To: Roadway Design Personnel
    ADOT and Consultants

Date: July 25, 2000

From: Terry H. Otterness
    Design Program Manager
    Roadway Design Section

Subject: Construction Standards - C-Stds.
    New 2000 Books

A new April 2000 Construction Standard Drawings book has been printed and is available in Engineering Records. No revisions have been made to the drawings with this printing; it is a consolidation of the 1994 C-Stds. including all of the revisions. Two sizes are available: 8 1/2” x 11” for construction personnel ease in handling and 11”x 17” for office use.

Design personnel should insure that the Plans General Note is updated to read “The roadway plans have been designed utilizing the 2000 Construction Standard Drawings (C-Series). Refer to the 1A sheet for a listing of current revision dates.” This is new Note GN18 in the HPS.CEL Cell Library available on the ADOT Roadway Web Page. Please provide this information to all design personnel and users of the Construction Standard Drawings in your respective Groups.

C:
    Roadway Engineering Group
    Traffic Group
    Statewide Project Management Group
    Construction Group/ AGC
    Central Maintenance
    Bridge Group
    Materials Group
    Valley Freeway Group
    Contracts and Specifications Section
    Engineering Consultant Services
    Districts (10)
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Regional Traffic Engineers (4)
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    FHWA
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</tr>
<tr>
<td>Road</td>
<td>Rd</td>
<td>Tangent to Spiral</td>
<td>TS</td>
</tr>
<tr>
<td>Roadway</td>
<td>Rwy</td>
<td>Telegraph</td>
<td>Tel</td>
</tr>
<tr>
<td>Route</td>
<td>Rte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber Gasket Reinforced Concrete Pipe</td>
<td>RGCP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Roadway width, cut ditch width, grass slope, and pavement structure section will be shown on project plans.

2. Design highwater should not be located above the subgrade in unpaved ditch.

3. Pavement structure slope is nominal. Actual slope is controlled by 9 of. See Shoulder Wedge Detail.

4. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.

5. For slope controls within interchange areas, see project plans.

6. When median slopes intersect, see project plans for controls.

7. These slopes are intended to be used with new or reconstructed roadways.

The 9 min is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 9 requirement may be waived under special conditions where guard rail is not utilized, the 9 min shall not be waived when the thickness of structure section has not been finalized.

INTERMEDIATE SLOPES

MINIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

MAXIMUM SLOPES

SHOULDER WEDGE DETAIL

SLOPE Rounding DETAIL

Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 6 ft, use 1 semi-tangent for slope rounding. For each additional foot of cut add 1 to semi-tangent to 11 maximum.
GENERAL NOTES

1. Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.
2. Design highwater should not be located above the subgrade in unpeved ditch.
3. Pavement structure slope is nominal. Actual slope is controlled by subgrade Slope Wedge Detail.
4. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
5. When median slopes intersect, see project plans for controls.
6. These slopes are intended to be used with new or reconstructed roadways. The 2.8 min is required when guard rails are utilized on the project. Treatment shall be uniform throughout the project length. The 2.8 requirement may be waived under special conditions where guard rail is not utilized. The 2.8 min shall not be waived when the thinness of structure section has not been finalized.

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

SLOPE ROUNING DETAIL

Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded.

DESIGN ENGINEER
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

SLOPES
PRIMARY ROADWAYS

C-02.20
GENERAL NOTES

1. Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.

2. Design highwater should not be located above the subgrade in ungraded ditch.

3. Pavement structure slope is nonflat. Actual slope is controlled by 0%. See Shoulder Wedge Detail.

4. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.

5. These slopes are intended to be used with new or reconstructed roadways.

- The 6% min is required when guardrail is utilized on the project. Treatment shall be uniform throughout the project length. The 6% requirement may be waived under special conditions where guardrail is not utilized. The 6% min shall not be waived when the thickness of structure section has not been finalized.

MINIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

SUBGRADE/SLOPE HINGE TREATMENT DETAIL

INTERMEDIATE SLOPES

SHOULDER WEDGE DETAIL

MAXIMUM SLOPES

SLOPE ROUNDED DETAIL

Except in solid rock, or as directed by the engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 8%, use 5% semi-tangents for slope rounding. For each additional foot of cut add 1% to semi-tangent to 11' maximum.
GENERAL NOTES

1. Round edge profile intersections with vertical curves having an approximate length in feet equal to the design speed in mph.
2. For main roadway curves without spirals, Ls is the same as for spiraled curves but with 0.7 Ls on tangent and 0.8 Ls on curve.
3. Shoulders transition with the adjacent travel lane when their normal cross slopes are the same.
4. If shoulders have a normal cross slope steeper than the adjacent lane, the shoulder transition will begin at a different point than that of the adjacent lane. See shoulder transition detail.

LEGEND

A - Point at which adverse crown removal begins.
B - Point at which super-elevation transition begins.
C - Point of equity between super-elevation and normal crown.
D - P.C. location for circular curve transition.
E - Point at which full super-elevation is reached.

Ls - Length of Normal Crown Removal
Lrs - Length of Super-elevation Runoff
E.T.L. - Edge of traveled lane
* - Distance BC = (INC) Ls/4
O - Length of Shoulder Transition = (INC) Ls/4/O of shoulder

10/95

SHOULDER TRANSITION DETAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

SLOPE LENGTH DISTRIBUTION
C-02.50
GENERAL NOTES

1. Dimensions of ditches shall be shown on the plans, as bottom width, depth and length.

2. Ditches shall be constructed with a minimum grade to prevent erosion. Ditch outlet treatment shall be as provided on plans.

CROWN DITCH

GRADER DITCH

DITCH

DITCH AND DIKE

Representative Slopes Only, See Plans for Specific Slopes.
**GENERAL NOTES**

1. Dimensions of dikes shall be shown on the plans as top width, height, length and top of dike elevation.

2. Dike side slopes outside the recovery area shall be shown on the plans.

**SLOPE TABLE**

<table>
<thead>
<tr>
<th>Inside Recovery Area</th>
<th>Outside Recovery Area</th>
<th>Desirable</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>10ft</td>
<td>4ft</td>
<td>15ft</td>
<td></td>
</tr>
</tbody>
</table>

**TYPE B TRANSVERSE MEDIAN DIKE**

* Slope relative to grade of median at intersection with toe

**TYPICAL TRANSVERSE MEDIAN DIKE INSTALLATION**

---

**Typical Dike Installation at Structure**

Place dikes at structures to create water drainage.
GENERAL NOTES

1. Dimensions for ditch dikes shall be shown on the plans as dike stationing, height, length, dike back slope and toe of dike elevation.

2. Dimensions for cut ditch widening shall be shown on the plans as beginning and ending stations.

SECTION B-B
- Slope relative to grade of cut ditch at intersection with toe

SECTION A-A

SECTION C-C
GENERAL NOTES

1. Pipe berms not required when pipe projection is protected by guard rail.

2. Berm construction similar for multiple pipe installation and for pipe without end sections.


If Point A is within the recovery area, then a pipe berm is required and Point B is set at the edge of the recovery area.

PIPE BERM REQUIREMENT DETAIL

SECTION A-A (WITH END SECTION)

SECTION A-A (WITHOUT END SECTION)

STRAIGHT PIPE PLAN

ELEVATION

SKewed PIPE PLAN

NOTE:
Single Pipe Installation D = Outside Diameter of Pipe
Multiple Pipe Installation D = Outside Edge to Outside Edge of Pipes

Pipe Backfill and Bedding Material Limits
See Std C-1310.
GENERAL NOTES

1. Berm construction similar for box culvert and pipe with headwall.

2. Berm construction shown is for extension of existing facilities. Berm construction similar for new facilities.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DITCHES, CHANNELS, DIKES AND BERM HEADWALL BERMS

[Diagram of Straight Headwall Plan, Elevation, Skewed Headwall Plan, Section A-A (for CBC), Section A-A (for Pipe with Headwall)]
GENERAL NOTES

1. Concrete for the spillway inlet, spillway outlet shall be Class B.

2. Where rock is encountered, the outlet may be omitted.

3. When outlet is used, the concrete mesh shall extend through the joint into the outlet in lieu of bending into the key.

4. Spillway invert slope shall be uniformly downward from A to B.
GENERAL NOTES

1. Round all exposed concrete corners.
2. Tons, stub, trash rack and angle supports shall be ship-fabricated, welded and galvanized in accordance with AASHTO M 36.
3. Stubs shall be of annular corrugation. Downdrain piping beyond stub shall be either annular or helical corrugation.
4. Permissible couplings shall be mechanical, heat-shrinkable polyethylene sheet or place lap type neoprene sheet or slip-seam at minimum 12" width and min 18 ga.
5. Inlet invert slope shall be uniformly downward from one foot inside of embankment curb base.
6. Inlet and outlet concrete shall be Class B.

Embayment curb concrete shall be in accordance with Standard Specifications.

OUTLET DETAIL

Finished Grade

1 in 6 Better Bath Slope

24"x4" Annular CMP Tank
Stakes 16 Gauge

6x6-1/4 Wire Mesh

1-3 Bars Cont Length
14-16" Field Bands 1-Way
33-1/2" Field Bands 2-Way

OUTLET-HEADWALL AND CONCRETE APRON

12", 16 Ga
Annular or Helical CMP

2 x 3/4" Holes

CMP OUTLET ON ROCK

Elevated Soil

Gavel J Bolts and Nuts

3/4" Dense Ribbed Steel to be galvanized after fabrication

DETAIL TRASH RACK

LP Hole

Tack Weld

DETAIL ANGLE SUPPORTS FOR TRASH RACK

SECTION A-A

10-0'

2-6'

2-Way Flow Symmetrical About E

OUTLET INLET

AC Pavement

Spillway Inlet

Warp Inlet Concrete to Meet Elevation of Top of Tank

Anchor Stakes 48 Bar 4' Long 10' C to C

*8 gau wire double wrapped

12" CMP

*3 Bar

DETAIL ANCHOR

Length Varies

Normal or 2" Widened Shoulder Line

Guard Rail Post

12" Expansion Joint, Reformed Joint Filler

Preferred Guard Rail Post Location 1.0 or 2.0 Flow

*6 bars, 1'-0" C to C horizontal and vertical. Piece 1/2" clear to inside of walls. Bend and wet vertical bars 1'-0" into fiber
### GENERAL NOTES

1. For C-02.10 slopes with embankment height over 24", use length for 24" embankment height from Table 2.24.

2. For C-02.20 slopes with embankment height over 26", use length for 26" embankment height from Table 2.26.

3. For C-02.30 slopes with embankment height over 30", use length for 30" embankment height from Table 2.30.

4. For spillway details, see Std C-04.10.

### LENGTH OF SPILLWAY

#### C-02.10 AND C-02.20 SLOPES

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Embankment Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>5' 6&quot; 7' 8&quot; 9&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>10' 10' 11' 12' 13'</td>
</tr>
<tr>
<td>16&quot;</td>
<td>14' 15' 16' 17' 18' 19'</td>
</tr>
<tr>
<td>18&quot;</td>
<td>20' 21' 22' 23' 24' 25' 26'</td>
</tr>
<tr>
<td>20&quot;</td>
<td>27' 28' 29' 30' 31' 32'</td>
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</table>

#### C-02.30 SLOPES

<table>
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<th>Thickness</th>
<th>Embankment Height</th>
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<tbody>
<tr>
<td>12&quot;</td>
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</tr>
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</tr>
<tr>
<td>20&quot;</td>
<td>27' 28' 29' 30' 31' 32'</td>
</tr>
</tbody>
</table>

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**Diagram Description:**

- **Inlet:** The point where water enters the spillway.
- **Spillway Length:** The distance from the inlet to the outlet.
- **Outlet:** The point where water exits the spillway.

---

**Diagram Notes:**

- The spillway length is determined based on the thickness of the embankment and the height of the embankment.
- The table above provides the spillway length for different thicknesses and embankment heights.

---

**Diagram Source:**

- **State of Arizona:** Department of Transportation
- **Division of Highways:** Standard Drawings
- **Spillway Length Table C-04.30**
### General Notes

1. For C-02.10 slopes with embankment height over 24", use length for 24" embankment height from Table A.2.4.

2. For C-02.20 slopes with embankment height over 32", use length for 32" embankment height from Table A.2.6.

3. For C-02.30 slopes with embankment height over 40", use length for 40" embankment height from Table A.2.6.

4. For down drain details, see Std C-04.20.

### Down Drain Length Table

#### C-02.10 and C-02.20 SLOPES

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Embankment Height</th>
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</tr>
<tr>
<td>14&quot;</td>
<td>34' 36' 38' 40' 42' 44' 46' 48' 50' 52' 54' 56' 58' 60' 62' 64' 66' 68' 70'</td>
</tr>
<tr>
<td>16&quot;</td>
<td>34' 36' 38' 40' 42' 44' 46' 48' 50' 52' 54' 56' 58' 60' 62' 64' 66' 68' 70'</td>
</tr>
<tr>
<td>18&quot;</td>
<td>36' 38' 40' 42' 44' 46' 48' 50' 52' 54' 56' 58' 60' 62' 64' 66' 68' 70'</td>
</tr>
<tr>
<td>20&quot;</td>
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<tr>
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<td>24&quot;</td>
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#### C-02.30 SLOPES

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<td>1' 2' 3' 4' 5' 6' 7' 8' 9' 10' 11' 12'</td>
</tr>
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<td>1' 2' 3' 4' 5' 6' 7' 8' 9' 10' 11' 12'</td>
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<tr>
<td>36&quot;</td>
<td>1' 2' 3' 4' 5' 6' 7' 8' 9' 10' 11' 12'</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Stub shall have annular corrugation. Down-drain piping beyond stub may be either annular or helical.

