STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
ROADWAY ENGINEERING
ROADWAY DESIGN SECTION

CONSTRUCTION
STANDARD DRAWINGS
To: All Users of the Roadway Construction Standard Drawings

Date: 18 April 06

From: Mary Viparina  
Assistant State Engineer  
Roadway Engineering Group

Subject: C-Standards Update

The October 2004 Roadway Construction Standard Drawings have been revised and updated, and are available for download on the Roadway Design web site at the following address: http://www.azdot.gov/highways/rdwyeng/roadwaydesign/viewable_drawings.asp

The attached spreadsheet summarizes the changes made to the previous drawings. The changes of note are more fully described below:

- C-02.20 & C-02.30: Revised cut and fill slope dimensions;
- C-05.30, Shts 3 & 4 of 7: Modified PLAN and PERSPECTIVE views to clarify ramp location;
- C-05.30, Sht 7 of 7: Added a PLAN and SECTION views for a brick detectable warning strip;
- C-10.76: Modified SECTION views to depict "F" shape; and
- C-11.10: Re-issued the drawings in four sheets. Sheet 4 shows the clamp designed to enhance the bicycle ridability of the cattle guard.

Design personnel should implement the updated drawings and incorporate them into their project plans. For projects at or near completion, where the inclusion of all new standard drawings is not practical, the 1A Sheet must accurately reflect the correct revision dates for the design. Construction personnel should review the drawing revisions for possible implementation on construction projects.

Please distribute this memorandum to all users within your Group, Section, or District, and arrange for printing of the updated Standard Drawings for those without computer access. Copies of the complete set of Roadway Construction Standard Drawings (either 8-1/2" x 11" or 11" x 17") may be obtained from Engineering Records located at 1655 West Jackson, Room 175, Phoenix, AZ 85007-3217 or by telephoning 602-712-8216.

The updated Construction Standards Index (1A Sheet) and Barrier Summary Sheets are also available online at the address shown above.

Please direct questions regarding this memorandum or the updated standards to Kenneth Cooper, Roadway Standards Engineer at 602-712-8674.

