER AND WRAPPED WITH 3M SCOTCHWRAP NO. 91 BLACK PVC TAPE (1/4" OVERLAP).

6. THE PORTION OF THE TRENCH FROM BACK OF METER TO THE DEVICE SHALL REMAIN OPEN UNTIL WATER DISTRIBUTION CROSS CONNECTION PERSONNEL HAVE INSPECTED AND APPROVED THE INSTALLATION.

7. THE TESTING SIDE OF THE DEVICE SHALL HAVE A MINIMUM 24" OF CLEARANCE FROM OBSTRUCTIONS (NON-TRIMMABLE LANDSCAPING, BUILDINGS, UTILITIES, ETC.). MULTIPLE BACKFLOW DEVICES SHALL BE SEPARATED BY A MINIMUM OF 19".

8. BACKFLOW ASSEMBLIES SMALLER THAN 2.5" SHALL BE COVERED WITH AN INSULATION BLANKET, MIN R-13, GREEN, WEATHERGUARD OR EQUAL AND PROTECTED BY A LOCKABLE WIRE CAGE ENCLOSURE FASTENED TO THE PAD. THE ENCLOSURE SHALL BE HINGED, POWDER COATED GREEN AND SECURED WITH A DOUBLE-LOCKED GALVANIZED CHAIN SUCH THAT EITHER LOCK CAN RELEASE THE CHAIN. ONE LOCK WILL BE SUPPLIED BY CITY.

9. BACKFLOW ASSEMBLIES 2.5" AND LARGER SHALL BE SECURED BY A DOUBLE-LOCKED, GALVANIZED, STRAIGHT LINK CHAIN THAT LOCKS THE VALVE HANDWHEELS IN THE OPEN POSITION AND EITHER LOCK CAN RELEASE THE CHAIN. ONE LOCK WILL BE SUPPLIED BY CITY. IN AREAS PRONE TO VANDALISM, CITY MAY ADDITIONALLY REQUIRE A LOCKABLE PROTECTIVE ENCLOSURE (SEE NOTE 8).

10. BOLLARDS MAY BE REQUIRED BY CITY TO PROVIDE ADDITIONAL PROTECTION (SEE SD-223 FOR BOLLARD DETAIL).

11. BACKFLOW ASSEMBLIES INSTALLED ON POTABLE WATER SERVICES SHALL BE LEAD FREE.

12. BACKFLOW ASSEMBLIES SHALL BE AT LEAST THE SIZE OF THE WATER METER OR THE WATER SUPPLY LINE ON THE PROPERTY SIZE OF THE METER, WHICHEVER IS LARGER.
FOR IRRIGATION AND WATER SERVICES
WHERE REQUIRED BY CCR, TITLE 17, § 7604

PLAN VIEW

PROTECTIVE ENCLOSURE
FOR ASSEMBLIES SMALLER
THAN 2.5" (SEE NOTE 6)

COLD JOINT AT BACK OF
SIDEWALK (SEE NOTE 2)

FOR ASSEMBLIES 4" & LARGER, THRUST
BLOCKS OR SLAB PER SD-207
(TREAT 4" PIPE SAME AS 6")

PROFILE VIEW

NOTES:

1. ALLOWED BACKFLOW ASSEMBLIES AND THEIR ORIENTATIONS SHALL BE LIMITED TO THOSE SPECIFIED ON THE "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES," BY THE UNIVERSITY OF SOUTHERN CALIFORNIA'S FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH. 2010 OR LATEST REVISION.

2. THE BACKFLOW DEVICE SHALL BE LOCATED: (A) A MAXIMUM OF 5' FROM BACK OF SIDEWALK (TYP.); (B) WHERE SCREENING IS REQUIRED, A MAXIMUM OF 30" FROM BACK OF SIDEWALK; OR (C) AT A LOCATION DETERMINED BY THE WATER DISTRIBUTION CROSS CONNECTION PERSONNEL IN THE FIELD.

3. CONCRETE PAD SHALL BE CLASS B CONCRETE, 4" MINIMUM THICKNESS, REINFORCED WITH WELDED WIRE MESH.

4. WHERE SERVICE LINES SMALLER THAN 4" PASS UNDER A SIDEWALK, THEY SHALL BE INSTALLED IN A PVC CASING/SLEEVE AT LEAST 1" LARGER THAN THE SERVICE LINE AND EXTENDS AT LEAST 6" BEYOND THE EDGES OF THE SIDEWALK.

5. METAL PIPES EXPOSED TO SOIL OR CONCRETE SHALL BE COATED WITH 3M SCOTCHWRAP PIPE PRIMER AND WRAPPED WITH 3M SCOTCHWRAP NO. 51 BLACK PVC TAPE (3/4" OVERLAP).

6. THE PORTION OF THE TRENCH FROM BACK OF METER TO THE DEVICE SHALL REMAIN OPEN UNTIL WATER DISTRIBUTION CROSS CONNECTION PERSONNEL HAVE INSPECTED AND APPROVED THE INSTALLATION.

7. THE TESTING SIDE OF THE DEVICE SHALL HAVE A MINIMUM 24" OF CLEARANCE FROM OBSTRUCTIONS (NON-TRIMABLE LANDSCAPING, BUILDINGS, UTILITIES, ETC.). MULTIPLE BACKFLOW DEVICES SHALL BE SEPARATED BY A MINIMUM OF 18".

8. BACKFLOW ASSEMBLIES SMALLER THAN 2.5" SHALL BE COVERED WITH AN INSULATION BLANKET, MIN R-13, GREEN, WEATHERGUARD OR EQUAL AND PROTECTED BY A LOCKABLE WIRE CAGE ENCLOSURE FASTENED TO THE PAD. THE ENCLOSURE SHALL BE HINGED, POWDER COATED GREEN AND SECURED WITH A DOUBLE-LOCKED GALVANIZED CHAIN SUCH THAT EITHER LOCK CAN RELEASE THE CHAIN. ONE LOCK WILL BE SUPPLIED BY CITY.

9. BACKFLOW ASSEMBLIES 2.5" AND LARGER SHALL BE SECURED BY A DOUBLE-LOCKED, GALVANIZED, STRAIGHT LINK CHAIN THAT LOCKS THE VALVE HANDWHEELS IN THE OPEN POSITION AND EITHER LOCK CAN RELEASE THE CHAIN. ONE LOCK WILL BE SUPPLIED BY CITY. IN AREAS PRONE TO VANDALISM, CITY MAY ADDITIONALLY REQUIRE A LOCKABLE PROTECTIVE ENCLOSURE (SEE NOTE 8).

10. BOLLARDS MAY BE REQUIRED BY CITY TO PROVIDE ADDITIONAL PROTECTION (SEE SD-223 FOR BOLLARD DETAIL).

11. BACKFLOW ASSEMBLIES INSTALLED ON POTABLE WATER SERVICES SHALL BE LEAD FREE.

12. BACKFLOW ASSEMBLIES SHALL BE AT LEAST THE SIZE OF THE WATER METER OR THE WATER SUPPLY LINE ON THE PROPERTY SIZE OF THE METER, WHICHEVER IS LARGER.

STANDARD - REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTION ASSEMBLIES

Dwg. No.

SD-202

Filed

Sht. 1 of 1
### Minimum Excavation Dimensions

#### Case "A"

- For work being done under City of Hayward Contract
- 1. City will furnish and install tapping tee and tapping valve and make the Wet tap, at no expense to the Contractor.
- 2. City will furnish the valve box and cover, at no expense to the Contractor.

#### Case "B"

- For work being done under City of Hayward Permit and/or Subdivision
- 1. City will furnish and install tapping tee and tapping valve and make the Wet tap, at Permittee's expense.
- 2. City will furnish the valve box and cover, at Permittee's expense.

3. Contractor/Permittee shall make the necessary excavation conforming to the above dimensions.
4. Contractor/Permittee shall install thrust blocks, backfill, compact and install valve box per SD-205.
5. Excavation for pipes over 24 inches shall be as shown on the plan or as designated by the Engineer.
6. Centerline of tapping tee shall be a minimum of 3 fee from any existing joint or fitting.
CITY RESPONSIBILITY ENDS AT THE PROPERTY LINE (R), RIGHT-OF-WAY (R/W) OR EASEMENT, AS APPLICABLE TO THE LOCATION OF THE FIRE SERVICE, WITH THE EXCEPTION OF ANNUAL TESTING. CUSTOMER OWNS AND SHALL MAINTAIN ALL THE COMPONENTS OF THE FIRE SYSTEM WITHIN THE PROPERTY LINES (INCLUDING BUT NOT LIMITED TO, DCDA, PIV, FDC, CAGE, BOLLARDS, CHAINS, LOCKS, ETC.), WITH THE EXCEPTION OF THE CITY'S BYPASS METER.

FIRE SERVICE SCHEMATIC

SEE SD-201 FOR ADDITIONAL REQUIREMENTS

DCDA DETAIL, PLAN VIEW

TYPICAL DCDA PROFILE VIEW

CONFIGURABLE DCDA PROFILE VIEWS

STANDARD FIRE SERVICE 3" AND LARGER

SD-204
NOTES:
1. BACKFLOW ASSEMBLIES SHALL BE FACTORY ASSEMBLED, WITH THE EXCEPTION OF THE BYPASS METER. ALLOWED DCCAs AND THEIR ORIENTATIONS SHALL BE LIMITED TO THOSE SPECIFIED ON THE "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES," BY THE UNIVERSITY OF SOUTHERN CALIFORNIA'S FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH, 2010 OR LATEST REVISION.
2. FIRE SERVICES MAY BE INSTALLED BY A CONTRACTOR AS PART OF A WATER MAIN THAT THE CONTRACTOR IS CONSTRUCTING AFTER CITY HAS APPROVED PLANS DETAILING THE PROPOSED WATER MAIN AND FIRE SERVICES.
3. ALL PLANS DETAILING FIRE SERVICES SHALL BE APPROVED BY CITY PRIOR TO INSTALLATION.
4. ALL FIRE SERVICES TO BE CONNECTED TO EXISTING LIVE WATER MAINS AND ALL BYPASS/TRIM METERS SHALL BE INSTALLED BY WATER DIVISION PERSONNEL ONLY.
5. THE BACKFLOW DEVICE SHALL BE LOCATED: (A) A MAXIMUM OF 5' FROM BACK OF SIDEWALK (TYP); (B) WHERE SCREENING IS REQUIRED, A MAXIMUM OF 30' FROM BACK OF SIDEWALK; OR (C) AT A LOCATION DETERMINED BY THE WATER DISTRIBUTION CROSS CONNECTION PERSONNEL IN THE FIELD.
6. CONCRETE PAD SHALL BE CLASS B CONCRETE, 4" MINIMUM THICKNESS, REINFORCED WITH WELDED WIRE MESH.
7. THE PORTION OF THE TRENCH FROM BACK OF SIDEWALK TO THE DEVICE SHALL REMAIN OPEN UNTIL WATER DISTRIBUTION CROSS CONNECTION PERSONNEL HAVE INSPECTED AND APPROVED THE INSTALLATION.
8. THE TESTING SIDE OF THE DEVICE SHALL HAVE A MINIMUM 24" OF CLEARANCE FROM OBSTRUCTIONS (NON-TRIMMABLE LANDSCAPING, BUILDINGS, UTILITIES, ETC.). MULTIPLE BACKFLOW DEVICES SHALL BE SEPARATED BY A MINIMUM OF 18".
9. DCDCs SHALL BE SECURED BY A DOUBLE-LOCKED, GALVANIZED, STRAIGHT LINK CHAIN THAT LOCKS THE VALVE HAND-WHEELS OPEN, SUCH THAT EITHER LOCK CAN RELEASE THE CHAIN. ONE LOCK WILL BE SUPPLIED BY CITY. IN AREAS PRONE TO VANDALISM, A LOCKABLE PROTECTIVE ENCLOSURE MAY ALSO BE REQUIRED BY CITY (SEE SD-201).
11. BOLLARDS MAY BE REQUIRED BY CITY FOR ADDITIONAL PROTECTION (SEE SD-223 FOR BOLLARD DETAIL).
12. TOUCHREAD SENSOR OF BYPASS METER SHALL BE MOUNTED TO AND THROUGH THE SIDE OF THE PROTECTIVE ENCLOSURE OR, IF NO ENCLOSURE, ATTACHED TO THE DCCA, AS DETERMINED BY THE WATER DISTRIBUTION PERSONNEL IN THE FIELD. TOUCHREAD SENSOR WIRE SHALL BE NEATLY SECURED TO THE DCCA.
13. POST INDICATOR VALVE (PIV) AND FIRE DEPARTMENT CONNECTION (FDC) SHALL BE CONNECTED TO THE FIRE SYSTEM DOWNSTREAM OF THE DCCA, PER THE FIRE DEPARTMENT'S REQUIREMENTS.
14. BELOW GRADE OR INTERIOR INSTALLATIONS OF BACKFLOW DEVICES WILL ONLY BE CONSIDERED ON A CASE-BY-CASE BASIS AND WHEN SPACE LIMITATIONS PREVENT USE OF AN ABOVE GRADE DEVICE. SUCH INSTALLATIONS MAY REQUIRE THE ADDITION OF A BURIED DETECTOR CHECK VALVE ASSEMBLY INSTALLED BY CITY WATER DISTRIBUTION PERSONNEL.