2. Couplings shall be mechanical heat-shrinkable polyethylene sheet; one piece lap type neoprene sheet or slip seals at 17 ft/min width and 18 ga min.

3. Maximum D Allowable = 8 cfs
   Minimum V Allowable = 1 fps

PLAN

SECTION A-A

- Catch Basin Structure
  - Type, Size, and Location as Shown on Plans
  - 18" 16 Gauge CMP Annular or Helical

- Flow
  - Vertes See Plans

- Roadway Width

- Toe of Embankment Slope - See Plans
- Channel Invert
- 12" Stub
- 36" Frame & Grate

- Invert Elevation See Plans
- Fillslope
- Subgrade Hinge Point
- Length as Required
- Std C-15.9

- Corrugated Metal Pipe
  - Prefabricated Tee, Steel Annular 16 GA 18"x36"x1/2"
  - 5" Class B Concrete
GENERAL NOTES

1. All gutter flow lines shall be constructed to an accurate grade.
2. See Slotted Drain Stds., C-13,10 and C-15,95 for curb and gutter with slotted drain.
3. See Std. C-05,10 for additional general notes and dimensions.

SECTION A-A

Varies 4'-6" to 6'-0"

Varies 2'-6" to 4'-6"

1'-6"

PERIODIC VIEW

SECTION B-B

15' Transition

Match Gutter Grades

Dimensions may vary,
Std C-05,10
Type D, D-1, D-2 or D-3

TYPE 1 - CURB & GUTTER TRANSITION - AT RAMP TAPERS

- Dimension may vary where exit occurs on curves, see plans

TYPE 2 - CURB & GUTTER TRANSITION
Curb & Gutter Type B or C Readjunct
Gutter Width = 4'-6"
Std. C-05.10

15' Transition

Curb & Gutter
Type C or D
Std. C-05.10
or Non-ADOT Std
See Plans

5' Transition

Curb & Gutter
Type D, Std. C-05.10
or Non-ADOT Std
See Plans

TYPE 5 - CURB & GUTTER TRANSITION

TYPE 6 - CURB & GUTTER TRANSITION
GENERAL NOTES

1. Unless otherwise specified, driveways shall be 6 inches in depth.

2. Two inch deep transverse contraction joints shall be placed in driveways if the driveway width is over 20 feet. If the driveway thickness is greater than 6 inches, then the contraction joint depth shall be 1/4" where 1" is the thickness of the driveway. Joints shall be either formed or sawed. Formed joints shall be finished with a tool having a 3/4" radius. See sheet 2 of 2 for the Contract Joint Detail.

3. Expansion joints shall be located between driveways and sidewalks and at abutting structures. The one-half inch joint filler shall extend the full depth of the Concrete. See sheet 2 of 2 for the Expansion Joint Detail.

4. Concrete shall be finished by means of a float, then steel trowelled and then broomed with a fine brush in a transverse direction.

5. Top of curb (TC) and driveway elevations shown are in relation to the gutter, gutter-0'.

6. When curb heights of 6" or less are shown on plans, use dimensions shown in 1/8".

7. When curb heights of 7" or more are shown on plans, see plans.

LEGEND

- Cross slope (0.01' Per Ft (Typical))
- Straight grade with downward slope,
- Maximum slope = 0.02' Per Ft.
1. Unless otherwise specified, sidewalks shall be 4 inches in depth.
2. One inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 15 feet or at a spacing that matches adjacent curb and gutter. If the sidewalk is over 7 feet in width, a 1 inch deep longitudinal contraction joint shall be placed in the center of the sidewalk. The maximum area of sidewalk without contraction joints or scoring lines shall be approximately 36 square feet. Joints shall be either forms or scored. Formed joints shall be finished with a too having a 1/4" radius.
3. Expansion joints shall be located between sidewalks and driveways and at abutting structures. Expansion joints shall match the joints in the adjacent concrete pavement or existing concrete curb and sidewalk. Maximum length of sidewalk without an expansion joint shall be 60 transverse feet. The one half inch joint filler shall extend the full depth of the concrete.
4. Concrete shall be finished by means of a float, then steel travelled and then broomed with a fibrous brush in a transverse direction.
5. Sidewalks shall be constructed to a desirable width of 5 feet on major streets, a minimum width of 4 feet on residential streets or as shown on the plans.
6. Scoring lines shall be 1/4 inch in depth. They shall be placed at 5 foot spacing when the contraction joint interval is 15 feet and at 6 foot spacing when the contraction joint interval is 12 feet.

**CONCRETE SIDEWALK ADJACENT TO CURB**

**CONCRETE SIDEWALK SETBACK FROM CURB**

**SIDEWALK ADJACENT TO CURB**

**SIDEWALK SETBACK FROM CURB**

**CONTRACTION JOINT DETAIL**

**EXPANSION JOINT DETAIL**
Transition to Match Curb & Gutter and Sidewalk. Existing dimensions may vary.

Ramp Curb Height to Match Adjacent Back of Sidewalk Elevation

Rough Brooke Finish Use Ripple Pattern

\( \frac{1}{2} \) Grooves at 1' C to C

Sea Groove Detail

Grooves at Approximately 45° (Typical)

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SIDEWALK RAMP WITH PEDESTRIAN BYPASS

GENERAL NOTES
1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially, gutter "O".
2. See Std C-0510 and C-0520 for joint requirements.
3. When curb heights of 8" or less are shown on plans, use dimensions shown in 1/8".
4. When curb heights of greater than 1' are shown on plans, see plans and ADA requirements.

LEGEND
- Cross slope 0.01% Per Ft (Typical)
- Maximum slope = 0.02% Per Ft.
GENERAL NOTES

1. For use when sidewalk is not continuous both sides. If sidewalk is anticipated in the future, utilize Type 1 or Type 6 Ramp.

2. Top of curb TCO and top of ramp elevations shown are in relation to the gutter and are located roadway, gutter, and curb.

3. See Std C-05.10 and C-05.20 for joint requirements.

4. When curb heights of 6" or less are shown on plans, use dimensions shown in C-60.

5. When curb heights of greater than 11" are shown on plans, see plans and ADA requirements.

PERSPECTIVE

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP WITHOUT PEDESTRIAN BYPASS

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

DESIGN NUMBER
SIDEWALK RAMP
TYPE 2
C-05.30
Sheet 2 of 2

8/99
GENERAL NOTES
1. Top of curb (TCC) and top of ramp elevations shown are in relation to the gutter,
   gutter-top.
2. See Std C-05.10 and C-05.20 for joint
   requirements.
3. When curb heights of 6" or less are shown on plans, use dimensions shown in TCC.
4. When curb heights of greater than 7" are shown on plans, see plans and ADA require-
   ments.
   - For sidewalk widths greater than 6'-0," the overall sidewalk ramp width shall match
     the sidewalk width.

LEGEND
O Cross slope 0.01 Per Ft (Typical)
* Maximum slope = 0.02 Per Ft.

ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

SIDEWALK RAMP AT MIDBLOCK
GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.

ELEVATION

DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

DEPRESSED CURB AT SIDEWALK RAMP

PLAN

PENDENT RAMP

GENERAL NOTES

1. Top of curb (T.C) and top of ramp elevations shown are in relation to the gutter, Gutter "0".

2. See Std C-05.10 and C-05.20 for joint requirements.

3. When curb heights of 6" are shown on plans, use dimensions shown in "I" ft.

4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
   - Use type A1 curb if median is to be landscaped.
GENERAL NOTES
1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially, gutter "0".
2. See Std C-05.10 and C-05.20 for joint requirements.
3. When curb heights of 8" or less are shown on plans, use dimensions shown in 1/2".
4. When curb heights of greater than 1" are shown on plans, see plans and ADA requirements.

LEGEND
- Cross slope 0.01% Per Ft (Typical)
- Maximum slope = 0.02% Per Ft.
- 30' x 45' access area for Pedestrian Push Button
- Control for Field Layout

PLAN
- Transition to match East Curb & Gutter and Sidewalk Existing Dimensions may vary See Plans
- Top of Ramp @ 1/2" (6 3/8")
- Top of Ramp @ 3" (7 1/2")
- Top of Ramp @ 5"
- Top of Ramp @ 7"
- Radius Per Plan
- Sidewalk Width Per Plan 5' Min
- Sidewalk Width Varies
- Roadway Width 8'6"
- 4" Concrete
- Veres 4' Min
- 6" Sidewalk Width Per Plan 5' Min
- 4" Sidewalk Width Per Plan 5' Min
- Transition to match East Curb & Gutter and Sidewalk

ELEVATION
- DEPRESSED CURB AT SIDEWALK RAMP
- 1/2" Grooves at 1" C to C
- See Groove Detail
- Rough Broom Finish Use Ripple Pattern
- Ramp Curb Height to Match Adjacent Back of Sidewalk Elevation

SECTION A-A
- 3 Dia Foundation
- 4" Concrete
- Veres 4' Min
- Contraction Joint Fiber
- Surface of top of foundation shall conform to the slope of the sidewalk

PERSPECTIVE
- Grooves at Approximately 45°

SIDEWALK RAMP WITH PEDESTRIAN BYPASS
(FOR USE WITH PEDESTRIAN PUSH BUTTON)
GENERAL NOTES

1. Traffic signal foundations, traffic sign foundations, and cut-outs for traffic signals shall be installed prior to placement of median paving.

2. See Std C-05.00, C-05.11 and C-05.20 for joint requirements.

3. Decorative median paving shall be staked concrete, concrete pavers or as specified on the project plans.

4. Decorative median paving shall not be placed on a median nose transition or on a median island on a structure.

5. A 4" x 6" concrete header shall be used to end decorative paving at locations when concrete sidewalk ramps are not present.

6. Median nose transitions shall not be placed on departure ends of raised medians.

7. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter, Gutter = 0'.

8. When curb heights of 6" are shown on plans, use dimensions shown in Fig. 11.

9. See Structure Plans for raised median on structures.
SECTION A-A

SECTION B-B

SECTION C-C

GENERAL NOTES
1. The RCCP surfaces within the bus bay area shall be textured transversely. Surface texturing to conform to Section 460.
2. Transverse weakened plane joints shall be constructed at a maximum spacing of 15 ft and shall align with joints in the concrete curb and gutter.
3. For additional data on slotted drains, see slotted drain Std C-1950.
4. For 1/2" expansion joint with preformed joint filler, see detail A.
5. Concrete pad to be poured separately from concrete bus bay pavement.
6. For sidewalk construction details, see Std C-0520.
1. **Driveway types**
   - Residential - one providing access to a single family residence, to a duplex, or to an apartment building containing five or fewer dwelling units.
   - Commercial - one providing access to an office, retail or institutional building or to an apartment building having more than five dwelling units.
   - Industrial - one directly serving a substantial number of truck movements to and from loading docks of an industrial facility, warehouse, or truck terminal.

2. Joint use driveways may become desirable for landowners of adjacent properties to serve both properties. If this is the case, only one of the two adjacent landowners need apply for the access permit, but a notarized written mutual agreement, signed by all parties involved, must accompany the application form. The property line can be located anywhere in reference to the driveway, depending on mutual agreement.

3. Driveways for high-volume traffic generators shall be approved individually by Traffic Engineering section.

4. Driveways with curb returns in urban areas shall be installed only with the approval of Traffic Engineering section.

5. Driveways and depressed curbs shall be located as noted on plans or as directed by the Engineer.

6. Drainage structures shall be provided under driveways where necessary. Dimensions indicated as minimum shall be avoided whenever possible in favor of those indicated as desirable.

7. The Type "A" turnout is the preferred turnout design. Type "B" and "C" shall only be used when absolutely necessary.

8. Paved turnouts, plans notation, will be W X L, surface materials, type and standard. Example: 20' X 30' 4%T. Type A, 5%T C-06.00, Show radius 40' graphically.

9. Construction of curb, gutter, sidewalk and drainage facilities in urban areas by the permittee along that portion of the highway frontage under permit application, may be a stipulation of the permit approval. If there appears to be reasonable need.

10. Excavation or embankment for turnouts shall be included in quantities for main roads.

11. Base material shall be the same as that shown for main roadway, unless otherwise noted.

12. Desirable slopes for rural turnouts are 6%.
1. Grade as shown on plans or as negotiated between Property Owner and Engineer.

2. When field conditions require modifications to plans, contact Design Engineer for assistance.

3. See Sheet 1 of 2 for all other General Notes.

3. Breakage greater than 6% requires a vertical curve. L/100' MIN. vertical curve shall not encroach on roadway or sidewalk.