MAV/KRC/krc

c: Roadway Engineering Group  
Traffic Engineering Group  
Valley Project Management Group  
Environmental and Enhancement Group  
Districts (10)  
Statewide Project Management Group  
FHWA  
Contracts and Specifications Section  
Construction Group  
Bridge Group  
Regional Traffic Engineers (4)  
Materials Group  
Local Government Section  
Engineering Consultant Section  
District Permits Office (9)  
Engineering Records  
Maintenance Group  
Dan Lance  
Sam Maroufkhani  
Doug Forstie
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<th>STANDARD DRAWING</th>
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<tr>
<td>C-02.10</td>
<td>Added &quot;Rural&quot; to title</td>
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<td>C-02.20</td>
<td>Modified slope criteria – slopes and range. Modified drawing title.</td>
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<tr>
<td>C-02.30</td>
<td>Modified drawing title, slopes, and ranges. Added a note regarding proper standard application.</td>
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<td>C-04.10, Sheet 2 of 2</td>
<td>Revised SECTION B-B and POST SLEEVE DETAIL by subduing graphics for post and w-beam guardrail. Revised note at outlet in SECTION B-B to correct references. General Note 4 revised by replacing &quot;in lieu&quot; with &quot;instead.&quot;</td>
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<td>C-05.12, Sheet 2 of 3</td>
<td>Removed Type 'G' Curb &amp; Gutter from note.</td>
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<tr>
<td>C-05.30, Sheet 1 of 7</td>
<td>Modified General Note 2. Defined elevation of &quot;Top of Ramp Curb&quot; in SECTION B-B. Revised text orientation.</td>
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<tr>
<td>C-05.30, Sheet 2 of 7</td>
<td>Modified General Note 2. Revised text orientation in SECTION A-A.</td>
</tr>
<tr>
<td>C-05.30, Sheet 3 of 7</td>
<td>Modified General Note 3. Modified ramp location in PLAN and PERSPECTIVE views. Revised text orientation in SECTION A-A.</td>
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<tr>
<td>C-05.30, Sheet 4 of 7</td>
<td>Modified ramp location in PLAN and PERSPECTIVE views.</td>
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<tr>
<td>C-05.30, Sheet 5 of 7</td>
<td>Modified General Note 3.</td>
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<tr>
<td>C-05.30, Sheet 7 of 7</td>
<td>Added PLAN and SECTION views of brick option Detectable Warning Strip (DWS). Modified PLAN view of non-brick DWS. Added General Note 1. Re-labeled section and detail views.</td>
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<tr>
<td>C-05.50</td>
<td>Revised General Note 6. Rearranged drawings on sheet. Modified SECTION A-A. Revised Std Dwg reference in SECTION C-C. Re-labeled &quot;PLAN VIEW OF SECTION C-C&quot;.</td>
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<tr>
<td>C-07.02</td>
<td>Revised General Notes 3 &amp; 4 to correct Std Dwg reference from C-07.05 to C-07.04. Revised drawing titles.</td>
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<tr>
<td>C-10.51</td>
<td>Changed &quot;PLAN VIEW&quot; to &quot;PLAN&quot;. Removed slope designation from sidewalk in SECTION views. Changed length of vertical taper from 12½&quot; to 1'-0&quot;. Revised text orientation. Added &quot;WITHOUT GUARDRAIL&quot; to title of ELEVATION view of departure vertical taper.</td>
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<td>C-10.52</td>
<td>Removed &quot;D&quot; reference and substituted &quot;may&quot; for &quot;can&quot; in General Note 5.</td>
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<td>C-10.75, Sheet 1 of 2</td>
<td>Changed &quot;PLAN VIEW&quot; to &quot;PLAN&quot;. Removed slope designation from sidewalk in SECTION views. Revised curb-height designation in SECTION A-A from &quot;H&quot; to &quot;h&quot;.</td>
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<td>C-10.75, Sheet 2 of 2</td>
<td>Changed &quot;PLAN VIEW&quot; to &quot;PLAN&quot;. Removed dimensions at right side of PLAN view. Revised text orientation.</td>
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<tr>
<td>C-10.76</td>
<td>Changed &quot;PLAN VIEW&quot; to &quot;PLAN&quot;. Revised SECTION view graphics to depict Type 'F' barrier.</td>
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<tr>
<td>C-10.77</td>
<td>Modified PLAN view to correct style and proportion of concrete half barrier and transitions. Modified references to other Std Dwgs.</td>
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<tr>
<td>C-11.10 Sheets 1 through 4 of 4</td>
<td>Re-issued Standard Drawing.</td>
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<td>C-15.20, Sheet 1 of 3</td>
<td>Revised sheet number references.</td>
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<tr>
<td>C-15.91 &amp; C-15.92, Sheet 2 of 2</td>
<td>Modified welding notations for ANSI conformance.</td>
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<tr>
<td>C-18.10, Sheet 2 of 3</td>
<td>Modified SECTION views to improve clarity.</td>
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</table>
From: Terry Otterness
Sent: Tuesday, April 25, 2006 11:13 AM
To: Chris Cooper; Urso Penalosa; Said Asad; Tim Wilson; Paul O'Brien; Joseph Warren; Baljeet Chawla; Vincent Li; Steve Mishler; Alfredo Zapata; Ken Brown; Robert Fortune; Kenneth Cooper; Jeff Beimer; LeRoy Brady; Susan Tellez; Robert Miller; Larry Maucher; George Wallace; Jim Delton; John Lawson; Steve Jimenez; John Carr; John Dickson; Greg H. Gentsch; Roger Hopt; George Chin; Chuck Gillick; Reza Karimvand; Daniel MacDonald; John Melanson; Lev Derzhavets; Oliver Antony; Pat Mahoney; Rod Collins; William Lyons; Bill Harmon; Dallas Hammit; David Sikes; John Harper; John Hauskins; Michael Kondelis; Paul Patane; Perry Powell; Richard Powers; Ron Casper
Cc: Mary Viparina; Sam Maroufkhani; Dan Lance; Doug Forstie; Sam Elters
Subject: Construction Std. Drawings- Slope Design Standard Revisions- C-02.20 & C-02.30

Please forward this e-mail notification to all roadway design personnel utilizing the subject Standard Drawings.