FIRE SERVICES SHALL BE SIZED PER NFPA 24: MAY BE LESS THAN 6" Ø IF: (1) IT ONLY SUPPLIES WATER TO A SPRINKLER, WATER SPRAY, FOAM OR CLASS II STANDPIPE SYSTEM; AND (2) IT DOES NOT SUPPLY A PRIVATE HYDRANT.
NOTES:
1. Valve box shall be poured on fill compacted by mechanical tamper to 95% relative compaction.
2. Thrust blocks shall be formed with lumber. Forms shall be removed before backfill.
3. Thrust blocks shall be poured against undisturbed soil.
4. Valve box slab shall be formed square 3' x 3' x 8" in easements and landscaped areas.
5. Valve box slab shall be a minimum 3' dia. concentric circle in paved areas.
6. See SD-228 for installation of tracer wire. Tracer wire to be brought to the top of the extension outside of the 8" valve box extension pipe.

---

**STANDARD VALVE INSTALLATION**

**SECTION A-A**

**PLAN**

- Keep bells free of concrete
- Street grade
- Class "B" concrete
- 3' dia. in paved areas
- Standard traffic valve box & cover
  - See Sht. 2
- 8" PVC C900 extensions as required
  - See Sht. 3
- Class "C" concrete thrust block
- 1/2" chamfer in unpaved areas
- Ground level in landscaped areas
- Ground level outside of street areas
- 3'x3'x6" in easements & landscaped areas
- Redwood boards (typ)
- 1" Min clearance
- Pipe O.D. plus 6"
- 4" min bedding material
- 6" for 6" & 8" pipe
- 12" for 10" & 12" pipe
**TABLE OF APPROXIMATE DIMENSIONS**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>APPROX. WT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHRISTY G05T</td>
<td>13</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>12</td>
<td>72 lbs</td>
</tr>
<tr>
<td>BROOKS 3-RT</td>
<td>12</td>
<td>-</td>
<td>10</td>
<td>2</td>
<td>12</td>
<td>66 lbs</td>
</tr>
</tbody>
</table>

**CAST IRON TRAFFIC LID**

**LOCKING GRADE RING(S)**

**TRAFFIC VALVE BOX**

**CHRISTY G05T,**
**BROOKS 3-RT OR**
**APPROVED EQUAL**

**STANDARD VALVE BOX**
STANDARD GATE VALVE SHAFT EXTENSION

NOTE:
1. SEE SD-228 FOR INSTALLATION OF TRACER WIRE. TRACER WIRE TO BE BROUGHT TO THE TOP OF THE Extension OUTSIDE OF THE 8" VALVE BOX EXTENSION PIPE.
Drill and tap 1/2" N.C. x 3/4" deep for 1/2" x 1-1/2" stainless steel pin, thread 1/2" N.C. x 3/4". Square: 1-15/16" at top 2" at bottom

0.052" (6.4 mm) drill for 1/4" dia. x 2-1/8" brass shear pin (peen in). See notes 4 & 5.

Steadying plate, 1/4" x 7-1/2" + 0 - 1/6" 2 - 1-1/2" dia. holes

1-1/4" dia.

Valve key, 1/4" plate

A.W.W.A wrench nut

Valve stem

NOTES:
1. Coat entire assembly with mastic.
2. Peen top of shaft to secure 2" A.W.W.A. nut or secure by welding.
3. Replace brass shear pin at valve with stainless steel pin, drive fit.
4. Brass shear pin to be purchased, tested, and installed by City of Hayward. Pin is cut from free cutting brass rod, SAE CDA 360, half hard. Pin is designed to fail between 175 and 200 ft.-lbs. when tested in assembly.
5. Replacement pins must meet above specifications.
6. See sheet 3 for valve box extension.

STANDARD BUTTERFLY VALVE SHAFT EXTENSION
1. Concrete shall not extend beyond face of ball or joints.
2. Thrust blocks shall be formed with lumber.
3. Thrust blocks shall be poured against undisturbed soil.
4. Class "C" portland cement concrete shall be used.
5. Remove forms before backfill.
6. All below grade DIP shall be polywrapped; above grade shall be painted.
7. Thrust block at the bury can be omitted if all joints are restrained.
8. The center of a hose outlet shall be not less than 18" above final grade.
9. Breakaway bolts shall be used on the breakaway risers.
10. Tracer wire shall be installed from main to hydrant. Tracer wire to be taped to hydrant riser and shall extend 12" above finish grade. Tracer wire shall extend into valve box per SD-228. See SD-228 for wire type.
HYDRANT LOCATION STANDARDS

THE FOLLOWING SHALL APPLY TO THE LOCATION OF FIRE HYDRANTS AND SHALL TAKE PRECEDENCE WHEN IN CONFLICT WITH APPROVED PLANS:

1. FIRE HYDRANTS SHALL BE INSTALLED AS FOLLOWS:
   A. ONLY IN LOCATIONS APPROVED BY THE FIRE DEPARTMENT.
   B. WITHIN 5 FEET OF A CURB RETURN, WHERE PRACTICAL. IF THE DISTANCE TO THE NEXT CURB RETURN EXCEEDS THE ALLOWED DISTANCE TO A HYDRANT, AN ADDITIONAL HYDRANT SHALL BE PLACED NEAR THAT CURB RETURN AND AT MID-BLOCK.
   C. AT LEAST 5 FEET AWAY FROM ANY:
      • DRIVEWAY OR WHEELCHAIR RAMP;
      • POLE, LUMINAIRE OR STREET SIGN;
      • BUILDING ENTRY SIDEWALK.
   D. AT LEAST 10 FEET AWAY FROM ANY SEWER MAIN OR LATERAL.
   E. ALIGNED WITH A PROPERTY LINE, WHENEVER POSSIBLE.
   F. AT LEAST 10 FEET FROM ANY EXISTING PARALLEL PARKING SPACE.
   G. WITH PROTECTIVE RETAINING WALLS WHEN SUBJECT TO ENCROACHMENT BY AN ADJACENT SLOPE.
   H. WITHIN A 2-INCH TOLERANCE WHEN INSTALLED AT THE STANDARD 2'-0" DISTANCE FROM CURB FACE.
   I. WITH PROTECTIVE GUARD POSTS WHEN THERE IS NO CURB & GUTTER. SEE SD-223 FOR REQUIREMENTS.
   J. WITH BLUE RAISED REFLECTIVE PAVEMENT MARKERS PER CA MUTCD SECTION 38.11 AND FIGURE 38-102(CA).

2. PCC SIDEWALK SLABS SHALL BE CONSTRUCTED TO MATCH THE SIDEWALK GRADE.
   SEE SD-107 AND SD-108 FOR REQUIREMENTS.

3. NUMBER AND DISTRIBUTION OF FIRE HYDRANTS (PER CITY ORDINANCE 10-14, APPENDIX C, TABLE C105.1):

<table>
<thead>
<tr>
<th>DISTRICT TYPE</th>
<th>MINIMUM FIRE FLOW REQUIRED (GPM) (1)</th>
<th>MIN NUMBER OF HYDRANTS AVAILABLE TO BUILDING</th>
<th>AVERAGE HYDRANT SPACING (FT) (2)</th>
<th>MAX DISTANCE FROM HYDRANT TO ANY POINT ON STREET OR FRONTAGE (FT) (3)</th>
<th>TYPE OF HYDRANT REQUIRED (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential, Low Density</td>
<td>1,500</td>
<td>1</td>
<td>400</td>
<td>200</td>
<td>Modified Steamer</td>
</tr>
<tr>
<td>Residential, Med. Density</td>
<td>3,000</td>
<td>3</td>
<td>400</td>
<td>200</td>
<td>Double Steamer</td>
</tr>
<tr>
<td>Residential, High Density</td>
<td>4,500</td>
<td>5</td>
<td>300</td>
<td>200</td>
<td>Double Steamer</td>
</tr>
<tr>
<td>Commercial/Industrial</td>
<td>5,000</td>
<td>5</td>
<td>300</td>
<td>200</td>
<td>Double Steamer</td>
</tr>
<tr>
<td>Civic (Hospitals, Schools, etc.)</td>
<td>4,000</td>
<td>4</td>
<td>300</td>
<td>200</td>
<td>Double Steamer</td>
</tr>
</tbody>
</table>

**TABLE NOTES:**
(1) Fire Flow is calculated at 20 psi residual pressure.
(2) a. Reduce spacing by 100 feet for dead-end streets or roadways.
   b. Spacing shall average 500 feet on each side where streets are provided with median dividers or arterial streets are provided with four or more traffic lanes.
   c. Where new water mains are extended along streets, where hydrants are not needed for protection of structures or similar fire problems, fire hydrants should be spaced at not less than 1,000 feet to provide for transportation hazards.
(3) Reduce by 50 feet for dead-end streets or roadways.
(4) Modified Steamer hydrants shall be Clow Valve Co. Model LB 614 (similar to Model 950), with 1 x 2.5" and 1 x 4.5" outlet.
   Double Steamer hydrants shall be Clow Valve Co. Model 865, with 1 x 2.5" and 2 x 4.5" outlets.
NOTES:
1. Concrete shall not extend beyond face of bell or joints.
2. Thrust blocks shall be formed with lumber.
3. Thrust blocks shall be poured against undisturbed soil.
4. Class "C" portland cement concrete shall be used.
5. Remove forms before backfill.

9" Min. for 6", 8" & 10" pipe
12" Min. for 12" pipe

SECTION A-A

PLAN

Thrust block for vertical bends

Bottom of trench for vertical bends

2'-0" Min. for 6" and 8" pipe
3'-0" Min. for 10" pipe
3'-6" Min. for 12" pipe

6" Min.

CITY OF HAYWARD
ENGINEERING DIVISION

STANDARD THRUST BLOCKS FOR HORIZONTAL & SAG BENDS 22½° OR MORE

CITY ENGR.