URBAN CROSS SECTION (UP GRADE)

URBAN CROSS SECTION (DOWN GRADE)

RURAL CROSS SECTION (UP GRADE)

RURAL CROSS SECTION (DOWN GRADE)
No. 5 x 2'-0" Reinforcing Bars at 2'-0" C to C

No. 8 x 2'-0" Reinforcing Bars at 2'-0" C to C

Transverse Weakened Plane Joint

LWP Joint

W/P Joint

Transverse Weakened Plane Joint

LC Joint

No. 7 x 2'-0" Smooth Dowels at 1'-6" C to C

PCPP (Initial Pour)

PCPP (Later Pour)

Silicone Sealant

Recess 5/16" from Pavement Surface

Expansion Joint

E Joint

Expansion Joint

H Joint

GENERAL NOTES

1. When load transfer dowel assemblies are required, use dimensions shown in Fig. See Assembly Placement and Edge Clearance Details, Std C-07.02.

2. In slab form type pavement construction, LWP joints shall be used, in fixed form construction either LWP or LC joints may be used.

3. Same as weakened plane joint detail, except initial saw cut will not be required.

JOINT ABBREVIATIONS

LWP - Longitudinal Weakened Plane Joint

TWP - Transverse Weakened Plane Joint

LC - Longitudinal Construction Joint

TC - Transverse Construction Joint

E, H - Expansion Joints

S - AC/PCPP Pavement Edge Seal Joint

T - PCPP Thickness

AC/PCPP EDGE SEAL JOINT

S Joint

WEAKENED PLANE JOINT DETAIL
1. Joints are generally shown with pavement sloping toward the joint. Joints are similar with pavement sloping away from the joint.

2. A 'B' joint shall be placed where piers, abutments, barrier transitions, light pole foundations, sign structure foundations, catch basins, dotted lines, and all other concrete facilities are located against the PCP edge unless otherwise noted in the plans or the standard drawings.

**GENERAL NOTES**

**JOINT ABBREVIATIONS**

- C = Curb Joint
- T = PCP Thickness
- D = Curb Thickness
- B = Barrier Joint

**Curb & Gutter Joint**

- **C Joint**
- Half Barrier Joint

**Median Barrier Joint**

- **B Joint**
- PCP On Both Sides of Barrier

**Single Curb Joint**

- **A Joint**

**Median Barrier Joint**

- **B Joint**
- AC Pavement On Back Side of Barrier
GENERAL NOTES

1. Load transfer dowel assemblies shall be used with non-skewed PCCP joints.

2. Load transfer dowel assemblies are to be placed at each transverse weakened plane joint on the traveled lanes as shown on the plans.

3. See Std C-07.01 thru C-07.05 for additional information.

4. See plans or Std C-07.03 thru C-07.05 for transverse joint spacing.

5. See plans for pavement thickness less than 12" or greater than 14".

Load transfer dowel assembly shall be assembled from the following materials.

(See Quantity Table)

- Dowel bars: 1/2" dia x 1'-6" plain round bars w/coating. See Special Provisions.
- Intermediate legs: 2 Ga or M-5,5, wire.
- End legs: 2 Ga or M-5,5, wire.
- Upper space bar: 2 Ga or M-5,5 wire x 3.
- Lower space bar: 2 Ga or M-5,5 wire x 3.
- Tie bars: M-1,5 wire x 16.
- Anchor straps: 1"x3" steel strap, 0.079 thick. Place with 1/16" mini steel nails for 12" or 6" mini steel nail for ACR or AAB. 0.465 dia ASTM A227 Class 1 w/1/2" head or washer to be power driven.

QUANTITY TABLE

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DIMENSION TABLE

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ASSEMBLY PLACEMENT AND EDGE CLEARANCE DETAIL
GENERAL NOTES

1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.

2. \( A' \) shall equal 4\" minimum (typical).

3. See Std C-07-03 for PCCP joints and additional notes.

4. All transverse joints shall be in line with joints in adjacent slabs.

5. See Std C-05-010 for curb and gutter joint requirements.

6. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

7. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1-3' from the TC joint.

- Transverse Construction Joint (TC) allowable limits (Typ).

8. Repeat Sequence

GENERAL NOTES

1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.
2. "A" shall equal 4' minimum (typical), "B" shall equal 3' minimum (typical), "C" shall equal 2' minimum (typical).
3. See Std C-07.03 for PCCP joints and additional notes.
4. All transverse joints shall be in line with joints in adjacent areas.
5. See Std C-05.10 for curb and gutter joint requirements.
6. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
7. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1-3/8" from the TC joint.

Transverse Construction Joint (TC) allowable limits (Typ)
GENERAL NOTES

1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.
2. 'A' shall equal 6 minimum (typical), 15 shall equal 3 minimum (typical), 'C' shall equal 2 minimum (typical).
3. See Std C-07.010 for PCCP joints and additional notes.
4. All transverse joints shall be in line with joints in adjacent panels.
5. See Std C-05.10 for curb and gutter joint requirements.
6. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
7. The reinforcing bars in the LMP & LC joints shall be placed no greater than 1'-3" from the LC joint.
8. Transverse Construction Joint (TC) allowable units (typical).
GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.

2. See Std C-07.01 for PCCP joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.

4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

5. See Std C-05.10 for curb and gutter joint requirements.

6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1" from the LC joint.

7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.
GENERAL NOTES
1. Non-slewed PCPP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCPP joints and additional notes.
3. All transverse joints shall be in line with joints in adjacent lanes and are perpendicular to the longitudinal joints.
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.10 for curb and gutter joint requirements.
6. The reinforcing bars in the LWP & LC joints shall be positioned no greater than 1'-3" from the LC joint.
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.
GENERAL NOTES

1. Non-skewed PCP joints shall be used with load transfer dowel assemblies.

2. See Std C-07.01 for PCP joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent sides and are perpendicular (90°) to the longitudinal joints.

4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

5. See Std C-05.03 for curb and gutter joint requirements.

6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 3/4" from the IC joint.

7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

Direction of Pour & Traffic

Concrete kerf Barrier or Concrete Curb & Gutter

85° PCCP

Repeat Sequence

Typical Joint Sequence (TMP Joints)

15° 13° 15° 17°

90° PCCP

Repeat Sequence

Typical Joint Sequence (TMP Joints)

15° 13° 15° 17°

PLAN
70° PCCP

PLAN
67.5° PCCP
GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCCP joints and additional notes.
3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular 90° to the longitudinal joints.
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.01 for curb and gutter joint requirements.
6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1"3" from the LC joint.
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

PLAN
84.25° PCCP

PLAN
96.25° PCCP
GENERAL NOTES

1. Dimensions with a tolerance may be
   adjusted to align to the nearest
   transverse weakened plane construction
   joint as directed.

2. See Std C-07.01 for joint information.

3. See plans for ramp dimensions.

4. See Std C-07.05 for Sections A-A and B-B.

5. The ratio of transverse to longitudinal
   joint spacing shall be greater than 32
   but not more than 128.

6. Ramp transverse joints shall be perpendicular
   to the ramp longitudinal joints, except
   as shown at the ramp terminals.
   ▲ 6 Minimum
   ☑ 8 Maximum
   ◯ 11 Minimum
   ◄ Transition, see Std C-05.22
   ♦ Without Curb & Gutter

7. 12" Face of Curb to Face of Curb

8. Mainline Structure Section, see Plans

9. Ramp Structure Section, see Plans

10. Gore Structure Section, see Std C-08.20

RAMP TERMINAL AT CROSSROAD

TYPICAL TRANSVERSE WEAKENED PLANE
JOINT LAYOUT AT GORE AREAS

RAMP WITHOUT CURB AND GUTTER

RAMP WITH CURB AND GUTTER
GENERAL NOTES

1. Bedding per Section 501 of the Standard Specifications.
2. Asphalt concrete shall be in accordance with the requirements of the Standard Specifications.
3. 12" AB is required on the sides of trenches that are not parallel to the center line of the street.
4. Types D & E require 9" of AB at top of trench when there is an existing base.
5. See Standard Drawing C-13/05 for Typical pipe installation.

LEGEND

- Compacted Backfill Density Per Section 501
- AB, Gravelly Backfill or Native Backfill Per Section 302-2 and 501
- AB Per Section 303-2 and 501
GENERAL NOTES

1. See Std C-07.01 for joint information.
2. See plans for crossroad dimensions.
3. See Std C-07.04 and C-07.05 for ramp joints.
4. The ratio of transverse to longitudinal joint spacing shall be greater than 1/2 but not more than 1/4.
5. Transverse joints shall be perpendicular (90°) to the longitudinal joints, except as shown at the ramp terminals.

▲ 6' Minimum
● Varies - 18' Maximum
● 6' Minimum
■ Varies - 12' when adjacent gutter widths are 2' or less.
■ 15' when adjacent gutter widths are greater than 2'.

CROSSROAD AT RAMP TERMINAL
GENERAL NOTES

1. All embankment curb shall be protected by guard rail.
2. Guard rail shall extend beyond the limits of embankment curb.
3. See Std. C-10.03 for measurement limits.

SECTION

TYPE A GUARD RAIL INSTALLATION
GENERAL NOTES

1. All embankment curb shall be protected by guard rail.
2. Guard rail shall extend beyond the limits of embankment curb.
3. See Std. C-10.03 for measurement limits.

PLAN

SECTION

TYPE B GUARD RAIL INSTALLATION
**GENERAL NOTES**

1. See plans and barrier summary sheets for location and type of guardrail, Timber post installation shown.

2. See Construction Standard Drawings C-05:10, 05:12, 10:01, and 10:02 for dimensions and details not shown.

3. Type B guard rail installation shown. For Type A guard rail installation, use Type D-1 Curbs and Gutter instead of the Type D-2 Curbs and Gutter shown. For Type A guard rail installation, use the Guard Rail Extruder Terminal as per Standard Drawing C-10:04.

4. See Plans for type and location of drainage facilities.

5. Bituminous joint filler (JS) shall be placed where the curb & gutter or concrete widening meets silted drains, catch basins, dams, barriers, etc. Scored joints, 2 inches in depth, shall be placed to match adjacent joints in PCCP or at 15 ft intervals where adjacent to AC or continuously reinforced concrete pavement.

**SECTION A-A**

- Normal slope per plans
- Curb & Gutter Type D-2 Std. C-05:10
- Optional Construction Joint
- Concrete Barrier Transition Type 3 Std. C-10:175
- Concrete Half Barrier Transition Std. C-05:12
- Curb & Gutter Type B or C Std. C-05:10

**SECTION B-B**

- Approach W Beam Transition to Concrete Half Barrier Std. C-10:31
- Std. C-10:80
- Concrete Half Barrier Transition Std. C-05:10
- Concrete Gutter Transition Type 2 Length = 13 Std. C-05:12
- Guard Rail Extruder Terminal GET-2 Std. C-10:41
- Various 18 for Type A Guard Rail 22 for Type B Guard Rail

**PLAN**

1. **TYPICAL HALF BARRIER TERMINAL W/TYPICAL B OR C CURB & GUTTER**
PLAN

25'-0" Nested Steel # Beam

ELEVATION

NESTED STEEL # BEAM - TYPE 1 - SHORT SPAN
(Splice Connection Inside Span) Length = 25'-0"

SECTION A-A

NESTED Steel # Beam, 12 Gauge

Normal Steel # Beam, 12 Gauge

SECTION B-B

NESTED Steel # Beam, 12 Gauge

Normal Steel # Beam, 12 Gauge

GENERAL NOTES

1. • Indicates AASHTO designation.
2. See Std C-10.20 and C-10.21 for additional information and dimensions.

Bolt Nested Steel # Beams Together
1/2"-HUNC x 1/2" Button Head Bolt (●) and Recess Nut (●).
GENERAL NOTES

1. Use Type 3 Nested Steel W Beam to span driveway or sidewalk inlets as shown in the plan view.

2. Use Type 3 to span multiple obstructions as shown in the elevation view.

ELEVATION

NESTED STEEL W BEAM - TYPE 3 - LONG SPAN

Length = 37'-6"

PLAN

37'-6" Nested Steel W Beam

Bolt Nested Steel W Beams Together
Standard Splice Connection (Typ)

Eliminate Post
Two Post Maximum

Verolas
Pipe Culvert

Bolt Nested Steel W Beams Together
3/4"-10 UNC x 1/2" Button Head Bolt (Ø)
and Recess Nut (Ø)

Traffic
GENERAL NOTES

1. See Std C-10.20 and C-10.21 for additional information and dimensions.

PLAN

ELEVATION

BOLTED ANCHOR
BOX CULVERT INSTALLATION
GENERAL NOTES

1. Drill through top of box culvert with rotary drill.
2. Bracket may be made of one piece or two pieces welded together.
3. Short timber posts anchored to box culvert roof shall be 8" x 8" only.