Please refer to the updated Construction Standard Drawings (Rev.date 4/06) that were issued today under separate e-mail notification. The maximum fill slope rates for Std. C-02.20 Rural Undivided and Fringe-Urban Highways and Std. C-02.30 Miscellaneous Roadways have been revised from 1 1/2:1 to 2:1. Also, the maximum cut slope rates for these two standards have been revised from 1:1 to 2:1. No slope changes have been made to Std. C-02.10 Rural Divided Highways. These revisions have been coordinated with the Materials Group Geotechnical Design.

The revisions to the slopes reflect what has been the norm for most projects. The 2:1 fill slopes provide a more stable embankment and provide an improved slope rate to establish vegetation and erosion control. The flatter 2:1 cut slope rates will also provide the same advantages. When in rock cuts, Geotechnical Design will continue to provide the maximum slope that can be used by the designer. Also, when cuts are in the higher ranges and there may be a significant project cost involved, Geotechnical Design will provide the designer the maximum slope that can be used to reduce the excavation required. The design process for establishing slope design for a project has not changed. The standard slopes simply provide the initial design slopes and the designer is to adjust the slopes for the project needs considering safety, material type, project costs, slope stabilization and other needs.

Thank you for your attention to these revisions. Please forward this e-mail to all users within your Groups and Districts. Contact your Roadway Group representative for any questions regarding these revisions.

Terry H. Otterness, P.E.
Staff Engineer
Roadway Design Section
PH  602-712-4285
FAX 602-712-3075
totterness@azdot.gov
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*NOTE: The diagram includes various symbols used in construction drawings to indicate different features and conditions.*
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GENERAL NOTES

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

2. Pavement structure slope is nominal. Actual slope is controlled by (D). See Shoulder Wedge Detail.

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

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

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

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

NOTE TO DESIGNERS

The 9' minimum is required when guardrail is utilized on the project. Treatment shall be uniform throughout the project length. The 9' requirement may be waived under special conditions where guardrail is not utilized.

SLOPES

RURAL DIVIDED HIGHWAYS

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL
GENERAL NOTES

1. Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.
2. Pavement structure slope is nominal. Actual slope is controlled by (D). See Shoulder Wedge Detail.
3. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
4. When median slopes intersect, see project plans for controls.
5. These slopes are intended to be used with new or reconstructed roadways.

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

NOTE TO DESIGNERS

■ The 9' minimum is required when guardrail is utilized on the project. Treatment shall be uniform throughout the project length. The 9' requirement may be waived under special conditions where guardrail is not utilized.

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', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

REVISED SHEET
4/06

REVISED TITLE
SLOPES
RURAL UNDIVIDED AND FRINGE-URBAN HIGHWAYS

C-02.20
GENERAL NOTES

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

2. Pavement structure slope is nominal. Actual slope is controlled by SD. See Shoulder Wedge Detail.

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

NOTE TO DESIGNERS

1. Use of this standard is limited. See Roadway Design Guidelines, Section 306.2.

   The 6' minimum 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.

   USE OF THIS STANDARD IS LIMITED. SEE ROADWAY DESIGN GUIDELINES, SECTION 306.2.

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', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.

MINIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

SHOULDER WEDGE DETAIL

SUBGRADE/SLOPE HINGE TREATMENT DETAIL

MAXIMUM SLOPES

INTERMEDIATE SLOPES
GENERAL NOTES

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

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

CROWN DITCH

GRADER DITCH

CHANNEL

DITCH AND DIKE
GENERAL NOTES

1. Dimensions of dikes shall be shown on the plans.

- Slope as shown on Plans (also desirable)
- Slope as shown on Plans

TYPE B TRANSVERSE MEDIAN DIKE

TYPICAL TRANSVERSE MEDIAN DIKE INSTALLATION

TYPICAL DIKE INSTALLATION AT STRUCTURE
GENERAL NOTES

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

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

3. All slopes are given relative to the grade of the cut ditch at the toe intersection.

4. **10DL Desired Slope**

CUT DITCH WIDENING DETAIL

SECTION B-B

SECTION A-A

SECTION C-C

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

REVISED 8/4/04

DITCHES, CHANNELS, DIKES AND BERMS
DITCH DIKE

Drawn by:
M. J. Wagner

Approved for Issue:
^5-212-04

Sheet 3 of 5

C-0310
GENERAL NOTES

1. Berm construction shown is for pipe extensions. Berm construction similar for new pipe and multiple pipe installations, See Pipe Berm Requirement Detail.