DIRE. PUBLIC WORKS

DWG. NO. SD-207

Filing Date: 11-1-88

Page 1 of 1
NOTES:
1. Thrust block shall be poured against undisturbed soil.
2. Class "C" portland cement concrete shall be used.
3. Concrete shall not extend beyond face of bell or joints.
4. Crest vertical bends shall not exceed 45° without the written approval of the Engineer.

Volume of thrust blocks in Table 1 calculated from formula

\[ V = \frac{2pA \sin \frac{A}{2}}{4050} \]

Where \( p = 200 \text{ psi} \) and \( A = \text{area of pipe in sq. in.} \)

TOTAL VOLUME OF THRUST BLOCK (IN CUBIC YARDS)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Vertical Deflection Angle (Δ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11°</td>
</tr>
<tr>
<td></td>
<td>22-1/2°</td>
</tr>
<tr>
<td></td>
<td>45°</td>
</tr>
<tr>
<td>6&quot;</td>
<td>0.5</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1.0</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1.5</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2.2</td>
</tr>
</tbody>
</table>

TABLE 1

CITY OF HAYWARD ENGINEERING DIVISION

STANDARD THRUST BLOCK
CREST VERTICAL BEND

DRAWN BY: FAP
CHECKED BY: BWS
APPROVED BY: WD
REV.: DATE: 6-15-93

SCALE: 1" = 1'-0"
Dwg. NO. SD-208
SHT. 1 OF 1
NOTES:
1. Thrust blocks shall be poured against undisturbed soil.
2. Thrust blocks shall be formed.
3. Remove forms before backfill.

Class "C" concrete thrust blocks.
Some dimensions and reinforcing for both thrust blocks.

No. 4 reinforcing bars

ELEVATION

Bedding material

SECTION XX

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Min. Dimensions - each block</th>
<th>Total Vol. 2 blocks Cu. Yd.</th>
<th>Total Steel 2 blocks Lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delta</td>
<td>A''</td>
<td>B''</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>11 1/2</td>
<td>22 1/2</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>45</td>
<td>50</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>11 1/4</td>
<td>22 1/2</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>45</td>
<td>50</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>11 1/4</td>
<td>22 1/2</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>45</td>
<td>36</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>11 1/4</td>
<td>22 1/2</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>45</td>
<td>36</td>
<td>30</td>
<td>36</td>
</tr>
</tbody>
</table>

Above table is for test pressure not exceeding 200 PSI

NOTES:
4. Crest vertical bends shall not exceed 45°
   without the written approval of the Engineer.
NOTES:
1. Concrete shall not extend beyond face of bell or joints.
2. Thrust blocks shall be formed with lumber.
3. Thrust blocks shall be poured against undisturbed soil.
4. Class "C" portland cement concrete shall be used.
5. Remove forms before backfill.

10' Min. for 12" pipe
9" Min for 8" & 10" pipe
6" Min. for 6" pipe

3-6" Min for 12" pipe
2-0" Min for 6" & 8" pipe
3-0" Min for 10" pipe

9" Min for 8" & 10" pipe
12" Min for 12" pipe

10' Min. for 10' pipe
NOTES:
1. Thrust blocks shall be formed with lumber.
2. Thrust blocks shall be poured against undisturbed soil.
3. Remove forms before backfill.

THRUST BLOCK DIMENSIONS

<table>
<thead>
<tr>
<th>Block</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>B</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
</tbody>
</table>
| C     | 0'-6" | 1'-0" | 0'-6" | 1'-0"

Class "C" concrete slab

PLAN

Pipe size
P/L For main extension

Blow off station

Std. traffic valve box and cover. See SD-205

Trench bottom

M J plug tapped 2"

ELEVATION

CITY OF HAYWARD
ENGINEERING DIVISION

STANDARD BLOW OFF FOR DEAD ENDS

DWG. SD-211
FILED 6-15-93
SHT. 1 OF 1
NOTES:

1. The future extension stub shall be tested and chlorinated with the rest of the main and blown off through the galvanized iron pipe.

2. Blow-off shall be 2" galv. iron pipe (6" & 9" main) or 4" galv. iron pipe (10" & 12" main).

3. Traffic valve box for blow off riser pipe and valves and valve box installation shall conform to SD-205.

**Minimum Dimensions For Collar Thrust Block**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
<td>6&quot;</td>
<td>2'-6&quot;</td>
<td>0&quot;-6&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1'-6&quot;</td>
<td>1'-6&quot;</td>
<td>8&quot;</td>
<td>2'-9&quot;</td>
<td>0'-6&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>10&quot;</td>
<td>3'-0&quot;</td>
<td>0'-6&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2'-3&quot;</td>
<td>3'-0&quot;</td>
<td>1'-0&quot;</td>
<td>3'-3&quot;</td>
<td>0'-9&quot;</td>
</tr>
</tbody>
</table>

NOTES:

4. Concrete shall not extend beyond face of bell or joints. **DETAIL A**
5. Thrust blocks shall be formed with lumber.
6. Thrust blocks shall be poured against undisturbed soil.
7. Remove forms before backfill.
8. Polywrap all ductile iron pipe per specification.

CITY OF HAYWARD
ENGINEERING DIVISION

STANDARD
BLOW OFF FOR
FUTURE EXTENSION

FILE: 9-25-02
SHT. ___ of ___
NOTES:
1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. All connections to copper tubing shall be flared.
3. Water Department only will install meter.
4. Water meter shall be located a minimum of 2' away from top of driveway flare or any other facility.

<table>
<thead>
<tr>
<th>WATER MAIN SIZE</th>
<th>METER BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot;</td>
<td>Christy B-09, Brooks No.36 or approved equal</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>Christy B-16, Brooks No.37 or approved equal</td>
</tr>
<tr>
<td>1&quot;</td>
<td>Christy B-16, Brooks No.37 or approved equal</td>
</tr>
</tbody>
</table>

**SADDLES REQUIRED FOR CORPORATION STOP TAP**

<table>
<thead>
<tr>
<th>WATER MAIN SIZE</th>
<th>TYPE</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; and larger</td>
<td>DIP</td>
<td>J-979 or H-16102 through H-16116</td>
<td>J-979 or H-16102 through H-16116</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
<td>J-996 or H-13490 through H-13494</td>
<td>J-996 or H-13490 through H-13494</td>
</tr>
</tbody>
</table>

1. Service Saddle, double strap & all bronze
2. Corporation Stop, H-10013, 3/4" or 1"
3. Coupling, H-15451
4. Copper Tubing, Type K, 3/4" or 1"
5. Coupling, H-15428
6. Angle Meter Stop, H-14265
NOTES:
1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. Water Department only will install meter.
3. Tracer wire shall be installed from tap to meter box. Tape wire to tubing at tap location without contact with bronze fittings. Wire shall be copper, type THHN wire size A.W.G. #12.
4. Stainless steel liners shall be used with all compression fittings.
5. Water meter shall be located a minimum of 2' away from top of driveway flare or any other facility.
6. Polyethylene pipe ends shall be trimmed with Mueller H-18017 tool or equal.

1. Service Saddle, double strap & all bronze
2. Corporation Stop, H-10013
3. Coupling ¾” H-15456
4. ¾” Polyethylene tubing
5. Angle meter stop, H-14266

<table>
<thead>
<tr>
<th>WATER MAIN</th>
<th>TAP</th>
<th>CORP. STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; and larger</td>
<td>DIP Saddle: J-979 or H-16102 through H-16116</td>
<td>H-10013</td>
</tr>
<tr>
<td></td>
<td>PVC Saddle: J-996 or H-13490 through H-13494</td>
<td></td>
</tr>
</tbody>
</table>

---

**Finished S/W Grade**

- 1" thick Rwd. board to cover entire bottom of box
- ¾" Polyethylene (iron pipe size only)
- Curb line
- 90°

**UNSTERILIZED MAIN ONLY**
(Do NOT connect to any sterilized main that has been accepted by the City)

---

**STANDARD PLASTIC 5/8" & 3/4" SINGLE WATER SERVICE CONNECTION**

---

**METER SIZE** | **METER BOX**
--- | ---
5/8" and ¾" | Christy B-09,
| Brooks No.36 or approved equal |
NOTES:
1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. Water Department only will install meter.
3. Tracer wire shall be installed from tap to meter box. Tape wire to tubing at tap location without contact with bronze fittings. Wire shall be copper, type THHN wire size A.W.G. #12.
4. Polyethylene pipe ends shall be trimmed with Mueller H-18017 tool or equal.
5. Stainless steel liners shall be used with all compression fittings.
6. Water meter shall be located a minimum of 2 feet away from top of driveway flare or any other facility.

<table>
<thead>
<tr>
<th>WATER MAIN SIZE</th>
<th>TAP</th>
<th>CORP. STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; and larger</td>
<td>DIP</td>
<td>H-10013</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
<td></td>
</tr>
</tbody>
</table>

1. Service Saddle, double strap & all bronze
2. Corporation Stop, H-10013
3. Coupling H-15456
4. Polyethylene (iron pipe size) Type 3408 NSF
5. Angle meter stop, H-14266 with Insta-Tite

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>METER BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾&quot;</td>
<td>Christy B-09, Brooks No.36 or approved equal</td>
</tr>
<tr>
<td>1&quot;</td>
<td>Christy B-16, Brooks No.37 or approved equal</td>
</tr>
</tbody>
</table>

**HAYWARD PUBLIC WORKS DEPT.**

**STANDARD ¾" & 1" CONSUMER WATER SERVICE CONNECTION PE WITH INSTA - TITE**

**DRAWN BY:** AL  **DATE:** 11/30/12

**CHECKED BY:** JF  **SCALE:** NTS

**APPROVED BY:**  **REV:**

**SD-215**

**SHT:** 1 OF 1
EXAMPLES OF RESIDENTIAL WATER SERVICES AND FIRE PROTECTION SYSTEMS

(FOR ILLUSTRATIVE PURPOSES ONLY - LAYOUTS NOT TO BE CONSIDERED AS RECOMMENDED OR APPROVED,
NOT ALL POSSIBILITIES SHOWN, MAY NOT COMPLY WITH SOME BUILDING CODES)

FIGURE 1A - SEPARATE SERVICES,
CLOSED SYSTEM, BRANCHED

FIGURE 1B - SEPARATE SERVICES,
FLOW-THROUGH SYSTEM, SINGLE-MEANDER

FIGURE 2A - COMBINED SERVICES,
CLOSED SYSTEM, BRANCHED

FIGURE 2B - COMBINED SERVICES,
FLOW-THROUGH SYSTEM, LOOPED

FIGURE 3A - COMBINED SERVICES,
MULTI-PURPOSE SYSTEM, SINGLE MEANDER

FIGURE 3B - COMBINED SERVICES,
MULTI-PURPOSE SYSTEM, LOOPED

STANDARD RESIDENTIAL DOMESTIC
AND FIRE SERVICES
1", 1.5" & 2"

CITY OF
HAYWARD
PUBLIC WORKS - U&S

DRAWN BY: RS
DATE: 11/05/2013
SCALE: NTS
APPROVED

REV DATE BY:
CITY ENGINEER
DDL PUBLIC WORKS - U&S

DWG. NO.
SD-216
FILED

SHT. 1 OF 3
TERMS AND DEFINITIONS

1. RESIDENTIAL WATER SERVICES, ONE AND TWO FAMILY, 2" OR SMALLER

1.1. SEPARATE SERVICES: THE DOMESTIC SYSTEM AND STAND-ALONE FIRE PROTECTION SYSTEM ARE EACH SUPPLIED BY A SEPARATE SERVICE LINE AND METER. (SEE FIGURES 1A & 1B)