INSTALLATION DETAIL

BOLTED ANCHOR
TIMBER POST INSTALLATION DETAIL

3/8" x 10 UNC x (T+2) 1/2" Hex Bolt and One Hex Nut with One Narrow Type A Plain Washer (Under Nut) (Type)

3/8" Diam, 2 Holes

 INSTALLATION DETAIL

BOLTED ANCHOR
STEEL POST INSTALLATION DETAIL

3/8" x 10 UNC x (T+2) 1/2" Hex Bolt and Two Hex Nuts with One Type B Plain Washer (Under Nut) (Type)

3/8" Diam, 2 Holes

BRACKET DETAIL

1/2" Plate

1/2" Diam, 3 Holes

BRACKET DETAIL

1/2" Plate

1" Radius (Max)
GENERAL NOTES

1. Curb not required when drainage flows transversely away from barrier.

2. Treatment at back of lip curb modified for constructability purposes. Front slope and height of lip curb shall not be exceeded. 

- indicate ARTBA designation.

PLAN

Concrete Barrier Transition
Type 10, 10” x 10” Concrete Barrier Transition, SDG 50 Series

WOOD POSTS (TYP)

Thrie Beam Terminal Connector (TYP)

3.5” x 5” Lip Curb
See Lip Curb Detail

SECTION A-A

2.5” x 5” Lip Curb
See Lip Curb Detail

ELEVATION

W - Thrie Beam Transition Section (TYP)

LIP CURB DETAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

JOHN H. COTTRILL
DEPUTY DIRECTOR

GUARD RAIL TRANSITION THREIBEAM
10” CONCRETE HALF BARRIER (10)
TYPE “F” APPROACH (PAVEMENT)
GENERAL NOTES

1. Two-inch-deep construction joints shall be placed in the curb and gutter at locations which match the joints in adjacent Portland cement concrete pavement and at approximately 15-foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand mowed or sawed.

2. Curb not required when drainage flows transversely away from barrier, • - indicate ARTBA designation.

PLAN

ELEVATION

LIP CURB DETAIL
GENERAL NOTES

1. For use with one-way traffic or with two-way traffic outside the clear zone.
   • - indicate ARTBA designation.

Concrete Barrier Transition, Type P. to W Beam Std C-10.71 or Bridge Concrete Barrier Transition, BWG 50.1.02

Planned

6''x8''x64'' Wood Post (Typ)

6''x8''x18'' Wood Blocks (Typ)

W Beam Terminal Connector (●)

Traffic

SECTION

1" 2.4" 11.5"

Roadway Width

Anchor Plate
See Detail A

Thrie Beam Guardrail Transition System

18'-9" 6'-3" 6'-3" 6'-3"

W - Thrie Beam Transition Section (●)

ELEVATION

ANCHOR PLATE - DETAIL A
GENERAL NOTES

1. The cable assembly shall be tightened to remove slack.

2. To ensure that the bearing plate remains in position, one wrap of 14 gauge galvanized steel wire shall be wrapped around the terminal post near the top of the plate.

3. See Std. C-10.03 for measurement limits.

- See # Beam End Section (Rounded), ARTBA Std. RE-6-76, for dimension variables.

0 Indicates ARTBA designation.
GENERAL NOTES
1. Lift Barrier shall be constructed by the slip form or formed Cast-in-Place method.
2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class 5, design strength f = 3000 PSI.
4. If the footing and barrier are cast monolithically, No. 6 5\'\' shaped rebars will not be required.
5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
6. No. 4 Rebar shall extend 12\'' past the construction joint at the completion of the bay's pour.

\[ \text{Depth to match adjacent PCCP thickness (8'' Min)} \]

WITH PCC PAVEMENT
BARRIER WITH GUTTER

WITH AC PAVEMENT
SECTION B-B

WITH PCC PAVEMENT
SECTION A-A
GENERAL NOTES

1. Concrete shall be Class 5, design strength ≥ 3000 PSI.

2. Half Barrier shall be placed upon either Asphaltic or Portland Cement Concrete Pavement.

3. Pavement thickness adjacent to Half Barrier shall be 7" minimum.

4. The half barrier shall be placed upon a bed of granular in order to provide a uniform bearing.

5. Dowelled joints shall be grouted under pressure until all of the openings and the joints are filled.

6. This standard shall not be used when an individual run consists of less than five 20 foot sections.

7. All bend dimensions for reinforcing steel shall be out-of-out of bars.

ELEVATION

SECTION A-A

SECTION B-B

SECTION C-C
GENERAL NOTES

1. Half Barrier shall be constructed by the slip form or formed Cast-In-Place method.
2. When obstacles are encountered which prevents the use of slip form equipment, the girder shall be accomplished by the use of stationary forms.
3. Concrete shall be Class 5, design strength f'c = 3000 psi.
4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
5. Thickness of footing, "D" can be adjusted to match the PCCP thickness, as approved by the Engineer.
6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.
7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.
8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent Portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

PLAN

ELEVATION

BARRIER GUTTER DETAIL
1. Half Barricade shall be constructed by the slip form or formed Cast-In-Place method.

2. When obstacles are encountered which prevents the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class S, design strength f_c ≥ 3000 PSI.

4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the pour.

5. Thickness of footing, "D", can be adjusted to match the RCCP thickness, as approved by the Engineer.

6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.

7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.

8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent pavement concrete pavement and at approximately 3 foot centerline when adjacent to asphalt concrete pavement. Joints shall be either hand tooled or sawed.
GENERAL NOTES

1. Concrete shall be Class 5, design strength is 3,000 PSI.
2. If the footing and barrier are cast monolithically, No. 6 S-shaped rebars will not be required.
3. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
GENERAL NOTES

1. Concrete shall be Class 5, design strength f_c = 4000 PSI.

2. The half barrier shall be placed upon a bed of grout in order to provide a uniform bearing.

3. Dowel joints shall be grouted under pressure until all of the openings and the joints are filled.

4. This standard shall not be used when an individual run consists of less than five 20 foot sections.

5. All bend dimensions for reinforcing steel shall be out-to-out of bars.
GENERAL NOTES

1. Concrete shall be Class S, design strength f'_c = 3000 PSI.

2. If the footing and barrier are cast monolithically, No. 6 S-shaped rebars will not be required.

3. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
GENERAL NOTES

1. Concrete shall be Class 5, design strength f’c = 4000 PSI.

2. The half barrier shall be placed upon a bed of grout in order to provide a uniform bearing.

3. Dowel joints shall be grouted under pressure until all of the openings and the joints are filled.

4. This standard shall not be used when an individual run consists of less than five 20 foot sections.

5. All bend dimensions for reinforcing steel shall be cut-to-cut.
GENERAL NOTES

1. All concrete shall be Class "5" (f'c = 3000 psi).
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. Transverse construction joints shall extend through the foundation slab and be located at intervals not to exceed 20 feet.
5. See drainage sheets for slotted drain and catch basin details.
6. Departure termination may be substituted for the C-10.76 barrier transition under departure conditions.
7. See Std. C-05.20 for sidewalk construction.
8. All bend dimensions for reinforcing steel shall be out-to-out of bars.
GENERAL NOTES

1. Median Barrier shall be constructed by the slip form or formed Cast-in-Place method.

2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class S, design strength f'c -3000 PSI.

4. If the footing and barrier are cast monolithically, No. 6 5-shaped rebars will not be required.

5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

6. No. 4 Rebar shall extend 3" past the construction joint at the completion of the day's pour.

Depth to match adjacent PCCP thickness 8" Min.

WITH PCC PAVEMENT

WITH AC PAVEMENT

SECTION A-A
GENERAL NOTES

1. Median Barrier shall be constructed by the slip form or by the formed Cast-In-Place method.

2. When obstructions are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class 5, design strength $f_c = 3000$ PSI.

4. If the footing and barrier are cast monolithically, No. 6 shaped rebar will not be required.

5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

6. No. 4 Rebar shall extend 3" past the construction joint at the completion of the day's pour.

△ Depth to match adjacent PCCP thickness (8" Min).

WITH AC PAVEMENT
SECTION A-A

WITH PCC PAVEMENT
SECTION A-A

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CONCRETE MEDIAN BARRIER
TALL TYPE T
CAST IN PLACE

C-04L06
GENERAL NOTES

1. Concrete shall be Class 5, design strength f'c = 4000 PSI.
2. Half Barrier shall be placed upon either Asphalt or Portland Cement Concrete Pavement.
3. Pavement thicknesses adjacent to Half Barrier shall be 3' minimum.
4. The Half Barrier shall be placed upon a bed of grout in order to provide a uniform bearing.
5. Dowelled Joints shall be grouted under pressure until all of the openings and the joints are filled.
6. This standard shall not be used when an individual run consists of less than five 20 foot sections.
7. All bend dimensions for reinforcing steel shall be out-to-out of bars.

PLAN

ELEVATION

CONSTRUCTION JOINT DETAIL
GENERAL NOTES

1. Concrete shall be constructed by the fixed form cast-in-place method.

2. Concrete shall be Class S, design strength f_c = 3000 psi.

3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.

4. All bend dimensions for reinforcing steel shall out-of-out of bend.

PLAN

ELEVATION
BARRIER WITHOUT CURB
GENERAL NOTES

1. See section B-B for caloason reinforcement.

* 1'-0" Min or Match
  Thickness of Adjacent AC Pavement

See Optional Construction
  Joint Detail, Sheet 3
GENERAL NOTES

1. Concrete shall be constructed by the
   Fixed Form Cast-in-Place method.

2. Concrete shall be Class S, design strength
   f_c = 3000 psi.

3. All reinforcing steel shall have 2" minimum
   clear cover unless otherwise noted.

4. All bend dimensions for reinforcing steel
   shall out-to-out of bars.

5. Two inch deep contraction joints shall be
   placed in the gutter at locations which
   match the joints in adjacent portland
   cement concrete pavement and at
   locations that are at least 2 feet from
   adjacent to asphaltic concrete pavement.
   Joints shall be either hand tooled or
   sawed.

ELEVATION
BARRIER WITH CURB AND GUTTER

* 1'-0" Min or Match
  Thickness of Adjacent
  ACC Pavement
1. Concrete shell be constructed by the Fixed Form Cast-in-Place method.

2. Concrete shell be Class S, design strength f_c = 3000 psi.

3. All reinforcing steel shell have 2" minimum clear cover unless otherwise noted.

4. All bend dimensions for reinforcing steel shell out-to-out of bars.
GENERAL NOTES

1. See section B-B for casing reinforcement.
GENERAL NOTES

1. Concrete slab shall be constructed by the Fixed Form Cast-in-Place method.

2. Concrete slab shall be Class S, design strength $f_c = 3000$ psi.

3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.

4. All bend dimensions for reinforcing steel shall out-to-out of bars.

5. Two inch deep connection joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphalt concrete pavement. Joints shall be either hand tooled or sawed.

PLAN

ELEVATION
BARRIER WITH CURB AND GUTTER

* 1"-0" Min or Match Thickness of Adjacent ACC Pavement
GENERAL NOTES

1. All concrete shall be Class "5" (f'c = 3000 psi).
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Barrier transition shall match both adjoining curb and gutter and concrete half barrier.
6. See Std. C-0.05 for sidewalk construction.
7. All bend dimensions for reinforcing steel shall be out-to-out of bars.
8. Two V-notch expansion joints shall be placed in the gutter at locations which match the joints in adjacent pavement and concrete pavement and at approximate 10 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand foiled or sawed.

PLAN VIEW

ELEVATION

SECTION C-C

TRANSITION TO VERTICAL TYPE CURB
GENERAL NOTES

1. All concrete shall be Class "S" (f'c - 3000 psi).
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Barrier transition shall match both adjoining curb and gutter and concrete half barrier.
6. All bend dimensions for reinforcing steel shall be cut-to-cut of bars.
7. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portions cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

- Varies - 2'-6", 4'-6" or width as per plans.
GENERAL NOTES

1. Half Barrier Transition shall be constructed by the formed Cast-In-Place method.

2. Concrete shall be Class S, design strength f'c = 3000 PSI.

3. If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.

4. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

5. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

6. Thickness of footing, 'D', can be adjusted to match the PCP thickness, as approved by the Engineer.

7. Two final deep construction joints shall be placed in the gutter at locations which match the joints in adjacent Portland cement concrete pavement. A joint at approximately 15 foot centers where adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

CONSTRUCTION JOINT DETAIL

(OPTI</p>
GENERAL NOTES

1. Poles shall be 12'-6" C to C. Structural steel shall conform to ASTM A-36, galvanized ASTM A-123.

2. Hex head bolt shall conform to ASTM A-325.

3. Mechanical spring lock washer shall conform to ASTM A-575, galvanized ASTM A-525 Class C.

4. Tension wire is ANSI NO. 8, 4/4, 1/4 galvanized to ASTM A-126 Class 2.

5. Hog ring is ANSI NO. 12 or 1/4" galvanized ASTM A-126 Class 2. Fasten glare screen to top and bottom tension wire space approximately 2" apart.

6. Glare Screen Illag Orange steel, ASTM A-525, galvanized ASTM A-325/G230, extended to the following diameters: L37' shortway of diamond and 40'-0" longway of diamond (center to center of bridges) with a strand at 0.250" spaced at approximately 20" to the plane of the original sheet. Top edge to be shop curved and crimped on 12" centers. Glare screen shall be installed such that flat portion of screen blocks light from headlights. See Direction Details.