2. 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.

3. See Std Dwg C-01215 for pipe backfill and bedding material tables.

   a. Slope Pipe Installation D = Outside Diameter of Pipe
   b. Multiple Pipe Installation D = Outside Edge to Outside Edge of Pipes

SECTION A-A

PIPE BERM REQUIREMENT DETAIL
GENERAL NOTES

1. Location may be adjusted to accommodate guardrail post layout.
2. All concrete shall be Class B. Embankment curb concrete shall be in accordance with the Std Spec.
3. Where rock is encountered the outlet may be omitted, as approved by the Engineer.
4. When outlet is used, the wire mesh shall extend through the joint into the outlet in lieu of bending into the key.
5. Spillway invert slope shall be uniformly downward from B to A. See Section 9.4.
6. See Std Dwg C-0420 for spillway length.
7. See Std Dwg C-1006 for nested guardrail requirements.

120" Timber Post

Indicates Inlet

Indicates Spillway

SECTION A-A

6x6-8"/4"/4" Wire Mesh

Fly Spar (Typ.)

SECTION B-B

Outlet

See General Note 2

Subgrade Shoulder

6x6-8"/4"/4" Wire Mesh Lap 12" and Tie

Pavement

Normal or 2" Widened Shoulder Line

Normal or 2" Widened Roadway Width

Subgrade Shoulder

6x6-8"/4"/4" Wire Mesh Continuous Bottom & Sides

OUTLET DETAIL

6x6-8"/4"/4" Wire Mesh in Apron

2"-

6.6'

6.6'

6.6'

6.6'

6.6'

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GENERAL NOTES

1. Location may be adjusted to accommodate guardrail post layout.
2. All concrete shall be Class B. Embankment curb concrete shall be in accordance with the Std. Specs.
3. Where rock is encountered the outlet may be omitted, as approved by the Engineer.
4. When outlet is used, the wire mesh shall extend through the joint into the outlet instead of bending into the key.
5. Spillway invert slope shall be uniformly downward from A to B. See Section B-B.
6. See Std Dwg C-04.30 for spillway length.
7. All posts within the inlet shall have a "leaveout" measuring a minimum of 1 1/2" in front and 1/2" at each side, to the full depth of the concrete. The "leaveout" behind Posts 1 & 3 shall end at the toe of the curb. The "leaveout" behind Post 2 shall be 8" minimum. After guardrail installation, the "leaveout" shall be filled with a one-sack grout mix or alternate material as approved by the Engineer.
8. Length may be 4'-6" or 5'-0".

SPECIFICATIONS

6x6-W1.4/W1.4 Wire Mesh
Continuous Bottom & Sides
Lap 12" and Tie

Outlet
See General Notes 3 & 4

Location may be adjusted to accommodate guardrail post layout.

All concrete shall be Class B. Embankment curb concrete shall be in accordance with the Std. Specs.

Where rock is encountered the outlet may be omitted, as approved by the Engineer.

When outlet is used, the wire mesh shall extend through the joint into the outlet instead of bending into the key.

Spillway invert slope shall be uniformly downward from A to B. See Section B-B.

See Std Dwg C-04.30 for spillway length.

All posts within the inlet shall have a "leaveout" measuring a minimum of 1 1/2" in front and 1/2" at each side, to the full depth of the concrete. The "leaveout" behind Posts 1 & 3 shall end at the toe of the curb. The "leaveout" behind Post 2 shall be 8" minimum. After guardrail installation, the "leaveout" shall be filled with a one-sack grout mix or alternate material as approved by the Engineer.

Length may be 4'-6" or 5'-0".

Location may be adjusted to accommodate guardrail post layout.

All concrete shall be Class B. Embankment curb concrete shall be in accordance with the Std. Specs.

Where rock is encountered the outlet may be omitted, as approved by the Engineer.

When outlet is used, the wire mesh shall extend through the joint into the outlet instead of bending into the key.

Spillway invert slope shall be uniformly downward from A to B. See Section B-B.