2. RESIDENTIAL FIRE PROTECTION SYSTEMS

2.1. STAND-ALONE: SEPARATE AND INDEPENDENT FROM THE DOMESTIC SYSTEM.

2.1.1. CLOSED: DOES NOT CONNECT TO ANY DOMESTIC WATER FIXTURES AND CAN ONLY BE Drained THROUGH A RELIEF OR DRAIN VALVE. AT A MINIMUM, A DOUBLE CHECK VALVE ASSEMBLY (DCVA) BACKFLOW DEVICE (PER SD-201) IS REQUIRED ON ALL CLOSED SYSTEMS TO PROTECT THE DOMESTIC WATER SUPPLY. (SEE FIGURES 1A & 2A)

2.1.2. FLOW-THROUGH: CONNECTS TO ONE OR MORE DOMESTIC WATER FIXTURES SUCH THAT WATER IN THE SYSTEM IS REPLACED UPON USE OF THE FIXTURE(S). FLOW-THROUGH SYSTEMS MUST BE LOOPED OR SINGLE-MEANDER. (SEE FIGURES 1B & 2B)

2.2. MULTI-PURPOSE: USES THE SAME DISTRIBUTION PIPING WITHIN THE STRUCTURE TO SUPPLY THE DOMESTIC WATER FIXTURES AND FIRE SPRINKLERS. MULTI-PURPOSE SYSTEMS MUST BE LOOPED OR SINGLE-MEANDER, IF ALLOWED. (SEE FIGURES 3A & 3B)

3. FIRE SPRINKLER PIPING LAYOUTS

3.1. BRANCHED: HAS DEAD-ENDS AT SOME SPRINKLER HEADS WHERE WATER COULD STAGNATE. (SEE FIGURES 1A & 2A)

3.2. LOOPED: HAS NO DEAD-ENDS AND FORMS ONE OR MORE LOOPS SUCH THAT WATER CAN CIRCULATE. (SEE FIGURES 2B & 3B)

3.3. SINGLE-MEANDER: ALL SPRINKLER HEADS ARE CONNECTED IN SERIES BY A SINGLE PIPING RUN. (SEE FIGURES 1B & 3A)

NOTES

1. RESIDENTIAL FIRE PROTECTION SYSTEMS SHALL BE DESIGNED BY A C-16 (FIRE PROTECTION) CALIFORNIA LICENSED CONTRACTOR OR A CALIFORNIA REGISTERED PROFESSIONAL ENGINEER (CIVIL, MECHANICAL, OR FIRE PROTECTION), AND PURSUANT TO THE CITY’S LATEST ADOPTED CALIFORNIA CODES & REGULATIONS INCLUDING, BUT NOT LIMITED TO: FIRE CODE (SEC. 903); CA RESIDENTIAL CODE (SEC. R313); NFPA 13D; CALIFORNIA DATA CODE (SEC. 604.4.16); CA ELECTRICAL CODE (ART. 760); NFPA 72; AND CALIFORNIA HEALTH & SAFETY CODE 1311.4.7.

2. WATER SERVICES, FLOW-THROUGH AND MULTI-PURPOSE SYSTEMS WILL BE REVIEWED BY THE PUBLIC WORKS DEPARTMENT, UTILITIES & ENVIRONMENTAL SERVICES (UTILITIES), FIRE PROTECTION SYSTEMS WILL BE REVIEWED BY THE FIRE DEPARTMENT. FLOW-THROUGH AND MULTI-PURPOSE SYSTEMS WILL BE REVIEWED BY BOTH THE BUILDING AND FIRE DEPARTMENTS.

3. THE DESIGN WATER PRESSURE FOR ALL FIRE PROTECTION SYSTEMS SHALL BE EITHER A MAXIMUM OF 80 PSI OR THE ACTUAL SUPPLY PRESSURE, WHICHEVER IS LOWER.

4. THE FIRE SPRINKLER SYSTEM DEMAND FLOW RATE FOR COMBINED SERVICES THAT DO NOT INCLUDE A BACKFLOW DEVICE SHALL INCLUDE AN ADDITIONAL 5 GPM AT THE POINT WHERE THE SYSTEMS ARE CONNECTED (R313.3.5). IF THE TOTAL DEMAND EXCEEDS 160 GPM, THEN THE USE OF A SEPARATE FIRE SERVICE WILL BE REQUIRED.

4.1. DOMESTIC AND IRRIGATION SYSTEMS: THE SIZE OF THE METER, SUPPLY AND SERVICE LINES SHALL BE SIZED PER 80% OF THE MAXIMUM FLOW RATING OF THE METER. PER AWWA, THE 80% MAX FLOW RATING OF DISPLACEMENT METERS ARE:

<table>
<thead>
<tr>
<th>Size</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>15 GPM</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25 GPM</td>
</tr>
<tr>
<td>4&quot;</td>
<td>40 GPM</td>
</tr>
<tr>
<td>6&quot;</td>
<td>60 GPM</td>
</tr>
</tbody>
</table>

5. FLOW-THROUGH AND MULTI-PURPOSE SYSTEMS SHALL HAVE LEAD-FREE SPRINKLER HEADS, VALVES AND FITTINGS (CA AB 1953).

6. IN MULTI-PURPOSE SYSTEMS, IF A WATER SOFTENER OR FILTRATION DEVICE WILL BE USED THAT MAY RESTRICT FLOW OR REDUCE WATER PRESSURE TO THE FIRE SPRINKLERS, THE DEVICE MUST BE INCLUDED IN THE DESIGN OF THE SYSTEM.

7. SERVICE AND METER SIZING

a) METERS SHALL BE THE SAME SIZE AS THE SERVICE LINE FROM THE WATER MAIN.

b) DOMESTIC, IRRIGATION AND FIRE SERVICE LINES SHALL BE THE SAME SIZE OR SMALLER THAN THE METER SIZE.

c) MANIFOLDS THAT SUPPLY "GANGED" METERS ARE NOT ALLOWED TO SUPPLY FIRE PROTECTION SYSTEMS.

1.1. DOMESTIC AND IRRIGATION SYSTEMS: THE SIZE OF THE METER, SUPPLY AND SERVICE LINES SHALL BE SIZED PER 80% OF THE MAXIMUM FLOW RATING OF THE METER. PER AWWA, THE 80% MAX FLOW RATING OF DISPLACEMENT METERS ARE:

<table>
<thead>
<tr>
<th>Size</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>15 GPM</td>
</tr>
<tr>
<td>3&quot;</td>
<td>25 GPM</td>
</tr>
<tr>
<td>4&quot;</td>
<td>40 GPM</td>
</tr>
<tr>
<td>6&quot;</td>
<td>60 GPM</td>
</tr>
</tbody>
</table>

2.2. MULTI-PURPOSE AND SEPARATE FIRE SYSTEMS: THE SIZE OF THE METER, SUPPLY AND SERVICE LINES SHALL BE SIZED PER THE MAXIMUM INTERMITTENT FLOW RATING OF THE METER. PER AWWA, THE MAX INTERMITTENT FLOW RATING OF DISPLACEMENT METERS ARE:

<table>
<thead>
<tr>
<th>Size</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>50 GPM</td>
</tr>
<tr>
<td>1.5&quot;</td>
<td>100 GPM</td>
</tr>
<tr>
<td>2&quot;</td>
<td>150 GPM</td>
</tr>
</tbody>
</table>

8. FIRE AND COMBINED SERVICES SHALL CONFORM TO SD-213 FOR 1" SERVICES AND SD-217 FOR 1.5" AND 2" SERVICES EXCEPT AS SPECIFIED HEREIN. OTHERWISE, SERVICE CONNECTIONS 2" AND SMALLER SHALL CONFORM TO STANDARD DETAILS SD-213 THRU SD-215 AND SD-217 THRU SD-219.

9. ALL HOSE BIBS AND IRRIGATION SYSTEMS SHALL BE EQUIPPED WITH ATMOSPHERIC VACUUM BREAKERS/ANTI-SIPHON DEVICES.

10. AS A CONDITION OF FINAL APPROVAL, THE OWNER/DEVELOPER/CONTRACTOR SHALL INSTALL A VALVE SIGN OR TAG AT THE MAIN SHUTOFF VALVE TO THE WATER DISTRIBUTION SYSTEM (ITEM #17 SHEET 3) WITH THE FOLLOWING TEXT: "WARNING THE WATER SYSTEM FOR THIS HOME SUPPLIES FIRE SPRINKLERS THAT REQUIRE CERTAIN FLOWS AND PRESSURES TO FIGHT A FIRE. DEVICES THAT RESTRICT THE FLOW OR DECREASE THE PRESSURE OR AUTOMATICALLY SHUT OFF THE WATER TO THE FIRE SPRINKLER SYSTEM, SUCH AS WATER SOFTENERS, FILTRATION SYSTEMS AND AUTOMATIC SHUTOFF VALVES, SHALL NOT BE ADDED TO THIS SYSTEM WITHOUT A REVIEW OF THE FIRE SPRINKLER SYSTEM BY A FIRE PROTECTION SPECIALIST. DO NOT REMOVE THIS SIGN. (CA R313.3.7) THE SIGN OR TAG SHALL BE OF MATERIAL SUITABLE FOR WET BURRALL. MIN. TEXT HEIGHT 0.2 INCHES.

STANDARD RESIDENTIAL DOMESTIC AND FIRE SERVICES

1", 1.5" & 2"
FIRE SERVICE TEE DETAILS FOR COMBINED SERVICES
(SOME FITTINGS OR COMPONENTS NEEDED MAY NOT BE SHOWN OR LISTED)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CURB STOP WITH LOCK WING</td>
</tr>
<tr>
<td>2</td>
<td>BRASS NIPPLE</td>
</tr>
<tr>
<td>3</td>
<td>BRASS TEE</td>
</tr>
<tr>
<td>4</td>
<td>BRASS NIPPLE</td>
</tr>
<tr>
<td>5</td>
<td>METER COUPLING</td>
</tr>
<tr>
<td>6</td>
<td>WATER METER</td>
</tr>
<tr>
<td>7</td>
<td>ANGLE METER STOP WITH LOCK WINGS</td>
</tr>
<tr>
<td>8</td>
<td>METER BOX, CHRISTY 816 (OR APPROVED EQUAL)</td>
</tr>
<tr>
<td>9</td>
<td>METER BOX, CHRISTY 89 (OR APPROVED EQUAL)</td>
</tr>
<tr>
<td>10</td>
<td>METER BOX, CHRISTY N36 (OR APPROVED EQUAL)</td>
</tr>
<tr>
<td>11</td>
<td>BRASS METER FLANGE WITH BRASS BOLTS AND NUTS</td>
</tr>
</tbody>
</table>

SEE SD-213 FOR ADDITIONAL MATERIALS AND REQUIREMENTS
DETAIL 1A - 1" FIRE & 1" DOMESTIC SERVICES, DUAL BOX

DETAIL 1B - 1" FIRE & 1" DOMESTIC SERVICES, SINGLE BOX

SEE SD-217 FOR ADDITIONAL MATERIALS AND REQUIREMENTS
DETAIL 2 - 1.5" OR 2" FIRE SERVICE & 1" TO 2" DOMESTIC SERVICE, DUAL BOX

STANDARD
RESIDENTIAL DOMESTIC AND FIRE SERVICES
1", 1.5" & 2"
NOTES:
1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. All connections to copper tubing except 2" shall be flared. 2" copper shall be installed in straight lengths with sweat fittings as required.
3. Water Department only will install meter.
4. Water meter shall be located a minimum of 2' away from top of driveway flare or any other facility.