7. Splices allowed in glare screen at posts only, with full flat diamond overlap.

8. Glare screen shall be constructed without interruption to the greatest degree possible.
1. Cattle guard shall be sloped to conform to the roadway grade and cross section, except that where an odd number of grill units is specified in a crowned roadway, the center grill unit shall have a level cross slope.

2. Grill units shall be set on an angle assembly consisting of one 6"x3/8" angle and 3/8" diameter studs with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 2.

3. Where the adjacent roadway is paved, an angle assembly shall consist of one 4"x4"x3/16" angle and 5/8" diameter stud with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 1.

4. Where the adjacent roadway is unpaved, an angle assembly shall consist of one 4"x4"x3/16" angle and one 2"x2"x3/16" angle and connected with 5/8" diameter studs. The assembly shall be crowned at the centerline and constructed with a bevel cut and welded. The studs shall be bent 90° and placed on 1'-0" centers. See Angle Assembly Detail No. 3.

5. Each angle and assembly shall be fabricated to form a single piece for the full length of the cattle guard.

6. Quantities shown for concrete and reinforcing bars are to be considered approximations for informational purposes only.

When guard rail is to be used at the cattle guard, it may be possible to reduce the number of grill units required.

---

**UNIT TABLE**

| Roadway Width (Feet) | Grill Units Required | Concrete Cubic Yards | Rebar-

<table>
<thead>
<tr>
<th>Units</th>
<th></th>
<th></th>
<th>lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>6.6</td>
<td>173</td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>8.0</td>
<td>240</td>
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<tr>
<td>20</td>
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<td>12.5</td>
<td>376</td>
</tr>
<tr>
<td>34</td>
<td>6</td>
<td>14.7</td>
<td>443</td>
</tr>
<tr>
<td>36</td>
<td>6</td>
<td>16.9</td>
<td>511</td>
</tr>
<tr>
<td>38</td>
<td>7</td>
<td>16.9</td>
<td>511</td>
</tr>
<tr>
<td>40</td>
<td>1</td>
<td>16.9</td>
<td>511</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Material for shoulder transition shall be placed to the finished roadway elevation for the entire length of the transition. When the roadway is paved, Aggregate Subbase or Aggregate Base shall be used. When roadway is unpaved, a material equivalent to the existing roadway shall be used.
GENERAL NOTES

1. See Std C-11:0 for all other Cattle Guard details.
2. This standard shall be used in embankment or where highly erodible soil is found.
3. All concrete shall be Class B.
GENERAL NOTES

1. This design applicable only to wood tie track construction. Wood shims shall be unpainted and cut from material meeting the specifications of the existing ties.

2. 3 x 3 x 3/8" treated, 2 1/4" bearing bars and 2 5/8" nominal diameter pipe wing assemblies shall be primed with one coat of No. 1 paint and finished with two coats of yellow enamel paint.

SECTION B-B

A

Detail No 5 (Typ)  

PLAN

Detail No 4 (Typ)  

BASE OF RAIL

SECTION A-A

FOR 8' TIES  

1-2 1/4"  8 1/2"  5 3/8"  

1-1 1/4"  3 3/4"  3 3/8"  2 2 1/4"  2 1/2"  2 3/8"  

FOR 9' TIES  

2 1/4"  8 1/2"  5 3/8"  

Detail No 2 (Typ)  

9 3/4"  

NOTE:  

For Section Between Double Track, Detail No 3

DETIAL NO. 4

6 x 2 x 2" Plate Drill for 3 1/2" Bolts

DETAIL NO. 5

SECTION NOTES

© SHIM HEIGHT

RAIL LBS/YD

80  90  100  110  120  130  140  150

2 1/2"  2 3/4"  3 3/4"  3 5/8"  4 3/8"  4 5/8"  4 7/8"  5 3/8"

3/8" DIAMETER GALVANIZED DOME HEAD SPIKE LENGTH

11"  11"  11"  11"  11"  11"  11"  11"  11"  11"  11"  11"
GENERAL NOTES

1. Length of post and braces shall not be less than 7'-0".

2. Woven wire fence fabric shall be attached to the post at the top, bottom, and intermediate wires.

3. Intermediate Post Assemblies shall be located as shown and at intervals to utilize standard rolls to minimize cutting and waste.

4. A twisted wire stay shall be centered between posts.

TYPICAL WOVEN WIRE FENCE INSTALLATION—TYPE 1 WW SHOWN

TYPE 1 WOVEN WIRE (WW)

TYPE 2 WOVEN WIRE (WW)

TYPE 3 WOVEN WIRE (WW)

TYPE 4 WOVEN WIRE (WW)

FENCE FABRIC DIMENSIONS AND DESIGN NUMBERS

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

FENCE, WOVEN WIRE

C-12.10
Sheet 1 of 5
GENERAL NOTES

1. Intermediate Post Assemblies shall be located as shown and at intervals not to exceed 650', or halfway between all braced posts.

2. For game fence the bottom wire shall be barbed.

3. The stays on game fence shall have their ends turned up, to prevent injuries to game.
GENERAL NOTES
1. Post assemblies shall consist of an upright angle 2 7/8"x2 7/8"x1/4 at 4.0 lbs/ft, end brace angles 2 7/8"x2 7/8"x1/2 at 3.5 lbs/ft.

TYPICAL FENCE LOCATION AT CATTLE GUARD

Existing Fence
New Fence
End Post Assembly

NEW FENCE

ABUTTING FENCE
ABUTTING FENCE AT POST

TYPICAL CROSS SECTIONS OF LINE POST SHAPES

TYPICAL FENCE LOCATION

DETAIL A

DETAIL B
INTERMEDIATE POST ASSEMBLY

DETAIL C
END POST ASSEMBLY

DETAIL D
CORNER POST ASSEMBLY

FENCE CONNECTION TO WINGWALL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

DRAWN:        CHK'D:
S. RIVERS        D. DAVIS

SHEET 5 OF 6
C-1210
7/94
GENERAL NOTES

1. Posts shall be round, inset, or re-formed and shall conform to the nominal dimensions and tolerances shown on the plans. All dimensions are in inches. Tolerance for all sizes shall be ± 0.5" for line posts and ±0.3" for terminal posts.

2. Chain link fabric shall be either zinc-coated or galvanized steel wire mesh. The fabric shall conform to the requirements of ASTM A352, Class I coating. Galvanized coating shall be at least 0.15 mm thick. The fabric shall be of a quality suitable for permanent installation.

3. Tension wires shall be 7 gauge (0.137 mm diameter) for all fences except those fabricated for fabric lengths exceeding 120 feet, where the tension wires shall be 8 gauge (0.127 mm diameter) for all fences except those fabricated for fabric lengths exceeding 150 feet.

4. Truss rods shall be 3/4 inch diameter adjustable rods. Truss tensioners shall have a strap thickness of not less than 3/4 inch.

5. Stretcher bars shall be 1/2 inch by 3/4 inch flat bars. Stretcher bars shall be 1/4 inch by one inch for all posts.

6. Bottom tension wire shall be 3/4 inch from top of crown on concrete footings.

7. Intermediate post assemblies shall be spaced at 500 feet to 600 feet between outposts. When the distance between such posts is less than 1,200 feet, the distance between intermediate posts shall be no more than 600 feet.

8. See sheet 3 of 3 for typical fence location.

TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE I SHOWN

TYPICAL POST DIMENSIONS

<table>
<thead>
<tr>
<th>Fabric Height</th>
<th>Corner, End, Intermediate, Gate, Latch and Pull Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
<td>Rot Formed</td>
</tr>
<tr>
<td>36&quot;</td>
<td>2.375</td>
<td>3.500 x 3.500</td>
</tr>
<tr>
<td>48&quot;</td>
<td>2.375</td>
<td>3.500 x 3.500</td>
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<tr>
<td>60&quot;</td>
<td>2.375</td>
<td>3.500 x 3.500</td>
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<td>72&quot;</td>
<td>2.375</td>
<td>3.500 x 3.500</td>
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<tr>
<td>Over 72&quot;</td>
<td>2.875</td>
<td>3.500 x 3.500</td>
</tr>
<tr>
<td></td>
<td>Height</td>
<td>2'-6&quot;</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Barbed wire for use with Type 2 chain link fence shall be 12 gauge steel wire with 4 point 14 gauge barbs spaced five inches apart and shall be either zinc-coated or aluminum-coated. Zinc-coated steel wire shall conform to the requirements of ASTM A263, Class 1 coating, Aluminum-coated steel wire shall conform to the requirements of ASTM 1390, Type 1, Class 1 coating.

2. Barbed wire support arm shall be of the type shown on the plans, shall be fabricated from commercial quality steel, and shall be zinc-coated in accordance with the requirements of AASHTO M119.

3. Bottom tension wire shall just clear top of crown on concrete footings.

4. For details and notes not shown - see chain link fence Type 1 sheet 1 of 3.

5. See sheet 3 of 3 for typical fence location.

TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE 2 SHOWN

TYPICAL POST DIMENSIONS

<table>
<thead>
<tr>
<th>Fabric Height</th>
<th>Corner, End, Intermediate, Gate, Latch and Pull Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
<td>Roll Formed</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>72&quot; 8'-6&quot;</td>
<td>2.375'</td>
<td>3.50&quot; x 3.50&quot;</td>
</tr>
</tbody>
</table>

DETAIL G
BARBED WIRE SUPPORT ARM
GENERAL NOTES

1. All concrete shall be Class S, 4000 psi.

2. All bolts, nuts, washers and fittings shall meet the dimensional requirements of the American National Standards Institute, unless otherwise designated and shall be galvanized in accordance with ASTM A153.

3. Galvanized swaged fitting and U-Bolt shall conform to ASTM A449.

4. The 7/8" galvanized wire rope shall conform to AS R1785 Class B, Type 3.

5. The wire fabric, ties, bands, stretchers, and other fittings and hardware shall conform to AS R1785 Mi B.

6. The wire fabric fence shall follow contour of the graded median.

7. The excavation for the concrete anchor blocks shall be to neat lines. Minimum excess shall be 5".

8. Perforated posts shall be square tube formed from 500-550 gauge ASTM A442/A 442M cold rolled carbon steel. The square tubes shall be welded directly in the corner by high frequency resistance welding or equal. The posts to be externally blasted to agree with standard corner radii of 5/8" and 3/4".

9. Perforated posts shall be galvanized to the requirements of ASTM A653/A 653M. Coating designation shall be 22%

10. The cables shall have enough tension to prevent sagging. The location of the concrete anchor blocks may also be varied to provide enough tension to help prevent sagging.

11. Two interior post and lamp bars shall be spaced at 1/3 of the distance between posts.


13. An alternate to rectangular concrete anchor blocks shall be a 36" diameter round footing with an additional depth of 4".

14. The median approach grade within 100% of the Chain Link Cables Barrier should not exceed a grade break of 10 percent.

NOTE: Shown C4 LW System Without Curb, May Use Other Systems With or Without Curb.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

DESIGNER: O’Connor

CHAIN LINK CABLE BARRIER
C-12-20
Sheet 1 of 1

10/95
GENERAL NOTES

1. Pipes shall be installed either in a trench condition or in a non-trench condition in natural ground or in embankment.

2. In a trench condition, the vertical and horizontal limits shall be maintained. If horizontal limits are exceeded or the vertical limits are not maintained, a non-trench condition exists.

3. Bracing and sloping shall conform to OSHA requirements.

4. Pipe backfill may be bedding material.

5. In a non-trench condition, the embankment for pipe stability shall be constructed in lifts to the limits shown in the detail simultaneously with the bedding material and pipe backfill. If the contractor chooses to construct it as a trench condition, the embankment shall be constructed before excavating the trench.

D - Outside diameter of full-circle pipe or outside dimension lap or riser of arch, arch pipe, elliptical pipe.
T - Minimum wall thickness for NRCIPP. See Plans.

6. 6 inches except when an unyielding or unstable material. See standard specifications.

- TRENCH BACKFILL
- PIPE BACKFILL
- BEDDING
GENERAL NOTES

1. Design of end section shall conform to standards.
2. End section joint configuration shall match the pipe joints.
3. Embankment slope shall be warped to match slope of end section.

<table>
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<th>Dimensions - Inches</th>
<th>Approx Slope</th>
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<td></td>
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PLAN

SECTION A-A

FRONT ELEVATION

SPACING FOR MULTIPLE INSTALLATION

RIGHT ANGLE CULVERT

SKEWED CULVERT
GENERAL NOTES

1. The end section may be joined to the pipe or connector section by bolts, rivets, dimpled bands, slip-seam bands or threaded rod type fasteners. For allowable connector types, see Table 1.

2. The type 1 connector is by means of bolts or rivets. Maximum circumferential fastener spacing shall be 12" and with a minimum of 8 fasteners per joint. The type 1 joint may be used with either annular or helical corrugations.

3. Type 2 and 3 connectors shall be used only with annular or helical pipe with a minimal number of annular corrugations.

4. Type 4 and 5 connectors shall be only used with helical pipe.

5. All steel end section components shall be galvanized.

6. Toe of embankment shall be warped to match toe of skewed end section.

7. A term shall be added to abnormal projections per ANSI C-133A.

8. The foregoing applies to all cross section configurations.

### Dimensions - Inches

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| Dimensions - Inches
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GENERAL NOTES

1. For lateral dimensions of invert paving, use 72° control for CMP and span for CMFA.

2. Paving shall be scored laterally at 1'-6" minimum intervals along the length of the pipe.

3. Use bevel on inlet headwall only.

4. Wire mesh shall be fastened or welded to corrugation crease at intervals and in a manner approved by the Engineer. Laps shall be 6" minimum.