See Std Dwg C-04.30 for spillway length.

All posts within the inlet shall have a "leaveout" measuring a minimum of 1 1/2" in front and 1/2" at each side, to the full depth of the concrete. The "leaveout" behind Posts 1 & 3 shall end at the toe of the curb. The "leaveout" behind Post 2 shall be 8" minimum. After guardrail installation, the "leaveout" shall be filled with a one-sack grout mix or alternate material as approved by the Engineer.

Length may be 4'-6" or 5'-0".
GENERAL NOTES

1. Location may be adjusted to accommodate guardrail post layout.

2. All posts within the inlet shall have a "leaveout" measuring a minimum of 1 1/2" in front and 1/2" at each side, to the full depth of the concrete. The "leaveout" behind Posts 1 & 3 shall extend at the toe of the curb. The "leaveout" behind Post 2 shall measure 8" minimum. After guardrail installation, the "leaveout" shall be filled with a one-sack grout mix or alternate material as approved by the Engineer.

3. See Std Dwg C-10.06 for nested guardrail requirements.
   - Indicates AASHTO, AGC & ARTBA Task Force 3 Report designation
   - Varies with subgrade slope and pavement structural thickness
   - Varies with fill slope and pipe cover
   - 72" Timber post
   - Length may be 4'-6" or 5'-0".
GENERAL NOTES
1. For C-02.20 slopes with embankment height over 24', use length for 24' embankment height from Table 1.
2. For C-02.20 slopes with embankment height over 32', use length for 32' embankment height from Table 1.
3. For C-02.30 slopes with embankment height over 33', use length for 33' embankment height from Table 1.
4. For spillway details, see Std Dwg C-04.20.
### General Notes

1. For C-02.10 slopes with embankment height over 20', use lengths for 24' embankment height from Table 1.

2. For C-02.20 slopes with embankment height over 30', use lengths for 32' embankment height from Table 1.

3. For C-02.30 slopes with embankment height over 40', use lengths for 48' embankment height from Table 1.

4. For downdrain details, see Std Dep C-04.20.

### Downdrain Length Table

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

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#### C-02.30 SLOPES

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**State of Arizona**
**Department of Transportation**
**Roadway Standard Drawings**
**No.: C-04.40**

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GENERAL NOTES
1. Stub shall have annular corrugation. Downspout plating beyond stub may be either annular or helical.
2. Couplings shall be mechanical heat-shrinkable polyethylene sheet; one piece (ap) type neoprene sheet or slip seals at 12" minimum width and 18 gauge minimum.
3. Maximum Q Allowable = 8 cfs
   Minimum Y Allowable = 1 fps
4. Concrete shall be Class B.
GENERAL NOTES

SINGLE CURB AND CURB & GUTTER

1. Single curb and curb & gutter may be constructed by the use of forms or the concrete may be extruded.

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

3. Two-inch deep contraction joints shall be placed in the curb and the gutter at the locations which match the lines in adjacent PCCP and at approximately 10 center to center adjacent to AC pavement. Joints shall be either hand tooled or sawn.

4. Expansion joints shall be located at tangent points in curb, returning at structures and at maximum 60 intervals, the ½" Joint filler shall extend the full depth of the concrete.

5. Concrete shall be finished with a steel trowel followed by brushing with a fine brush along the length of the curb and gutter.

6. All exposed edges and hand tooled joints shall be finished with a tool having a ½" radius, or as noted on the plans.

CURB & GUTTER

Type D, D-1, D-2 & D-3

CURB & GUTTER

Type B, C & C-1

CURB & GUTTER

Type G

SINGLE CURB

Type A & A1

URBAN FREEWAY CURB & GUTTER

EXPANSION JOINT DETAIL

VALLEY GUTTER

DEPRESSED CURB & GUTTER

EMBANKMENT CURB

CURB TERMINAL SECTION
1. All gutter flow lines shall be constructed to an accurate grade.
2. See Slotted Drain Std Dwg C-13.60 and C-15.91 for curb & gutter with slotted drain.
3. See Std Dwg C-05.10 for additional general notes and dimensions.
4. See Std Dwg C-07.04 for typical curb and gutter transition locations.
5. Dimension may vary where transition occurs on curves, see plans.