1. Service Saddle, double strap and all bronze
2. Corporation Stop, H-15023
3. Copper tubing, Type "K"
4. Coupling, H-15428
5. Flanged angle meter stop, H-14286

---

SADDLES REQUIRED FOR CORPORATION STOP TAP

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STANDARD WATER SERVICE CONNECTION 1½" & 2" COPPER

---

**NOTES:**

1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. All connections to copper tubing except 2" shall be flared. 2" copper shall be installed in straight lengths with sweat fittings as required.
3. Water Department only will install meter.
4. Water meter shall be located a minimum of 2' away from top of driveway flare or any other facility.

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STANDARD WATER SERVICE CONNECTION 1½" & 2" COPPER

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STANDARD WATER SERVICE CONNECTION 1½" & 2" COPPER

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**NOTES:**

1. The water service piping shall be run in a straight line perpendicular to the curb from main to meter location.
2. All connections to copper tubing except 2" shall be flared. 2" copper shall be installed in straight lengths with sweat fittings as required.
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NOTES:
1. The water service piping shall be run in a straight line perpendicular to the curb.
2. Where meter serves two lots, service and meter box must be centered on common property line.
3. Water Department only will install meter.
4. Tracer wire shall be installed from top to meter box. Tape wire to tubing at top location without contact with bronze fittings. Wire shall be copper, Type THHN wire size AWG #12.
5. Stainless steel liners shall be used with all compression fittings.
6. Water meter shall be located a minimum of 2' away from top of driveway flare or any other facility.
7. Polyethylene pipe ends shall be trimmed with Mueller H-18017 tool or equal.
8. For use on domestic & irrigation services only. Not for use on fire or combined services.

<table>
<thead>
<tr>
<th>SIZE</th>
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<th>CORP. STOP</th>
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<td>4&quot;</td>
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<td></td>
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1. Saddle, double strap and all bronze
2. Corporation stop, 1" H-15456
3. Coupling 1" H-15456
4. 1" Polyethylene (Iron pipe size only)
   Type 3408 NSF
5. U-Branch (6" wide) 1"x ¾" H-15364
6. Angle stop, Mueller ¾" H-14265

METER BOX
Christy B-24, Brooks No.11 or approved equal

Unsterilized Main Only
(Do Not connect to any sterilized main that has been accepted by the City.)
Riser pipe and house lateral shall be same size as meter but not less than ½".

Manifold shall be the same size as the service lateral and shall be all brass.

Water main

Face of curb

Angle stop installed in City-approved valve box.

Copper to building (typ.)

NOTES:
1. Service line shall be Copper, type "K".
2. Manifold installation requires 15" from face of curb to center of angle stop (springline).
3. Water meter shall be located a minimum of 2' clear from top of driveway flare.
1. Concrete shall not extend past face of bell or joints.

2. Thrust blocks shall be formed with lumber.

3. Thrust blocks shall be poured against undisturbed soil.

4. Class "C" Portland cement concrete shall be used.

5. Remove forms before backfilling.

6. See SD-228 for installation of tracer wire when PVC is used.
PLAN

NOTES:

1. Valve boxes shall be installed at all buried valves.

2. Valves less than 4” shall be provided with handwheels. All others shall be furnished with a 2” square nut.
NOTES:

1. All taps on steel mains shall be attached by welded coupling method. Clamp with nylon bushing shall be used on service saddles.

2. Taps shall not be closer than 12" from another tap.

3. Coat welded coupling on steel main with same protective coating as on main, or as specified by the City Engineer.

4. Install service line as shown on SD-213 through SD-219.

5. Service line shall be located 2 feet minimum away from top of driveway flare and 6 feet minimum from sanitary sewer house lateral.

6. A "W" is to be chiseled or stamped and painted red on face of curb at service location.

7. Wet tap shall be made by City Water Distribution Personnel ONLY.
MARKER POST

NOTES:

1. Where permanent curbs exist, references shall be inscribed on top of curb at point nearest to the facility.

2. A marker post shall be erected where there are no permanent curb.

3. Marker posts and their markings shall face the facility.

4. Location of marker posts shall be as directed by the City Engineer.

5. Distance from face of curb or marker post to facility shall be shown in Roman Numerals, to the nearest whole foot.

Inscribe arrow on top of curb by chiseling and paint red
Inscribe numerals in face of curb by chiseling and paint red

1/8" Deep

FACILITY DESIGNATIONS

AV  Air Valve
BO  Blow Off
BV  Butterfly Valve
CTS  Cathodic Protection Test Station
ETS  Electrolysis Test Station
GV  Gate Valve
MH  Manhole
Mon  Monument
PRS  Pressure Regulating Station
4" Steel pipe filled with Class "C" concrete, painted with one coat synthetic red lead primer and one coat chrome yellow paint.

Alternate post to be installed where specified.

Class "C" concrete

1'-0" Dia.

2'-6"

2'-6"

3"

This installation shall be used in areas without curb and gutter.
NOTES:

1. All ductile iron pipe shall have a fusion bonded epoxy finish or shall be wrapped with polyethylene sheathing.

2. In lieu of thrust blocks, "Megalug" retainer glands as manufactured by EBAA Iron Inc. or equal may be utilized if properly designed and approved by the City Engineer.

3. This dimension shall be a minimum of 8' if the water main drop is necessary to avoid a pipe conveying sanitary sewer, storm drain, recycled water or hazardous fluids (Title 22 CCR, Div. 4, Ch.16, Art. 4).

4. Maximum depth of water main drop shall not exceed 9' without City Engineer's approval.

5. An inverted drop, or rise, may be used where a drop would exceed 9' depth, with City Engineer's approval. Minimum cover of water main shall be 30 inches.
PURPOSE:

To provide temporary water for construction and minimum fire protection to new developments prior to and for the activation of a new water system.

TEMPORARY SERVICE METER:

A "TEMPORARY PERMIT FOR WATER USE" shall be obtained when the required deposit is made by the applicant in the Revenue Office at City Hall, First Floor, 777 B Street, (510-583-4632). The construction meter or Hydrant RP Assembly can then be picked up in the Corporation Yard at the Water Distribution Office, 24504 Soto Road, (510-881-7933).

INSTALLATION:

All materials for the temporary service, excluding the City supplied construction meter or Hydrant RP Assembly, shall be supplied by the applicant. The installation shall be made by the applicant except for wet tap to the existing water system. The installation shall be inspected by a City of Hayward construction inspector.

Before providing temporary potable water service, a new water system shall be tested at 200 psi for 1 hour by the applicant and bacteriological tested by the City (typ. 3 workday turnaround).

Hydrant meter assemblies are available in 3" or 3" and come with a RP Backflow device attached. Construction meters are available in 4" or 6".

---

Flow

From Existing System

4" or 6" City Supplied Construction Meter, Flanged

4" or 6" Double Check Valve Assembly, supplied by applicant, see SD-201

To New System
**NOTES:**

1. ALL AIR VALVE ASSEMBLIES SHALL CONFORM TO AWWA C-512.

2. ALL PIPING SHALL MAINTAIN AN UPWARD GRADE FROM THE CORPORATION STOP TO THE GROUND SURFACE.

3. IF AIR VALVE LOCATION IS AT AN INTEGRAL CURB AND SIDEWALK OVER 10 FEET WIDE, INSTALL AIR VALVE AT BACK OF CURB. IF INSTALLED IN FURNISHINGS ZONE OF SIDEWALK, VENT ASSEMBLY SHALL BE INSTALLED PRIOR TO SIDEWALK CONSTRUCTION, CONCRETE PAD SHALL BE OMITTED AND VENT ENCLOSURE SHALL BE ATTACHED TO SIDEWALK.

4. IF AIR VALVE LOCATION IS IN AN AREA WITHOUT CURB, INSTALL AT LOCATION AS DIRECTED BY CITY.

5. WHERE APPROVED OR REQUIRED BY CITY, AIR VALVE AND VENT ASSEMBLY MAY BE INSTALLED UPTO 18 INCHES BEHIND PROPERTY LINE (INSIDE PRIVATE PROPERTY) PROVIDED MINIMUM COVER, SLOPE AND CLEARANCE REQUIREMENTS ARE MAINTAINED.

6. VENT OUTLET SHALL BE A MINIMUM 1 FOOT ABOVE FINISHED GRADE OR 1 FOOT ABOVE THE CALCULATED 100-YEAR FLOOD WATER LEVEL OR HIGHEST RECORDED WATER LEVEL, WHICHEVER IS HIGHER.

7. AIR VALVE SHALL BE INSTALLED IN A POSITION SUCH THAT IT MAY BE ROTATED 360° WITHIN THE METER BOX. GATE VALVE SHALL BE INSTALLED IN A POSITION SUCH THAT THERE IS SUFFICIENT CLEARANCE BETWEEN THE HANDWHEEL AND THE BOX FOR EASY OPERATION.

8. 1" COMBINATION AIR VALVE SHALL BE DeZurik 143C, CLA-VAL 361-CVS64.3 OR APPROVED EQUAL;

9. 2" COMBINATION AIR VALVE SHALL BE DeZurik 145C, CLA-VAL 362-CVS32.3 OR APPROVED EQUAL.

10. METER BOX SHALL BE CHRISTY N36, BROOKS NO. 66 OR APPROVED EQUAL. MANUFACTURER'S BOX EXTENSIONS SHALL BE USED IF NEEDED.

11. METER BOX LID SHALL BE INSCRIBED "HWD-AV." WHEN METER BOX IS LOCATED IN A TRAFFIC SUSCEPTIBLE AREA, LID SHALL BE H2O RATED AND BOX SHALL BE CEMENTED IN PER SD-205.

12. TRACER WIRE SHALL BE INSTALLED FROM THE CORPORATION STOP TO THE GATE VALVE, PER SD-228.

13. GALVANIZED VENT PIPE WITHIN THE VENT ENCLOSURE SHALL BE COATED WITH TWO COATS OF RUST-OLEUM PAINT COLORED TO MATCH THE ENCLOSURE COLOR. PIPE SURFACE SHALL BE PREPARED PER PAINT MANUFACTURER'S RECOMMENDATIONS.
NOTES

1. CONTRACTOR SHALL USE CARE TO PREVENT DAMAGE TO TRACER WIRE WHEN PLACING CONCRETE.

2. ALL WIRE SHALL BE COPPER, TYPE THHN WIRE SIZE A.W.G. #12.

3. SPLICES SHALL BE MADE WITH TWO COPPER OR BRASS SPLIT BOLT FASTENER WITHOUT ENCAPSULATION IN EPOXY.

4. TRACER WIRES SHALL BE INTER-CONNECTED AT PIPE TEES AND CROSSES AND VALVES.

5. CONTINUITY TESTS SHALL BE CONDUCTED AS DIRECTED BY THE CITY ENGINEER.

6. TRACER WIRE IS REQUIRED ON ALL NON-METALIC MAIN LINE PIPE AND HYDRANT RUNS.
NOTES:

1. Other methods of testing the new main that do not disturb existing water facilities may be employed only if pre-approved by the City Engineer prior to use. Pressure testing the new main against existing water facilities is not allowed.

2. Standard Detail SD-231 entitled "STANDARD JUMPER PIPE" depicts an approved mechanism for transferring water from the existing main to the new main for pressure and bacteriological testing of the new main. The "cast iron cap or plug" cited above can be modified to accommodate SD-231 for the jumper detail.
Install cast iron cap or plug with tie-backs. Encase with concrete.

Use embedded flange base for PVC pipe and glands for DIP.

Existing main to be abandoned

Concrete plug

Existing main to be removed

3" Typ.

Tie-rods (2 min). Size to fit cast iron cap or plug

18" Min.

6' Max.

12" Min.

Existing joint or sawcut line

Existing main to remain

Existing trench

See SD-212 for size of collar type thrust block

NOTE:

Other methods of abandonment may be employed only if pre-approved by the City Engineer prior to use.
EXISTING BLOWOFF ASSEMBLY

AS REQUIRED TO FIT FIELD CONDITIONS

12" MIN.