5. Paving shall not be placed until backfitting is completed.

6. Concrete shall be Class B.

7. See Table B-1112 for headwall and bevel dimensions not shown.
GENERAL NOTES

1. This end treatment is to be used only for those cattle and/or vehicle passes not used for drainage.

2. All concrete shall be Class B. An optional 12" AB invert paving base course and 6" of concrete may be used in the 14" diameter pipe.

3. Anchor bolts shall be retained in a horizontal position during pour with final tightening a minimum of 7 days after pour.

4. Pipe shall be backfilled before concrete bond beam is constructed. Minimum forming may be used.

5. Edges of wire mesh shall be fastened or welded to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be a minimum of 61.

6. For installation normal to roadway centerline only,
**GENERAL NOTES**

1. Slotted drain pipe shall be 2½" × 1½" corrugated steel pipe with a minimum wall thickness of 0.064" and shall conform to the requirements of ASTM A36.

2. All concrete shall be Class B.

3. Reinforcing steel shall conform to ASTM A615, Grade 40.

4. Structural steel shall conform to ASTM A36.

5. Concrete anchors shall conform to ASTM A307 and hex nuts shall conform to ASTM A563, Grade A.

6. All slotted drain pipe hardware except anchor bolts and reinforcing steel shall be given two coats of red oxide primer.

7. When annular pipe is used, apply water proof sealer before attaching coupling bands.

8. When helical pipe is used, it shall be formed with at least one annular corrugation at each end of each pipe section. Water proof sealer shall be applied to the annular corrugation prior to attachment of coupling bands.

9. Cover seat during construction with removable tape or other acceptable substitute.

10. Slotted drain pipe stub shall be cleaned at the time of final acceptance.

11. Concrete curb and gutter thru the slotted drain shall be paid for under the respective curb and gutter items.

12. Refer to curb and gutter details for dimension and details not shown.


**SECTION A-B**

1. **Finished Grade**
2. **Cross Bar Spacer**
3. **CMP Coupling Band**
4. **CMP Joint Sealant**
5. **Cement-Treated Slurry**
6. **Concrete Class B**
7. **Edge of Base Materiel or PCP Placed Directly on Subgrade**
8. **Type B or C Curbing with Slotted Drain**
9. **Roadway Width Per Plane**
10. **Concrete Class B**
11. **Slotted Drain Pipe**
12. **Cement-Treated Slurry**
13. **Concrete Class B**
14. **Slotted Drain Pipe**
15. **Cement-Treated Slurry**
16. **Concrete Class B**
17. **Slotted Drain Pipe**
18. **Cement-Treated Slurry**
19. **Concrete Class B**
20. **Slotted Drain Pipe**
21. **Cement-Treated Slurry**
22. **Concrete Class B**
23. **Slotted Drain Pipe**
24. **Cement-Treated Slurry**
25. **Concrete Class B**
26. **Slotted Drain Pipe**
27. **Cement-Treated Slurry**
28. **Concrete Class B**
29. **Slotted Drain Pipe**
30. **Cement-Treated Slurry**
31. **Concrete Class B**
32. **Slotted Drain Pipe**
33. **Cement-Treated Slurry**
34. **Concrete Class B**
35. **Slotted Drain Pipe**
36. **Cement-Treated Slurry**
37. **Concrete Class B**
38. **Slotted Drain Pipe**
39. **Cement-Treated Slurry**
40. **Concrete Class B**

**SECTION B-B**

1. **Finished Grade**
2. **Cross Bar Spacer**
3. **CMP Coupling Band**
4. **CMP Joint Sealant**
5. **Cement-Treated Slurry**
6. **Concrete Class B**
7. **Edge of Base Materiel or PCP Placed Directly on Subgrade**
8. **Type B or C Curbing with Slotted Drain**
9. **Roadway Width Per Plane**
10. **Concrete Class B**
11. **Slotted Drain Pipe**
12. **Cement-Treated Slurry**
13. **Concrete Class B**
14. **Slotted Drain Pipe**
15. **Cement-Treated Slurry**
16. **Concrete Class B**
17. **Slotted Drain Pipe**
18. **Cement-Treated Slurry**
19. **Concrete Class B**
20. **Slotted Drain Pipe**
21. **Cement-Treated Slurry**
22. **Concrete Class B**
23. **Slotted Drain Pipe**
24. **Cement-Treated Slurry**
25. **Concrete Class B**
26. **Slotted Drain Pipe**
27. **Cement-Treated Slurry**
28. **Concrete Class B**
29. **Slotted Drain Pipe**
30. **Cement-Treated Slurry**
31. **Concrete Class B**
32. **Slotted Drain Pipe**
33. **Cement-Treated Slurry**
34. **Concrete Class B**
35. **Slotted Drain Pipe**
36. **Cement-Treated Slurry**
37. **Concrete Class B**
38. **Slotted Drain Pipe**
39. **Cement-Treated Slurry**
40. **Concrete Class B**

**CONNECTION OF SLOTTED DRAIN TO CATCH BASIN AND SLOTTED DRAIN END CAP**

- The 18" × 10'-0" or 24" × 10'-0" CMP stub shall be included in the price of respective catch basins.
GENERAL NOTES

1. Pipe collars not required where direct catch basins connections can be made within 1' of a normal 90° installation, either horizontally or vertically.

2. "T" connections direct to the main drainage trunk line should be avoided and used only where manhole connections are impractical.
GENERAL NOTES
1. Prefabricated tee shall be used when the outside diameter of the inlet pipe exceeds one half of the inside diameter of the main storm drain, except when the manholes are shown on plans.
2. Centerline of the inlet pipe shall intersect the centerline of the main storm drain except when elevation "5" is shown on plans.
3. If Z is 45° or less, type 1 shall be used.
4. All concrete shall be class B.
5. All reinforcing steel shall conform to A603-1, 2, grade 40.
6. Reinforcing steel shall have 2" minimum cover.

SECTION A-A

CONNECTION DETAIL
TYPE 2

SIDE INLET
TYPE 1

CATCH BASIN ABOVE STORM DRAIN
TYPE 2
1. Compact soil at end of pipe plug to 95% of maximum density.

2. If depth of cover is less than 5' or greater than 10', increase plug thickness a minimum of 4'.

DRAINAGE OUTLET INTO CHANNEL

STORM DRAIN PLUG
GENERAL NOTES

1. All concrete shall be Class B.

2. All reinforcing steel shall conform to 1003-1, 2, Grade 40.

3. All reinforcing steel shall have 3" minimum clear cover.

4. A concrete collar shall be required where pipes of different diameters or materials are joined or where the design change in alignment or grade exceeds that allowed for a standard joint.

5. When pipes of different diameters are joined with a concrete collar, "T" & "T" shall be those of the larger diameter.

6. The diameter of the circular ties shall be the outside diameter of pipe + 1.

7. Pipe ends to be trimmed such that the maximum distance between pipes at any point is 2".

PIE COLLAR TABLE

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GENERAL NOTES

1. Catch basin can be used on grade or at roadway sep.

2. Catch basin has three configurations:
   - Sump only: Sump portion of catch basin
     (See Detail No. 4).
   - Single Winged: Wing basin upstream
     Double Winged: Wing basin on each side.

3. Pipes can be placed in any wall except wall adjacent to wing basin.

4. Floor shall have a wood trowel finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 1:4.

5. Any specified crest depression shall be warped to opening according to Std C-15.70.

6. All structural steel shall be ASTM A36.

7. Nose plate, access frame and cover shall be given one shop coat of No. 1 paint.

8. All concrete shall be Class B.

9. All reinforcing bars shall be 1/2" or 5/8" C to C in both ways and 1/2" clear inside of walls and surplus of wing basin floor except as shown.

10. Curb opening area is 1 sq ft per lin of curb x gutter depression + curb opening length (ft) x 0.0833.


12. Construction joints and graining shall be placed to meet field conditions. See Std C-15.70.

13. H = 6" when H is 8" or less.

SECTION A-A
USE THIS SECTION WHEN H=5' OR LESS

SECTION B-B

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

STATE P:\DRAWINGS\D\C-15.20\A03.C-15.20.T"
SECTION A-A
USE THIS SECTION WHEN H IS GREATER THAN 5'

GENERAL NOTES
1. See sheet 1 of 2 for other dimensions, notes and reinforcing steel.

2. 31 - 6' when H is 8' or less,
   8' when H is greater than 8'.

PLAN

Curb Support Anchor
4 Max Anchor Spacing
See Detail No. 2

Catch Basin Sump

Diagram showing:
- Curb Support Anchor
- Construction Joint
- No Bottom Reinforcing
- Reinforcing bars shown are for floor of wing and wall only.
- See sections on sheet 1 for other reinforcing.

DETAIL NO. 1

No. 3 Bar (Typ)

ANCHOR NO. 4 Bar

DETAIL NO. 2

CURB SUPPORT ANCHOR

DETAIL NO. 3

DETAIL NO. 4

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CATCH BASIN TYPE 3

C-15.2A
Sheet 2 of 2
GENERAL NOTES

1. Catch basin can be used on grade or at roadway sag.
2. Pipes can be placed in any way.
3. Floor shall have a wood trowel finish and a minimum 4% slope along the axis of the pipe toward the pipe.
4. Floor over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.
5. Curb over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.
6. Curb must be cast C-1550 for grate and frame details and opening areas.
7. Any specified joint depression shall be warped to opening according to Sto C-1570.
8. All structural steel shall be ASTM 436.
9. Grate frame and beam shall be given one shop coat of No. 1 paint.
10. All concrete shall be Class B.
11. Construction joints and drains shall be placed to meet field conditions. See Sto C-1570.
12. Silicidal sealant shall be placed between the grate frame and PCPP, recessed 3/4" from the pavement surface.
13. See Details No. 2 for catch basin with wide gutter.
14. Grate: 6", when h is 8" or less, 8" when h is greater than 8". See Section B-B.
   - 5" when pavement is AC, 8" when pavement is PCPP.
GENERAL NOTES

1. Catch basin can be used on grade or at roadway seg.

2. Catch basin has three configurations:
   - Super Sump-Sump portion of catch basin
   - Single Wing Illustrated-Sump with wing basin
   - Double Wing Illustrated with symmetrical wing basins on both sides.

3. Pipes can be placed adjacent to a wing basin.

4. Floor shall have a wood trowel finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 4%. The curb may be placed adjacent to the wing basin.

5. Any specified inlet depression shall be covered with grating of No. 2 or 3 Bara. 6" C to C.

6. All structural steel shall be ASTM A36.

7. Nose plate shall be given one shop coat of No. 1 paint.

8. All concrete shall be Class B.

9. Reinforcing bars shall be No. 4, 1/2" C to C both ways and 3/4" clear to frangible wall of wall outside of wing basin. 6" C to C where shown.

10. Curb opening shall be 15% of curb + inert depression + curb opening length (FT) x 0.0264.

11. Wearing shall be in accordance with Standard Wearing Specifications.

12. See Std C-15,500 for grate and frame details and opening areas.

13. Construction joints and details shall be placed to meet field conditions. Std C-15,700.

14. Silicate sealant shall be placed over the grate frame and PCCP, recessed 1/2" from the pavement surface.

15. ■ = 6" when h is 8" or less. 6" when h is greater than 8. See Section C-C.

16. ■ = 5" when pavement is AC. Match pavement thickness when pavement is PCCP.
GENERAL NOTES

1. See sheet 1 of 2 for other dimensions, notes and reinforcing steel.

2. \( \phi = \frac{6}{\sqrt{H}} \) when \( H \) is 8' or less, 8' when \( H \) is greater than 8'.

PLAN

SECTION A-A

USE THIS SECTION WHEN H IS GREATER THAN 5'

DETAIL NO. 1

DETAIL NO. 3

DETAIL NO. 2

CURB SUPPORT ANCHOR

DETAIL NO. 4

Construction Joint

No Bottom Reinforcing

Notes:
- Reinforcing bars shown are for floor S of wing and wall only.
- See sections on sheet 1 for other reinforcing.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CATCH BASIN TYPE S

C-15.40
Sheet 2 of 2
GENERAL NOTES

1. Grating units and frames shall be fabricated from structural steel ASTM A36 except as noted.

2. All welding shall be in accordance with Standard Welding Specifications.

3. The completed assembly shall be given one shop coat of No. 1 paint.

4. Frames and grates shall fit to a maximum rock of 0.035" at any point.

5. Grate opening is 3.97 Sq. Ft.
GENERAL NOTES

1. Cover shall be non-locking.
2. Frame and cover shall be cast iron or structural steel.
3. Catch basin access frame and cover is for use in sidewalk area only.
4. Cover shall be filled with concrete and broom finished.
GENERAL NOTES

1. No inlet depression shall extend into a traffic lane.
2. Maximum combined inlet and gutter depression is 3 inches. See Detail No. 1.
3. Maximum distance along curb between catch basins where full gutter depression is used is 10 feet.
4. See Std. C-15.80 for aprons used with C-15.80 Catch Basin.
5. See Detail No. 2 for grate type catch basins with wide gutter.