Type 1 - Gutter Transition at Roadway Edge with Angle Point is applicable with Concrete Half Barrier and Curb & Gutter Applications. Curb & Gutter Alternative is shown.

Curb & Gutter Application

Type B or C, Std Dwg C-05.10

SECTION
CONCRETE BARRIER APPLICATION

SECTION
CURB & GUTTER APPLICATION

EXIT

ENTRANCE

RAMP GUTTER LINE

SECTION
CURB & GUTTER APPLICATION

EXIT

ENTRANCE

RAMP GUTTER LINE

SECTION
CONCRETE BARRIER APPLICATION

EXIT

ENTRANCE

RAMP GUTTER LINE

SECTION
CURB & GUTTER APPLICATION

EXIT

ENTRANCE

RAMP GUTTER LINE
**Description of Revisions Made by Date**

**Roadway Standard Drawings**

**Approved for Distribution**

**Approved for Design**

4/06

**C-05.12**

**Sheet 2 of 3**

---

**Curb & Gutter Transitions**

**Type B, C, C-1, D, D-1, D-2 or D-3**

- **Curb Height Varies 0" to 7" Maximum in Depressed Curb Area Beyond the End of Barrier. See Plans for Curb Height.**

- **Curb & Gutter Type B, C, C-1, D, D-1, D-2 or D-3**

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**Type 2 - Curb & Gutter Transition**

**Plan**

**Type 3 - Curb & Gutter Transition at Paved Core**

**Plan**

**Type 4 - Curb & Gutter Transition**

**Elevation**

**Section A-A**

**Section B-B**

**Perspective**

---

**Sheet 2 of 2**

**Project No:**

**State of Arizona Department of Transportation**

**Roadway Standard Drawings**

**No:**

4/06

**Curb & Gutter Transitions**

Sheet 2 of 3
Curb & Gutter
Type B, C or C-1
Std. Dwg. C-05.10
See Plans

Curb & Gutter
Type B, C or C-1
Std. Dwg. C-05.10
See Plans

Curb & Gutter
Type B
W-3 Curb Height
5" Gutter Depression
or match roadway cross-slope
Std. Dwg. C-05.10

Curb & Gutter
Type C or C-1
W-3 Curb Height
5/8" Gutter Depression
or match roadway cross-slope
Std. Dwg. C-05.10

Curb & Gutter
Type B
W-3 Curb Height
2" Gutter Depression
Std. Dwg. C-05.10

Sidewalk
Std. Dwg. C-05.20

Sidewalk Ramp
Type C
Std. Dwg. C-05.30

AC Pavement (Typ)

PCC Pavement (Typ)
1. Unless otherwise specified, driveways shall be 6" thick.

2. Two-inch deep transverse contraction joints shall be placed in driveways if the driveway width is over 20'. If the driveway thickness is greater than 6", then the contraction joint depth shall be T/3, where T is the thickness of the driveway. Joints shall be either formed or sawn. Joints shall be finished with a tool having a 1/4" radius. See Sheet 2 of 2 for the Contraction Joint Detail.

3. Expansion joints shall be located between driveways and sidewalks and at all 90° to structural changes, the 12" 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 troweled and then broomed with a fine brush in a transverse direction.

LEGEND
- Minimum slope = 0.01' Per Ft
- Maximum slope = 0.02' Per Ft
- Straight grade with downward slope

Concrete shall be finished by means of a float, then steel troweled and then broomed with a fine brush in a transverse direction.
1. Unless otherwise specified, sidewalks shall be 4" thick.

2. One-inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 15' or at a spacing that matches adjacent curb and gutters. If the sidewalk is over 7' in width, a 2" 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 formed or sawn. Formed joints shall be finished with a tool having a 1/4" radius.

3. Score marks shall be 3/8" in depth. They shall be placed at 5' spacing when the contraction joint interval is 15', and at 6' spacing when the contraction joint interval is 12'.

4. Expansion joints shall be located between sidewalks and driveways and all 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 1/2" joint filler shall extend the full depth of the concrete.