MATCH LINE "A" SEE SHEET 2

EXISTING STERILE MAIN TEMPORARY BLOCKING AS REQUIRED TO PREVENT BLOW-OUT

4 TYP.

EXTEND VENT PIPE ABOVE EXISTING GRADE ALTERNATE LOCATION UPON APPROVAL OF THE CITY ENGINEER

5 TYP.

FLOW

FLOW

JUMPER PIPE DETAIL FROM EXISTING BLOWOFF ASSEMBLY

UNSTERILE MAIN
JUMPER PIPE DETAIL
FROM TAPPING AND/OR LINE ASSEMBLY

NOTES:

1. JUMPER PIPE SHALL BE DISINFECTED WITH A MINIMUM 1% SODIUM HYPOCHLORITE SOLUTION PRIOR TO INSTALLATION.

2. JUMPER CONSTRUCTION OTHER THAN HEREON SPECIFIED WILL NOT BE ALLOWED WITHOUT PERMISSION OF THE CITY ENGINEER.

3. JUMPER SIZE:
   2” PIPE FOR 10” MAIN OR LESS
   4” PIPE FOR 12” MAIN

4. REPLACEMENT MAIN SHALL BE DISINFECTED AND TESTED PER AWWA STANDARD C651, "DISINFECTING WATER MAINS".

ITEM | MATERIAL DESCRIPTION
-----|----------------------
1    | DDCV OR RPP
2    | GATE VALVE WITH HANDWHEEL
3    | GALVANIZED TEE WITH PLUG
4    | 90° GALVANIZED ELBOW
5    | GALVANIZED PIPE
6    | GALVANIZED UNION
7    | TAPPED PLUG

DDCV = DOUBLE DETECTOR CHECK VALVE
RPP  = REDUCE PRESSURE PRINCIPLE BACKFLOW PREVENTER

STANDARD JUMPER PIPE
Standard manhole required at every change in grade or change in alignment or at equal intervals not to exceed 400 feet.

BUILDING COURT MAIN SEWER – 10 or less equivalent dwelling units
PER HAYWARD MUNICIPAL CODE SEC. 11-3.350

8" diameter minimum
s=0.006 minimum
SSMH

Connection—See Standard Detail SD-312

BUILDING COURT MAIN SEWER – More than 10 dwelling units
PER HAYWARD MUNICIPAL CODE SEC. 11-3.350

8" diameter minimum
s=0.004 minimum
SSMH

Standard manhole required at connection to public sanitary sewer.
WHEN DIP SEWER IS REQUIRED:

1. New Construction:
   a) Whenever the clearance between the sanitary sewer pipe and any utility pipe (except water main) is 6" or less.
   b) Whenever the clearance between the sanitary sewer pipe and water main is less than 12". However the clearance shall never be less than 4".

2. Repair or Reconstruction:
   a) Whenever the clearance above the sanitary sewer pipe to any utility pipe (except water main) is 6" or less.
   b) Whenever the clearance above the sanitary sewer pipe to the water main is less than 12".
   c) Whenever any utility pipe located below the sanitary sewer pipe is repaired or reconstructed regardless of the clearance between the pipes.

* SEWER PIPE WITH AN INSIDE DIAMETER OF 6 INCHES OR MORE SHALL BE REPAIRED WITH POLYETHYLENE LINED DUCTILE IRON WASTEWATER PIPE OR APPROVED EQUAL.

STANDARD SEWER CONSTRUCTION IN THE VICINITY OF OTHER UTILITIES
STANDARD 48" MANHOLE FOR SEWERS SMALLER THAN 18"

NOTES:

1. CONCRETE SLAB AROUND CASTING SHALL BE: A CONCENTRIC CIRCLE IN ROADWAYS; OR SQUARE AND FORMED WITH LUMBER IN EASEMENTS.

2. FOR USE WITH PIPE ID. LESS THAN 21". FOR PIPES WITH AN ID. 21" AND LARGER, A 60" MANHOLE SHALL BE USED (SEE SHEET 2 OF 2).

3. PRECAST CONE HEIG-IT SHALL BE 3.0' (EXCEPT WHEN OTHERWISE SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER).

4. PRECAST MANHOLE SECTIONS SHALL CONFORM TO ASTM C478 AND SHALL NOT BE CHIPPED OR MODIFIED IN HEIGHT.

5. A MINIMUM OF 6" OF COMPACTED AGGREGATE BASE OR CRUSHED ROCK SHALL BE PLACED UNDER THE MANHOLE BASE.

6. MANHOLE BASE SHALL BE CAST-IN-PLACE CLASS "B" CONCRETE (EXCEPT WHEN ALTERNATIVE DESIGN IS SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER). PRECAST BASES WILL NOT BE PERMITTED.

7. FOR RIGID PIPE ONLY (VCP, DI, ETC.), A FLEXIBLE JOINT OR COUPLING WITH A SHEAR RING SHALL BE LOCATED 12" TO 24" FROM THE MANHOLE. PIPE CONNECTIONS AND COUPLINGS SHALL CONFORM TO SECTION 2.06 OF THE CITY'S "SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWER MAINS AND APPURTENANCES," LATEST REVISION.

8. WATERSTOP GROUTING RINGS SHALL CONFORM TO SECTION 2.07 OF THE CITY'S ABOVE REFERENCED SPECIFICATIONS.

9. PRECAST MANHOLE SECTIONS SHALL BE JOINED USING PREFORMED PLASTIC GASKETS CONFORMING TO SECTION 2.07 OF THE CITY'S ABOVE REFERENCED SPECIFICATIONS. WHERE PRECAST JOINTS ARE BELOW OR WITHIN 3' OF GROUNDWATER, THE EXTERIOR OF THE JOINTS SHALL BE FINISHED SMOOTH WITH MORTAR AND, AFTER MORTAR HAS SET, WRAPPED WITH RUBR-N-EK BY K.T. SNYDER CO., OR APPROVED EQUAL.

ELEVATION SECTION

SECTION A-A

SLOPE SHELVES TO DRAIN, 1:6 TO 1:12

CAST-IN-PLACE CLASS "B" CONCRETE BASE

FLEXIBLE JOINT FOR RIGID PIPE (SEE NOTE 7)

REMOVE TOP HALF OF PIPE WITHIN MANHOLE (TYP.)

SHELL

SHELL

PRECAST CONCENTRIC SANITARY SEWER MANHOLE

STANDARD - PRECAST CONCENTRIC

DRAWN BY: R.S. DATE: 05/20/10
CHECKED BY: J.H./AA. SCALE: NTS
APPR. BY: APPROVED

REV DATE BY
CITY ENGINEER DR. PUBLIC WORKS

SD-304

SHT. 1 OF 2
NOTES:

1. THE NOTES AND TYPICAL DETAILS ON SHEET 1 SHALL APPLY TO 60" MANHOLES UNLESS SPECIFIED OTHERWISE HEREIN.
2. A MINIMUM OF 9" OF COMPACTED AGGREGATE BASE OR CRUSHED ROCK SHALL BE PLACED UNDER THE MANHOLE BASE.
3. MANHOLE BASE SHALL BE CAST-IN-PLACE CLASS "B" CONCRETE REINFORCED WITH A GRID OF #4 REBAR @ 12" O.C., EACH WAY AND WIRE TIED (EXCEPT WHEN ALTERNATIVE DESIGN IS SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER).
4. PRECAST BASES WILL NOT BE PERMITTED.
5. ALL REINFORCING STEEL SHALL BE COVERED BY A MINIMUM 3.0" OF CONCRETE.
6. THE INVERT OF BRANCH PIPES 12" AND SMALLER SHALL INTERSECT THE TRUNK SEWER AT ITS CENTERLINE OR ABOVE, (EXCEPT WHEN INDICATED OTHERWISE ON CITY PROJECT PLANS OR SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER).
NOTES:

1. The vertical wall of the manhole shall be installed over the downstream sewer main, or at a location as directed by the City Engineer.

2. Concrete slab around casing shall be a concentric circle in streets.

3. Concrete slab around casing shall be square and formed with lumber in easements.

4. This MANHOLE MAY BE USED ONLY WHEN SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER.

5. For use with pipe diameter 30" or less.

6. Cone height shall be 3'-0" except when specifically authorized by the City Engineer.

7. Cone shall not be chipped or modified in height.
NOTE:
1. Concrete may be formed in large excavations.
2. See SD-304 for construction notes.
ELEVATION SECTION

NOTES:

1. All pipes within the manhole shall be cast iron or D.I.P.

2. This manhole shall be used in seriously unstable soil or in depths in excess of 7' subject to approval by the City Engineer.

3. See SD-304 for construction notes.
STANDARD 24" MANHOLE COVER AND FRAME
FOR 48" MANHOLES

1 OF 4 – 1/2" HEX-HEAD STAINLESS STEEL NC BOLTS
(required on easement manholes and when specified, see note 5)

1" PICK HOLE

1 OF 18 – 13/4" STARS

1 OF 6 – 1/2" RIBS

1 OF 18 – 1" Ø VENT HOLES; STORM DRAIN ONLY
(storm drain covers in sidewalks or unpaved areas, and all sanitary sewer covers shall have no vent holes)

NOTES:
1. FOUNDRY MAY VARY UNDERSTRUCTURE DESIGN AND
MINOR VARIATIONS TO THE SPECIFIED DIMENSIONS,
SUBJECT TO CITY'S PRIOR REVIEW AND APPROVAL.
2. FRAME AND COVER MATERIAL SHALL BE GRAY CAST
3. TOLERANCE ON NON-MACHINED SURFACES SHALL BE
±1/16".
4. ALL HORIZONTAL BEARING AND VERTICAL CONTACT
SURFACES SHALL BE MACHINED.
5. WHEN BOLT-DOWN-COVERS ARE REQUIRED OR
SPECIFIED, A 1/8-INCH FLAT NEOPRENE GASKET SHALL
BE INCLUDED BETWEEN COVER AND FRAME. A RUBBER
GASKET INTEGRAL TO THE FRAME OR COVER MAY BE
USED INSTEAD OF A FLAT GASKET.
6. 24" MANHOLE COVERS SHALL BE HEAVY DUTY "TYPE B"
COVER BY PHOENIX IRON WORKS OF OAKLAND, OR
APPROVED EQUAL.
7. PANS, IF SPECIFICALLY REQUIRED FOR SANITARY
SEWER MANHOLES, SHALL BE CONSTRUCTED OF
PLASTIC, AND SHALL BE "TYPE E" COVER BY PHOENIX
IRON WORKS OF OAKLAND, OR APPROVED EQUAL.
8. MANHOLE FRAMES FOR 48" MANHOLES SHALL BE AS
SPECIFIED BELOW, BY PHOENIX IRON WORKS OF
OAKLAND, OR APPROVED EQUAL:

- IN R/W, STANDARD P-1015
- IN R/W, BOLT-DOWN P-1024
- IN EASEMENT, BOLT-DOWN P-1023

STANDARD MANHOLE FRAME, COVER AND PAN

DRAWN BY: FM
DATE: 05/20/10
CHECKED BY: JF
SCALE: NTS
APPROD. BY: UNREADABLE
REV DATE BY: CITY ENGINEER
DR. PUBLIC WORKS

SD-307
FILED

1 OF 2
STANDARD 36" MANHOLE COVER AND FRAME
FOR 60" MANHOLES

1" PICK Holes

1" Ø VENT HOLES, 12 TOTAL, STORM DRAIN ONLY
(STORM DRAIN COVERS IN SIDEWALKS OR
UNPAVED AREAS, AND ALL SANITARY SEWER
COVERS SHALL HAVE NO VENT HOLES)

NOTES:
1. THE GENERAL NOTES AND TYPICAL DETAILS ON
   SHEET 1 SHALL ALSO APPLY TO 36" MANHOLE
   COVERS AND FRAMES UNLESS SPECIFIED
   OTHERWISE HEREIN.
2. 36" MANHOLE COVERS AND FRAMES FOR 60"
MANHOLES SHALL BE MODEL "A-1325" BY
ALHAMBRA FOUNDRY CO., LTD., OF ALHAMBRA,
CA. OR APPROVED EQUAL.