LEGEND

○ - Normal pavement or gutter flow line elevation.
● - Depressed elevation.
□ - Straight grade with downward slope.
# - Normal gutter width per Std. C-05.10.
△ - Types 1, 3, & 5.
□ - Type 4 & C-15.91.

CATCH BASIN SPACING AT ROADWAY SAG CONDITION

INLET DEPRESSION

INLET DEPRESSION

CATCH BASIN WITH SLOTTED DRAIN

INLET DEPRESSION

CATCH BASIN WITH WIDE GUTTER

DETAIL NO. 2

DETAIL NO. 1

The diagram illustrates the spacing and installation details of catch basins at a roadway sag condition, as well as the design considerations for inlet depressions with and without wide gutters. The general notes outline specific conditions and limitations for the installation of catch basins and inlet depressions. The legend provides symbols for different types of elevations and gutter widths.
GENERAL NOTES
1. Construction drain may be deleted at the option of the Engineer.

LEGEND
O - Normal pavement or gutter flow line elevation.

CATCH BASIN CONSTRUCTION DRAIN

TYPE 4 CATCH BASIN WITHOUT CURB
### General Notes

1. See also Std. C-1510.
2. High point of headwall shall not project more than 3' above slope.
3. All concrete shall be Class B.
4. All reinforcing bars shall be Number 4, 1/2" O.D. to E and 3" clear to inside of walls and floor.

### PLAN

- Double Symmetrical About A
- Z
- E

### ELEVATION

- Y'
- Chamfer

### SECTION Y-Y

### SECTION Z-Z

### PIPE

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<td>3.85</td>
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|      |        |        |       |       |       |       |       |       |       | Single        | Double            |
|      |        |        |       |       |       |       |       |       |       | Lbs.           |
|      |        |        |       |       |       |       |       |       |       | 278           | 278               |

---

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CATCH BASIN, DROP INLET
C-1578

10/95

keith mcwilliams
GENERAL NOTES

1. Apron shall be portland cement concrete.
2. All concrete shall be Class B.
3. Grating shall be fabricated of structural steel.
4. Structural steel shall be in accordance with ASTM A36.
5. Grating shall be in accordance with Standard Welding Specifications.
6. Grating assembly shall be given one shop cost of No. 1 points.

1. "V" Indicated on plans.
   * "B" When Wall Height Exceeds 8'

SECTION A-A

SECTION B-B

MEDIAN DITCH GRADE DETAIL

GRATING DETAIL

DETAIL NO. 1

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS
CATCH BASIN, MEDIAN
FLUSH

C-15.80
GENERAL NOTES

1. Concrete shall conform to the requirements for Class S Concrete. The minimum strength shall be 4000 psi.

2. Grout shall be in accordance with Standard Specifications except water content shall be such that the consistency is proper for smooth troweling.

3. Grate cross rods shall be resistance welded, fillet welded or electro-forged to bearing bars.

4. The completed grate shall be given one shop coat of No. 1 paint.

5. Foundation soil and backfill shall be in accordance with Section 203-6 of the Standard Specifications.
GENERAL NOTES

1. Concrete shall conform to the requirements for Class S Concrete. The minimum strength shall be 4000 psi.

2. Grout shall be in accordance with Standard Specifications except water content shall be such that the consistency is proper for smooth troweling.

3. Grate cross rods shall be resistance welded, flange welded or electro-forged to bearing bars.

4. The completed grate shall be given one shop coat of No. 1 paint.

5. Foundation soil and backfill shall be in accordance with Section 203-9 of the Standard Specifications.
GENERAL NOTES

1. All concrete shall be Class B.

2. All reinforcing steel shall conform to 1003-1, 1003-2, Grade 40.

3. All reinforcing steel shall have 2" min clear cover unless otherwise noted.

4. Reinforcing steel shall be No. 4 rebar, 12" C to C horizontal & vertical in walls.

5. Pipe can be placed in any wall.

6. See Std C-13.60 and C-13.65 for more information and dimensions of slotted drains.

7. **1**: 6" when H is less than 8';
   **2**: 8" when H is greater than 8'
GENERAL NOTES
1. All structural steel shall be in accordance with ASTM Spec A-36.
2. Grid design is not suitable for locations subject to bicycle traffic.
3. All welding shall be in accordance with Standard Welding Specifications.
4. The completed grate assembly (frame & grate) shall be given two shop coats of No. 1 paint.
5. The installation and inspection of steel studs welded to steel acting as connection devices to the concrete shell conform to the American Welding Society's Structural Welding Code (AWS D11), Specifications 4.21-4.27.

GRATE AND FRAME DIMENSIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Curb Width</th>
<th>Brace Plate Width</th>
<th>Brace Plate Length</th>
<th>Brace Plate Width</th>
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<tr>
<td>B</td>
<td>2'-0&quot;</td>
<td>2&quot;</td>
<td>24'-0&quot;</td>
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</tr>
<tr>
<td>C</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>D</td>
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<td>3'-0&quot;</td>
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<td>3'-0&quot;</td>
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</table>

SECTION A-A

SECTION B-B

BRACE PLATE DETAIL
GENERAL NOTES

1. All concrete shall be Class B.

2. All reinforcing bars shall be *4 except two *6 bars over pipe. Bar spacing approximately 1'-0" center to center unless otherwise noted.

3. 30° wing wall flare shown as 45° normally dealt with. See hydraulics and utility and railroad engineering sections.

PIECE DIMENSIONS QUANTITIES

<table>
<thead>
<tr>
<th>ID</th>
<th>L</th>
<th>E</th>
<th>F (Approx)</th>
<th>CY Concrete CMP</th>
<th>Reinf Steel Lbs</th>
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</tr>
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<td>9'-0&quot;</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td>7'-1&quot;</td>
</tr>
</tbody>
</table>
GENERAL NOTES
1. All concrete shall be Class B.
2. Structural steel shall be in accordance with ASTM A36.
3. All cover steel and exposed appurtenances shall be given one shop coat of No. 1 paint.
4. Plans shall specify locked or bolted cover for standpipe No. 1.
5. For specific details of a flush pavement or sidewalk installation, see Utility and Railroad Engineering Section.

PLAN

SECTION C-C

SECTION D-D

BOLTED COVER FOR STANDPIPE NO. 2

COVER
IRRIGATION STANDPIPE NO. 1

LOCKING COVER
IRRIGATION STANDPIPE NO. 2
**PRECAST IRRIGATION GATE**

For Open Ditch Installation

**TYPE 1**

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

**MATERIALS**
- 16 Gauge Galvanized Iron Gate
- Pipe Size 6" thru 18" as Called for on Plans
- Slot in Concrete for Gate

**PART SECTION**
- **FLUSH IRRIGATION VALVE**

**NOTES**
- Masonry Mortar
- Slope to Fit Local Conditions
- Ground Line
- Concrete 6" to 20"
- Utility Concrete Ring for Lean Installation

**TYPE 2 IRRIGATION GATE**

For pipes 6" through 24", Gate and Frame shall be galvanized iron. Type shown is for concrete pipe. For CIP, external steel adjustable bend shall be used in place of internal steel ring.
**GENERAL NOTES**

1. Irrigation sleeves shall be installed in a trench condition. See Sec C-3.1.3 and Sec C-7.06.
2. Bedding and backfill material shall be Class 2 Aggregate Base.
3. Pipe installation shall conform to Section 501 of Standard Specifications.
4. The Contractor shall imprint a '6' high letter 'S' on the face of all curbs at sleeve locations. The width of the letter shall be 3/8", and shall penetrate the concrete surface 3/16".
5. For non-continuous sleeves under crossroads, Sec C-9.10 Type A-1 curb shall be required where median is irrigated. See plans for locations. Dumbell waterstop shall be at all expansion joints.
6. Materials used for caps or plugs shall be as recommended by the pipe supplier and approved by the Engineer.

**GENERAL** Generally, sleeves shall be installed parallel to the roadway subgrade. Slopes may vary in super-elevated sections, minimum slope nominal to drain.

**DETAIL C** SLEEVE TERMINATION AT ELEVATED ROADWAY
GENERAL NOTES

1. Rock shall be sound and durable, of rounded or angular shape and with a nominal diameter of 8" minimum and 21" maximum. Flat or needle shapes are not acceptable. Rock shall be comprised of 30% min 8" to 12" and 55% max 18" to 21".

2. Wire mesh splice shall have a 6" minimum lap vertically and horizontally.

The roadway plans have been designed utilizing the 2000 Construction Standard Drawings (C-Series), and current revisions. Refer to the 1A sheet for a listing of current revision dates.
GENERAL NOTES

1. Precast manholes shall conform to the requirements of AASHTO M219 except that the compressive strength of each unit shall be determined and accepted in accordance with Section 1006.7 of the AASHTO Specifications.

2. Concrete for all other manholes shall be Class B.

3. Every fifth course of bricks in Manhole No. 1 shall be laid as stretchers.

4. See Std C-1830 and C-1840 for additional information and dimensions.

5. See plans for Std C-1820 frame and cover type.

6. Steps shall be placed in manholes in accordance with the requirements of AASHTO M219.

7. See Std C-1840 for location of Station Location Reference Point.

8. Manhole height, "H", shall be measured from the lowest pipe invert to the top of the manhole frame.
GENERAL NOTES

1. When specified on the plans, the cover (excluding grates) shall be shown with existing identification and conform to the following: Lettering on manhole covers to contain name of agency and utility as directed, letters and words to be equally spaced. Letters to be 2" in height and placed 1/4" above level of cover. Type of letters and layout to be submitted for approval.

2. Casting weights shown are minimum weights and may be used for either cast iron or ductile iron castings. Maximum casting weights shall not exceed 100 percent of weights shown.

3. H20 loading minimum.

4. Details shown are typical.

5. Alternate designs of manhole frame and cover may be utilized with the approval of the designer as long as minimum loading and weight are equivalent.
GENERAL NOTES

1. All dimensions are minimum except where noted.
2. Location & elevation shown on plans.
3. Construction to conform to Sect. 303-2 or SOL.

PLAN

Four Steel Spacers, 4"x4" Thickness
As Required from 1/2" to 2". When
Thickness is Less Than 1/2" Use
Mortar. When Greater Than 2", Use
Brick Or Precast Adjusting Rings

5" Bar

Existing
PCCP

Existing
AC Pveit

PRECAST ADJUSTING RING DETAIL

(2) No. 2 Hoops For
4" Ring, Use with
No. 8, 14, 16, 20 Gauge
Wire, 6" & 8" Ring
Require (4) No. 2
Hoops.

SECTION

MANHOLE COVER FRAME
ADJUSTMENT - PAVEMENT
CUT AND REPLACEMENT
GENERAL NOTES

1. Ford walls shall be Class B concrete.

2. Depth gauge tubing shall be protected against concrete entering through bottom of perforations.

3. Depth gauge tubing and both sides of numeral tabs shall be painted with two coats of white enamel. Numerals and markers shall be painted with one coat of gloss black enamel.

CONCRETE SURFACE ROAD CONCRETE WALLS

- Min Distance Below Stream Bed

BITUMINOUS SURFACE ROAD CONCRETE WALLS

ELEVATION LOOKING UPSTREAM

Well to be Built to One Foot Above High Water Level.

3° Weep hole 70% C to C

Finished Grade

3° Max

Depth Gauge (2)

Wall May Be Built to this Line

3° Max

Vertical Alignment to be as Near Average Transverse Grade of Stream as Possible

DEPTH GAUGE DETAIL

2 1/2" x 1/8" Gauge Sheat

1/2" x 1/8" Perforated Telescoping 3/4" Tube

12 Gauge, 1/4" Holes

2" x 2 1/4" x 3" Numerals

3" Weep holes 70% C to C
GENERAL NOTES

1. All timber shall be rough, pressure treated and unpainted.
2. Rock basket, full length of structure, shall be included only when called for on plans.
3. See plans for bituminous surface and base material details.
4. See Std C-19A0 for Depth Gauge details. Depth Gauge Foundation may be utilly concrete.

WITH TREATED BASE

TYPE 1
BITUMINOUS SURFACE ROAD

ELEVATION - TYPE 2

BITUMINOUS SURFACE FORD
TIMBER CUTOFF WALLS

4"x4"x6'-0" Post
C to C

2'-2"x12" Planks

3'-2"x12" Planks

4'-0" Min

5'-0"

12" x 12" Deep
Conc Foundation
for Depth Gauge

6x6 W/WELD Welded Wire Fabric,
1/4" with 2 Strands of 9.36 oz

Tie Top and Bottom of Basket
to Top 2'-0" Planks at 3'-0"

INTERVALS and at each end
Tie by Encirling Planks with two
Strands of No 9 Wire

2" Non Pipes

T-0" to C
GENERAL NOTES

1. Standard Marker may be used as bench, survey monument or R/W markers.

2. Standard Marker shall be made of brass, bronze or aluminum.

3. Standard Marker will be furnished by the Department. Cast-in lettering format may vary.

4. Bench Marks shall be established on headwalls, bridge curbs or other permanent structures.

5. Surfaces of Aluminum Markers in contact with concrete shall be epoxy coated.

6. Fluted shank may be straight or twisted.

7. Station, Elevation, Year, or other information shall be hand stamped in field, as approved by the Engineer.
GENERAL NOTES
1. All concrete shall be Class B.