PLAN VIEW

FRAME SECTION
CONCRETE SLAB DETAIL - No scale

\[ \frac{3}{8} \text{ Dia. x 1 1/2} \text{ Long course thread brass hex head bolts to be installed when riser is placed in easement} \]

CAST IRON FRAME & COVER DETAIL

Slope concrete up to top of cover (easement only)

Street grade

Band seal connection
See concrete slab detail

Compacted pipe bedding

NOTE:

1. Concrete slab shall be formed with lumber when constructed in an easement.

2. Riser may be reduced to 8" after the elbow if main is larger than 8".

3. MINIMUM SEWER GRADE
   a. 8" Diameter - 0.0033 FT/FT
   b. 12" Diameter - 0.0020 FT/FT

Sanitary sewer pipe
NOTE:
Manhole frame and cover shall be Phoenix Iron Works No. P1090, Neenah Foundry Co. No. R1695 or as approved by the Water Pollution Source Control Inspector.
Refer to the City of Hayward Department of Public Works Specifications for the Construction of Sanitary Sewer Mains for:

- Cleaning
- Video Inspection
- Air Test
- Deflection Test
Example

Given: \( d = 8'' \)
\( L = 450' \)

From Nomograph
Test Time "A" = 320
Test Time "B" = 226.7

Use 226.7 Seconds as the minimum test period.

NOTE:

1. The duration of the test shall be the period of time for the air pressure to drop from 3.5 PSI G. to 2.5 PSI G. To pass the test, this period shall not be less than the smaller of scales "A" and "B"
NOTES:

1. The house sewer shall be installed with a straight grade and alignment from sewer main to property line unless otherwise directed by the City Engineer.
2. Cleanouts to grade required at house connection and changes in alignment.
3. Tap may be made to sewer only if lateral is at least one size smaller than the main.
NOTES:
1. Rectangular box as shown shall be used for cleanouts sealed with caps installed with banded rubber couplings. Circular boxes are permitted for cleanouts sealed in cast iron screwed plugs or other approved top opening caps. Type & manufacturer subject to approval of the City Engineer.

2. Approved rectangular boxes are:
   Christy Concrete Products B3 box with B3D concrete lid or B3C metal lid; Brooks Product, Inc. No. 3 Meter Box with No. 3 heavy duty concrete lid or No. 3 cast iron traffic lid; or approved equal. Concrete lids are acceptable for use in non-vehicular traffic areas while metal lids must be used elsewhere. All lids shall be marked with an “S” or “Sewer”.

3. Cleanouts shall not be installed within City Right–Of–Way.

4. Pipe type shall be one of the following:
   a) PVC SDR 26. Joints shall be bell and spigot type with flexible elastomeric seals.
   b) High Density Polyethylene (HDPE) SDR 17. Joints shall be fused. Inner wall shall be light in color.
   c) Extra Strength Vitrified Clay Pipe (VCP).
   d) Ductile Iron Pipe (DIP). Thickness class shall be Number 51 for four inch pipe and Number 50 for pipe 6 inches and larger. DIP shall be polyethylene lined and seal coated. DIP shall be wrapped with black polyethylene with a minimum thickness of 10 mils. Joints shall be bell and spigot with elastomeric seals.
NOTES:

1. If the lowest fixture in any building is below the rim elevation of the nearest upstream manhole or riser, a backflow prevention valve shall be installed.

2. The valve shall be installed between the house plumbing and the property line.

3. The top of the valve box shall be a minimum of 2" above adjacent ground. The adjacent ground shall be sloped to drain away from the valve box.

4. The top of the valve box shall be a minimum of 12" below the lowest plumbing fixture in the building.
SECTOR I - Leaching field

Dwelling

Cast iron soil pipe

Septic tank

Distribution box

Cast iron soil pipe

Contours

SECTOR II - Leaching field

Leaching field shall run parallel to contours.

4" Drain tile

Rock filled trench

Unexcavated block of soil

4" Drain tile

4" C.I. soil pipe from septic tank

Rock filled trench

Unexcavated block of soil

TRENCH DETAIL
4" Cast iron soil pipe from septic tank

4" Cast iron soil pipe to SECTOR II of leaching field

4" Cast iron soil pipe to SECTOR I of leaching field

PLAN
Distribution Box

Finished grade

No. 4 bars a 12" both ways

Building paper cover

3/4-1" Gravel

Pea gravel

Redwood plug

Outlet to SECTOR II
Distribution Box
Outlet to SECTOR I

TRENCH SECTION

CITY OF HAYWARD
ENGINEERING DIVISION

STANDARD
SEPTIC TANK

DWG. NO. SD-315
FILED 6-15-93
SHT. 3 OF 3
4 - $\frac{3}{4}'' \times 3\frac{1}{2}''$ Sq. head bolts at 1'-2'' C-C.

3$\frac{1}{2}'' \times 3\frac{1}{2}'' \times 1\frac{1}{2}'' \times 4'\,0''$ Curb opening angle.

NOTE: Frame, grate and anchor shall be galvanized after fabrication

Cross bars shall be $\frac{3}{8}''$ diameter and shall be electroforged or resistance welded to bearing bars.

Bearing bars shall be $3\frac{1}{2}'' \times \frac{1}{2}''$ bars on 1$\frac{7}{8}''$ centers.

$\frac{3}{8}''$ Fillet weld full depth each side on outside bearing bars and on every third internal bearing bar.

SECTION BB

SECTION AA

FRAME

GRATE

CITY OF HAYWARD
ENGINEERING DIVISION

STANDARD
STORM WATER INLET
ANCHOR, FRAME
AND GRATE

DRAWN BY: F.A.
DATE: 11-18-74
CHECKED BY: E.H.
SCALE: 1/4" = 1'-0"

APPROVED
CITY ENGINEER
D.E. PUBLIC WORKS

REV. DATE BY

DWG. NO. SD-401
FILED 6-15-93
SHT. 1 OF 1
NOTES:

1. Storm drain markers shall be aluminum with blue background and 0.25” x 0.25” square hole in the center, manufactured by ALMETEK Industries (1-800-248-2080) – Item No. SDA4R0201BLNAH or approved equal.
2. Surface installation requires the concrete surface be brushed with a wire brush to remove all curing compound or debris, and all dust blown off the surface. A ½” x 1” deep hole for a ¾” x ¼” drive rivet shall be drilled where the center of the marker will be placed and the hole shall be blown clean.
3. Install marker with both SIKABOND Construction Adhesive (or approved equal) and one ¾” x ¼” drive rivet by ALMETEK Industries (1-800-248-2080) – Item No. DR250 or approved equal. Place adhesive on the back side of the marker in a circular motion from the outside of the marker to the middle of the marker so that the entire backside is covered. Place the marker in place so the ¼” x ¼” square hole in the middle of the marker is centered over a pre-drilled ½” x 1” deep hole in the concrete surface, apply pressure to the face of the marker, then install the ¾” x ¼” drive rivet in the center of the marker.
4. This marker shall be installed at all storm water inlets, centered on top of the curb, with words and fish symbol facing the street. Consult City Engineer for placement location if storm water inlets are in a location with no curbs.
NOTES:
1. See SD-401 for angle anchor, frame and grate details.
2. See SD-401A for Storm Water Inlet Marking details.
3. See SD-112 for gutter flare details.
4. Inlets shall be formed and concrete shall be vibrated in place.
5. Class "B" concrete shall be used.
6. Type "A" inlet shall only be used for pipes 24" and smaller, with centerline of pipe located 0.67' from face of curb.
7. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for pre-cast boxes.
8. All rebar lap splices to be 20" min.
9. Install construction joint if top part (apron) is poured monolithically with gutter flare.

SECTION A-A

SECTION B-B

STANDARD
TYPE "A"
STORM WATER INLET

Dwg. No. SD-402
File: 1 of 1

Hayward Public Works Dept.

Drawn by JT
Date 04/22/10

Checked by JF

Scale 3/16" = 1'-0"

Reviewed by JF

Dwtn Engineer

Dwtn. Public Works
NOTES:
1. See SD-401 for angle anchor, frame and grate details.
2. See SD-112 for gutter flare details.
3. See SD-401A for Storm Water Inlet Marking details.
4. Inlet shall be formed and concrete shall be vibrated in place.
5. Class "B" concrete shall be used.
6. The channel from springline to invert shall conform to the inside circumference of the pipe.
7. Channel height shall be 7/8 of the inside diameter of the pipe above the invert.
8. Type "C" inlet shall be used only for pipes 27" to 48" I.D., located 2' from face of curb.
9. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for precast boxes.
10. All rebar lap splices to be 20" minimum.

Top reinforcement:
4-#7 bars bent 7" into wall
#4 hoops at 9" O.C.
5-#4 bars at 9" O.C.

SECTION A-A

SECTION B-B

STANDARD
TYPE "C"
STORM WATER INLET

HAYWARD
PUBLIC WORKS DEPT.

DWC. NO. SD-403

REV DATE BY

ST. 1 OF 1
NOTES:

1. See SD-401 for frame and grate details.
2. See SD-112 for gutter flare details.
3. See SD-401A for Storm Water Inlet Marking details.
4. Inlet shall be formed and concrete shall be vibrated in place.
5. Class "B" concrete shall be used.
6. Type "D" inlet shall only be used for a large area drain where required.
7. Use structural details shown on SD-403 for inlets with 27" to 48" pipes.
8. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for pre-cast boxes.
9. All rebar lap splices to be 20" minimum.
NOTES:
1. See SD-401 for frame and grate details.
2. See SD-112 for gutter flare details.
3. See SD-401A for Storm Water Inlet Marking details.
4. Inlet shall be formed and concrete shall be vibrated in place.
5. Class "B" concrete shall be used.
6. Use structural details shown on SD-403 for inlets with 27" to 48" pipes.
7. Type "E" inlet shall only be used in front of driveways.
8. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for precast boxes.
9. All rebar lap splices to be 20" minimum.

SECTION A-A

SECTION B-B
NOTES:
1. Inlet shall be formed and concrete shall be vibrated in place.
2. Class "B" concrete shall be used.
3. See SD-402, SD-403 and SD-405 for construction details.
4. This inlet conversion shall only be permitted when a driveway is required in front of an existing inlet.
5. See SD-401A for required Storm Water Inlet Marking details.

Blood existing bars into new concrete

#4 dowels @ 6" C.C. Epoxy to existing concrete (Typ.)

Remove top of existing S.W.I.

Maintain 1" lip along flowline of gutter and along edge of grate

Construction Notes same as above

STANDARD CONVERSION
TYPE "A" & "C" S.W.I.
TO TYPE "E" S.W.I.
NOTES:

1. All gaps in existing #4 bars shall be bridged with #4 bar.

2. New bars and existing bars shall have a minimum 12" lap.

3. Inlet shall be formed and concrete shall be vibrated in place.

4. Class "B" concrete shall be used.

5. This inlet conversion shall only be permitted when a driveway is abandoned and a curb is constructed.

6. See SD-401A for required Storm Water Inlet Marking details.
NOTES:

1. See SD-401 for angle anchor, frame and grate details.

2. See SD-112 for gutter flare details.

3. Inlet shall be formed and concrete shall be vibrated in place.

4. Class "B" concrete shall be used.

5. Type "F" inlet may be required by the City Engineer in order to intercept the gutter flow where street grades are excessive.