FOR SINGLE INSTALLATION

<table>
<thead>
<tr>
<th>QUANTITIES PER FT OF SLAB LENGTH</th>
<th>CONCRETE</th>
<th>REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.31 CY</td>
<td>35.22 lb</td>
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</table>
1. Type A encasement to be used for sewer laterals or house connections BELOW water lines.
2. Type B encasement to be used for sewer laterals or house connections ABOVE water lines.
3. The encasement shall extend at least 6' on each side of the water line and must include the nearest joint.
4. Protection for Type A required when distance from bottom of water line to top of sewer line is 24' or less. When the sewer is a 6" or 8" house connection no protection is required if distance is more than 12".
5. For Type B crossings, Class 150 CLP, or ductile iron pipe may be used as an alternate. For Type B crossings reinforced encasement is always required.

**TYPE A ENCASEMEN**

**TYPE B ENCASEMEN**
GENERAL NOTES

1. Type A pipe support may be used for any type crossing condition.

2. Type C pipe support may be used for crossing pipes with a bed diameter of 18" or less if sufficient clearance over storm sewer is available and total span is less than 36'.

3. Intermediate pipe support shall be used in conjunction with Type C pipe support if total span exceeds max. as in table.

4. The contractor shall be responsible for furnishing all supports both permanent and temporary. Temporary supports shall not be a separate pay item.

5. Permanent pipe supports may be decreased from plan quantities or extended to include some listed below as temporary supports if so desired by the engineer in his discretion and at his expense.

6. When Type A pipe support is used, the contractor shall provide the wall with suitable openings to prevent unequal pressure resulting from flooding of the backfill. The volume of the plowed opening shall not exceed 2% of the volume of the supporting wall.

7. Use Type B pipe support instead of Type C when clearance between pipes is less than 1/2 in table.

8. Concrete cover for reinforcing steel shall be 3", minimum.

SCHEDULE OF REQUIRED SUPPORTS

<table>
<thead>
<tr>
<th>PERMANENT</th>
<th>TEMPORARY</th>
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<tbody>
<tr>
<td>Sewer Lines</td>
<td>Cast Iron Pipe</td>
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<tr>
<td>Conc Irrig Pipe</td>
<td>Conc Box Culvert</td>
</tr>
<tr>
<td>Buried Teleco</td>
<td>Traffic Control Consultant</td>
</tr>
<tr>
<td>Gas Pipes</td>
<td>Water and Sewer Lines</td>
</tr>
</tbody>
</table>

NOTE:
Other utilities as noted on plans or as required by the engineer at time of construction.
ALTERNATE TO PIPE SUPPORT
GENERAL NOTES

1. Pre-cast, reinforced manhole sections shall be manufactured in accordance with AASHTO M299 except that the compressive strength of each unit will be determined and accepted in accordance with section 1006.7 of the specifications.

2. Manhole steps shall be installed at the site of the manhole section manufacture in accordance with industry standards meeting AASHTO M299 requirements. Steps not required in 60" manhole.

3. Use low alkali cement only.

4. Pipe sizes and elevation shown on plans.

5. Frame and cover shall be adjusted to the finished grade prior to placing of the asphaltic concrete or RCCP surface.
GENERAL NOTES
1. Compact soil at end of pipe to 95% of maximum density.
2. If depth of cover is less than 5 ft or greater than 30 ft, increase plug thickness a minimum of 4 ft.

TYPICAL STUB OUT

PIPE PLUG MARKER

PIPE SIZE PLUG THICKNESS A'

12'-36' 8'
39'-48' 12'
51'-72' 18'
75'-90' 24'
96'-114' 32'
120'-132' 36'
138'-150' 40'

STORM DRAIN LINE PLUG

SEWER LINE PLUG

Vitrified Clay Pipe

2" Layer Cement Plaster (Water Tight)

Anchor with Brick or Stone at Trench Bottom or Tie to Bell End

+20 Copper Wire with Yellow Insulation or 2x4 Stake

Preformed Joint

Ground Line

Vitrified Clay or Plastic Plug

Black or Brick and Mortar Plug. See Note 2

Vitrified Clay or Plastic Plug

Band Seal Coupling
TYPE A
2.5' TO 5' DROP

TYPE B
5' OR MORE DROP

NOTE:
D = Same Diameter Pipe
CLEANOUT INSTALLATION
1. Thrust blocks are to extend to undisturbed ground.
2. All concrete shall be Class B.
3. Table is based on 3000 psi. If soil conditions are found to indicate soil bearing less, the areas shall be increased accordingly.
4. Areas for pipe larger than 18" shall be calculated for each project.
5. Form all non-bearing vertical surfaces.

**Minimum Thrust Block Area Required (T x W)**

<table>
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<tr>
<th>PIPE SIZE</th>
<th>WATER PIPE</th>
<th>TEE, DEAD END</th>
<th>90° BEND</th>
<th>45° &amp; 22½° BEND</th>
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<td>3 SQ. FEET</td>
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<td>16&quot;</td>
<td>23&quot;</td>
<td>12&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Gate valves 4" to 16" may be used with any type of pipe.
2. Gate valves larger than 16" to be detailed on plans.
3. Butterfly valves 3" to 12" may be used with any type of pipe.
4. Butterfly valves larger than 12" to be detailed on plans.
5. Valve box and cover required per Std C-23.30.
GENERAL NOTES

1. Either this detail or restraint rods may be used when allowed to relocate a water line upward to cross over a conflict.

2. Ductile iron pipe may be used.

3. Anchor blocks for pipe larger than 12" shall be calculated for each project.

4. Reinforcing bars to be coated with 2 coats of coal tar, epoxy, or by other approved methods.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MINIMUM BAR SIZE</th>
<th>A-DIMENSION (INCHES)</th>
<th>MINIMUM BLOCK DIMENSION</th>
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<tbody>
<tr>
<td>6&quot;</td>
<td>0.5</td>
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<td>0.6</td>
<td>9&quot;</td>
<td>4x4x2.5</td>
</tr>
<tr>
<td>12&quot;</td>
<td>0.6</td>
<td>9&quot;</td>
<td>4x5x5</td>
</tr>
</tbody>
</table>

* For 125 psi working pressure
GENERAL NOTES

1. This detail covers moving of water mains, 2" to 12" only.
2. Thrust blocking per Std C-23.30 and C-23.20.
3. If offsets is to go over obstruction, joint restraints must be used.
4. Pipe is to be cast iron or ductile iron.
5. 45° cast iron bands may be used in place of cast iron offsets.
6. Drop section is to be prefabricated and installed as a single unit for cast iron mechanical joints.
GENERAL NOTES

1. Extension to valve stems required on all valves where operating nut is over 5" below surface. Extension stem shall be 1/2" minimum diameter steel designation A-53, with square socket on bottom to fit 2" square valve nut. Length to fit each installation, 2" square operating nut to be held on top of extension stem with stop nut.

2. If two or more joints of ACP are used to make riser, use standard AC pipe rubber gasket coupling to join pipe, where riser pipe length exceeds 10', use 12' AC pipe.

3. All steel to have prime coat of paint No. 4 and one heavy application finish coat of Light Gray Enamel paint as per section 1002-4.06.

4. Valve box shall be adjusted to the finished grade prior to the placing of the asphaltic concrete surface or PCCP.

5. Ground below the concrete pad or three bricks to be compacted to 95% of the maximum density.

6. Use Parkson, Tyler Apco, or equal deep skirted cover (4" or more) type, sliding adjustable cast iron valve box, CI minimum 15 30,000 psi.

TO BE USED IN AREAS SUBJECT TO VEHICULAR TRAFFIC
TYPE A-2
TO BE USED WHEN VALVE BOX IS LOCATED WITHIN PCCP PAVEMENT

TYPE B
NOT SUBJECT TO VEHICULAR TRAFFIC
GENERAL NOTES

1. Thrust blocks are to extend to undisturbed ground.

2. Optional blocking of 3" x 6" x 12" solid or concrete masonry units may be used as indicated.

3. All concrete shall be class B, normally, cured 24 hours before backfilling, or use high, early strength concrete.

4. All taps shall be made by city crews at prevailing rates.

5. Install permanent blocking under valve before tap is made. All flange bolts shall be clear of footing.

6. All tapping sleeves must be pressure tested prior to request for tap by city.

7. Contractor shall excavate as shown and shall set tapping sleeve and valve, and tighten all bolts prior to requesting city to make tap.

8. Tapping sleeve to be placed a minimum of 18" from any bell, coupling, valve, or other obstruction.

9. Areas for more than 15' shall be calculated for each project.

---

**SIZE OF PIPE BEING CONNECTED** | **MINIMUM THRUST AREA REQUIRED (A x B)**
---|---
4" & LESS | 3 SQUARE FEET
6" | 4 SQUARE FEET
8" | 6 SQUARE FEET
10" | 9 SQUARE FEET
12" | 13 SQUARE FEET
16" | 25 SQUARE FEET

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STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

DRAFTS

7/94

TAPPING SLEEVE AND VALVE INSTALLATION

DATE: 7/94

C-23.35
GENERAL NOTES

1. This detail is for use only on underground installations where the use of concrete thrust blocking per Std C-2320 cannot be used because of obstructions, or requirements of the specifications.

2. Washers may be cast iron or steel, and may be round or square. Holes shall be ½ inch larger than the rod.

3. All tie rods, rod couplings, turn-buckles, bolts and nuts for these joints shall be of carbon steel equivalent to ASTM A-307, grade B, with cadmium plating in accordance with ASTM B 696, except that the minimum thickness of the plating shall be .0032 of an inch. Cadmium plated bolts shall have class 2A threads and the nuts, rod couplings and turn-buckles shall have 2A threads.

4. High strength, heat treated cast iron tee-head bolts with hexagon nuts, all in accordance with the strength requirements of ARRA C-111, may be used in lieu of the cadmium plated bolts and nuts.

5. The sketches in this figure show acceptable methods of providing anchorages. There is no particular significance to be attached to whether the sketch shows a bolt and saddle joint or a standard mechanical joint, the anchoring procedure illustrated applies in most cases to either type of joint. In some cases, dimensions of the particular pipe or hub and space available for working around the particular joint will influence the choice of methods used.

6. In certain assemblies of rod and clamps shown, rods run from a lug on the fitting or a clamp behind the hub of the bell to a clamp against a face of a bell. Note that in this arrangement, anchors only one joint. The stability of the joint where the clamp is against the face of the bell depends on having joint above a negative long piece of pipe on both sides of the joint. Consequently, if the distance between the first and the second joint is less than 12 feet, the second joint shown shall be anchored by a clamp behind the hub of the bell and rods to a clamp at the face of the next bell.

7. For pipe larger than 12 inch diameter, restraint details shall be submitted for approval prior to installation.

8. All exposed metal shall be coated with anesthetic primer per subsection 507-2.22.

9. Bolt holes in clamps shall be ¾ inch larger than the bolts.

<table>
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<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>CLAMP</th>
<th>ROD</th>
<th>BOLTS</th>
<th>WASHERS</th>
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GENERAL NOTES

1. The meter boxes shall conform to the dimensions as shown and shall be made of portland cement concrete poured and tamped for vibration in true forms.

2. Use Class S concrete, f=4000 psi.

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**METER BOX DIMENSIONS**

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1" METER 1½" METER 2" METER
GENERAL NOTES

1. Cut and plugs must be adequately "dry blocked".
2. Dry blocks shall be standard size solid masonry concrete blocks, (ASTM C-139).
3. The quantity and arrangement of the blocking must withstand the line pressure by holding the cap or plug in position.
4. Concrete thrust blocks shall not be poured until the line pressure is restored and the cap or plug is inspected for leakage.
5. Concrete shall not be poured over any portion of the abandoned pipe.
6. Minimum thrust block area per Std C-2310.
7. Where a 4" or larger line is specified to be abandoned, the cut and plug should occur at the supply line main to avoid creating an unused deadend line.

PLAN

ELEVATION
GENERAL NOTES

1. All joints in hydrant run-out to be mechanical joints.

2. Hydrant Tee or approved equal may be used in place of Tee and 90° bend.

3. 90° bend not required if sufficient room for perpendicular installation.

4. See Std C-23.10 and C-23.35 for concrete thrust blocks.

5. A flange by mechanical joint shutoff valve, connecting directly to the tee or below at the main shall be used.

6. Fire hydrant, fire hydrant threads, valve and valve boxes per municipal requirements.
GENERAL NOTES

1. Obstructions, such as utility poles, street signs, irrigation boxes, fences, etc., must not be placed between curb and hydrant.

2. Radius varies by municipality.

3. Dimensions shown on plans supersede locations shown on this detail.

4. On locations in midblocks, the fire hydrant will be aligned with a property line.

**AREA WITH SIDEWALK**

**PARKWAY AREA OR NO SIDEWALK**