(continued on sheet 2)
SECTION C-C

NOTES: (continued from sheet 1)

6. The extended curb opening will always be constructed on the upstream side of the inlet.

7. Location and direction of pipes entering or leaving inlet to be shown on general plans.

8. Flowline elevations to be shown on general plans.

9. All metals, except spreaders, shall be structural grade steel or better.

10. A vee channel four inches deep shall join two or more pipes entering an inlet.

11. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for pre-cast boxes.

12. See SD-401A for Storm Water Inlet Marking details.

SECTION B-B

Pipe shall not extend inside inner wall.

#4 bars @ 12" O.C. each way

#4 bars @ 12" Max. each way

Normal gutter slope

Curb width

6" 2'-1½" 12'

⅛" Radius

6" Radius

Frame

15"

3'-4½"

6" 6"

3" 1"
NOTES:
1. Location and direction of pipes entering and leaving the junction box are shown on the General Plans.
2. Omit steps in junction boxes less than 3'-6" deep.
3. For step detail, see SD-410A.
4. All miscellaneous iron and steel to be galvanized after fabrication.
5. For use in non-traffic bearing areas.
6. For pipe depths less than 3', smaller box may be used subject to approval of the City Engineer.
7. Class "B" concrete shall be used.
8. All concrete shall be cast-in-place except where authorized by the City Engineer. Submittal approval required for pre-cast boxes.
9. All rebar lap splices to be 20" minimum.

PLAN

SECTION A-A

SECTION B-B

STANDARD JUNCTION BOX
For heights less than shown above, use type "B" standard manhole or special design.

* Step is required when "D" is greater than 3'-6". See plastic step detail on SD-410A.
TYPE "B" MANHOLE

<table>
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<th>MINIMUM DEPTH (D) (feet)</th>
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Type "B" manhole to be used only where available height restricts the use of Type "A" manhole.

* Step is required when "D" is greater than 3'-6". See plastic step detail on SD-410A.
General Notes:
1. Omit step in channelization of any channelized manhole and provide a notched step as directed by the City Engineer.

2. Step shall conform to ASTM C-478, paragraph # 11.

3. Polypropylene plastic molding and extrusion materials shall conform to the latest revision of ASTM D2146–78 Type II, Grade 16906.

Top of structure or frame rim.

Steel reinforced copolymer polypropylene plastic step to be cast in place or press–fitted into provided holes per manufacturer’s specification.

Inside face of structure

Bottom of structure

SECTION A–A

SECTION B–B
$\frac{1}{4}$" raised checks each side as shown

$\frac{1}{4}$" raised serrated tread

$1\frac{1}{2}$" min. raised end lugs

Copolymer polypropylene plastic with $\frac{1}{2}$" grade 60 steel reinforcement

Flexibilized sewage resistant epoxy resin, concresive as manufactured by Adhesive Engineering of San Carlos CA., or approved equal

SECTION C-C
Minimum dimension 1' to nearest joint

2 - #4 Hooped bar

When using short stub extend collar 9" beyond joint. See Note 2.

#4 Dowel bar extension (2" concrete cover from end)
Class "C" concrete

Trim lateral pipe flush with inside face of main pipe. Finish as directed by the City Engineer.

SECTION A-A

1. Side Connection shall only be allowed when the inside diameter of a lateral is not larger than 1/2 of inside diameter of main pipe
2. Use short stub when pipe is too small to finish from inside.
NOTE:
This joint may be used to join two pipes with the same inside diameter, but constructed of different materials.

D = Pipe Diameter
W = Bottom Width of Channel
P = Wetted Perimeter of Channel

Design
Velocity
(FT./SEC.)

No. 2 Backing
1/4 Ton
1/2 Ton
1 Ton
2 Ton

SELECTION OF RIP RAP

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 = 35 f.p.s.

2. Concrete shall be Class "A", "A1", or "B".

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 bars, bends shall be fabricated with standard hooks.

7. Five foot high chain link fencing, embed post 18" deep in walls and encase with class 1 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.

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Ref: San Diego Regional Standard
Drawing D-42 Dec. 1975

Symmetrical about centerline

3-#5
typ.

4-#4

3-#4
typ.

END SILL ELEVATION

HEADWALL ELEVATION

Symmetrical about centerline

Pipe opening

3" clrr.

2" typ.

2 - #5 ea. face

4@8''

#4 @ 7''
(note 1)

SECTION A-A

SECTION C-C

#4 @ 8''

#5

1'-0''

4@8'' (note 2)

4@8'' (note 2)

4@8'' (note 1)

#4@8'' (note 1)

#5@7''
(note 1)

4@8'' (note 1)

#4@8'' (note 1)

C

D

D

See Ensil Sill Elev.
Note 1

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.

SECTION D-D

18'' lap

- #4@7 (note 1)

2@8 (full ht.)
HEADWALL ELEVATION

END SILL ELEVATION

SECTION A—A

add # 4 @ 20" vertical spacing to reinforcing shown (ea. face)

SECTION D—D

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.

Pipe dia. (in.) 36 42 48 54 60 72
A bar # 5 @ 12" # 6 @ 12" # 7 @ 12"
B bar # 5 @ 12" # 6 @ 12"
C bar # 4 @ 12" # 5 @ 12"
D bar # 4 @ 12" # 5 @ 12" # 6 @ 12"
E bar # 4 @ 12" # 5 @ 12"
F bar # 4 @ 9" # 5 @ 9" #888"
G bar # 7 # 11

CITY OF HAYWARD
ENGINEERING DIVISION
DRAWN BY: RPE DATE: DEC. 1976
CHECKED BY: WIL SCALE: 1" = 1'
REV. DATE BY: 
AIR drafting SP. 
DIA. PUBLIC WORKS
DIMENSION SCHEDULE

<table>
<thead>
<tr>
<th>SIDE SLOPE</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:3:1</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>2:1</td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>2:2:1</td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>3:1</td>
<td>1/4</td>
<td>1/4</td>
</tr>
</tbody>
</table>

Install two metal marker posts, 6 feet long, to a depth of 3 feet, straddling pipe, and spaced 2 feet apart at top of side slope, see notes 7 and 8.

Trim pipe along this line

Conform to toe and flowline of channel

Fill trough with loose “Rock”

Cut-off walls to end at low point of trough as shown

Place concrete against neatly trimmed undisturbed earth or on compacted backfill material approved by the City Engineer.

SECTION THROUGH SPILLWAY & PIPE

NOTES:
1. All concrete shall be Class “A”.
2. Provide #4 reinforcing bar at 12" O.C. each way.
3. Spillway slope shall conform to the existing earth channel side slope.
4. “Rock” shall be hard, durable, resistant to water action and free from cracks, seams, and other defects that would tend to accelerate its deterioration.
5. “Rock” shall measure 6” to 16” nominal size and have a minimum specific gravity of 2.5.
6. Exposed surface of “Rock” shall be clean of any evidence of cement or concrete.
8. Metal markers may be substituted with 6” x 6” redwood marker posts, 6 feet long, and painted white.
9. Design engineer shall confirm that this detail will work for the actual channel maximum velocity and discharge, and determine the size of the rock slope protection for existing conditions in accordance with Section 72-1 of the Caltrans Standard Specifications.
SECTION A-A

SECTION C-C

SECTION C-C

GENERAL NOTES

1. Provide #4 hoop bar around pipe.
2. Provide #4 reinforcing bars at 12" O.C. each way.
3. Side slope varies to conform with Earth Channel.
4. Trim projecting pipe flush with surface of channel lining, and provide a smooth finish.
5. If "D" > 5 feet then construct side slope with a depressed slab as shown in Section C-C.
   Applicable to type IA and type IB.

Earth Channel

FLOW

3" diam. weep hole

TYPE IA

(CHANNEL BOTTOM WIDTH b > 8 FEET)

SECTION B-B

TYPE IB

(CHANNEL BOTTOM WIDTH b ≤ 8 FEET)
GENERAL NOTES:

1. For use on concrete lined channel sections of 1:1 side slope only. View shown is perpendicular to side slope.

2. Construct thickened pipe entry section as shown at all side-drain connections for pipes of 12" I.D. and larger.

3. Trim projecting pipe flush with surface of channel lining, and provide a smooth finish.
SETBACK OF BALES FROM TOE OF SLOPE.

STRAW BALE SEDIMENT TRAP

WIRE FENCE BACKING

OUTLET SECTION

WATER FLOW

STRAW BALES

BALE BURIED 4 INCHES INTO THE GROUND.
1. Set posts and excavate a 4" x 4" trench upslope along the line of posts.

2. Staple wire fencing to the posts.

3. Attach the filter fabric to the wire fence and extend it into the trench.

4. Backfill and compact the excavated soil.

EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.

FILTER FABRIC 4"

CONSTRUCTION OF A SILT FENCE
SPECIFICATIONS FOR SILT FENCE

Materials

1. Filter fabric shall be a pervious sheet of synthetic polymer composed of at least 85% by weight ethylene, propylene, amide, ester or vinylidene yarn, woven or non-woven, and shall contain stabilizers and/or inhibitors to resist deterioration by heat, water, and ultraviolet light. The fabric shall conform to the following criteria:
   a) The Equivalent Opening Size (U.S. Standard Sieve) shall be within the range 70-100.
   b) The tensile strength (ASTM D1682G) shall be at least 120 pounds. The strength of fabric required depends on the wire support fence. The strength given is the minimum for a 6-inch square mesh wire support fence. If extra-strength fabric is used without a support fence, the strength required shall be 200 pounds minimum with posts spaced on 6-foot centers.

2. Posts for silt fences shall be either 4-inch-diameter wood, or 1.33-pounds per linear foot steel with a minimum length of 5 feet. Steel posts shall have projections for fastening wire to them.

3. Wire fence reinforcement for silt fences shall be 42 inches in width, shall be a minimum of 14-gauge, and shall have a maximum mesh spacing of 6 inches.

Construction Specifications

1. The height of a silt fence shall not exceed 36 inches. On slopes, the fence line shall follow the contour as closely as possible. In small swales, the fence line shall be curved upstream at the sides to direct the flow toward the middle of the fence.

2. If possible, the filter fabric shall be cut from a continuous roll to avoid the use of joints. When joints are necessary, filter cloth shall be spliced only at a support post, with a minimum 6-inch overlap and both ends securely fastened to the post.

3. Posts shall be spaced a maximum of 10 feet apart and driven securely into the ground (minimum of 12 inches). When extra-strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet.

4. A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upslope from the barrier.

5. When standard-strength filter fabric is used, a wire-mesh support fence shall be fastened securely to the upslope side of the posts using heavy-duty wire staples at least 1 inch long, tie wires, or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.

6. The standard-strength filter fabric shall be stapled or wired to the fence, and 8 inches of the fabric shall extend into the trench. The fabric shall not extend more than 36 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.

7. When extra-strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of No. 6 above applying.

8. The trench shall be backfilled and the soil compacted over the toe of the filter fabric.

9. Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.
BALES SHALL BE PLACED CLOSELY TOGETHER SO THAT NO SILT WILL ENTER THE STORM DRAINAGE SYSTEM

SECTION A-A

STRAW BALES PROTECTION

2" X 4" WOOD STAKE OR 1" DIAM. STEEL PIN, 4" LONG (MIN.) 2 PER BALE.

ANGLE FIRST STAKE TOWARD PREVIOUSLY LAID BALE (TYPICAL)

baling wire (typical)