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

GENERAL NOTES

LEGEND

Minimum slope = 0.01' Per Ft
Maximum slope = 0.02' Per Ft

LEGEND

Minimum slope = 0.01' Per Ft
Maximum slope = 0.02' Per Ft
GENERAL NOTES
1. Ramp centerline shall be radial from the face of the curb at the sidewalk ramp control point.
2. The 12:1 and 15:1 ramp slopes shown are the steepest slopes allowed for a ramp 10 ft long or less. Where the 12:1 or 15:1 slopes would require the ramp to extend longer than 10 ft, the ramp may be limited to a 10 ft length with slopes steeper than 12:1 or 15:1. Ramp length is measured along the back of the sidewalk.
3. Drainage inlets should not be located within the marked crosswalk, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
4. Concrete shall receive a rough broom finish as shown.
5. See Std Dwg C-05.10 and C-05.20 for joint details.
6. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

SECTION A-A
- Minimum Slope = 100:1 (0.01 '/ft)
- Maximum Slope = 50:1 (0.02 '/ft)
- Top of Sidewalk Ramp
- Bottom of Ramp Curb
- Location (Typ)
- See Plans
- Varies
- Minimum

SECTION B-B
- Top of Ramp Curb
- Bottom of Sidewalk Ramp
- Location (Typ)
- See Plans
- Varies
- Minimum

SECTION C-C
- Top of Sidewalk Ramp
- Bottom of Ramp Curb
- Location (Typ)
- See Plans
- Varies
- Minimum

RAMP CURB DETAIL
- Parallel Sidewalk Ramp
- Construction Joint
- Top of Ramp Curb
- Bottom of Ramp Curb
- Location (Typ)
- See Plans
- Varies
- Minimum

LEGEND
- Minimum Slope: 100:1 (0.01 '/ft)
- Maximum Slope: 50:1 (0.02 '/ft)
- Detectable Warning Strip See Sheet 7 of 7
- Sidewalk Std Dwg C-05.20
- Curb & Gutter Std Dwg C-05.10
- Depressed Curb & Gutter (Typ) Std Dwg C-05.10
- Ramp Curb
- Location (Typ)
- See Plans
- Varies
- Minimum

REISSUED STD DWG
- 4/06

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS
APPROVED FOR DISTRIBUTION
APPROVED FOR DESIGN
4/06

SIDEWALK RAMP
TYPE A
C-05.30
REV. 3 3/3/01
GENERAL NOTES

1. Ramp centerline shall be radial from the face of the curb of the sidewalk ramp control point.

2. The 15:1 ramp slope shown is the steepest slope allowed for a ramp 10 ft long or less, where the 65:1 slope would require the ramp to extend longer than 10 feet, the ramp may be limited to a 10 ft length with slope steeper than 65:1. Ramp length is measured along the back of the sidewalk.

3. Drainage inlets should not be located within the marked crosswalk, or if crosswalks aren't marked, within the area a standard marked crosswalk would encroach.

4. Concrete shall receive a rough broom finish as shown, the side slope wings do not receive a broom finish.

5. The Engineer may approve replacing the side slope wing with a curb at a location where access to the side of a ramp run is blocked by a pole, utility box, other obstruction, or by a non-accessible surface such as a dirt planter strip.

6. See Std Dwgs C-05.10 and C-05.20 for joint details.

7. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

DETECTABLE WARNING STRIP

Location (Typ) See Plans

48" Landing Minimum Length Varies See Notes 2 & 3

Top of Sidewalk Ramp

SECTION B-B

PERPENDICULAR CURB RAMP

SECTION A-A

LEGEND

Minimum Slope = 100:1 (0.01 '/ft)

Maximum Slope = 50:1 (0.02 '/ft)

Minimum Slope = 100:1 (0.01 '/ft)

Maximum Slope = 50:1 (0.02 '/ft)

Detectable Warning Strip See Sheet 7 of 7
1. For use where sidewalk is not continuous.
2. Ramp centerline shall be radial from the face of the curb at the Sidewalk Ramp Control Point.
3. The 15:1 ramp slope shown is the steepest slope allowed for a ramp 10 ft long or less. Where the 15:1 slope would require the ramp to extend longer than 10 feet, the ramp may be limited to a 10 ft length with slope steeper than 15:1. Ramp length is measured along the back of the sidewalk.
4. The top of the Ramp Curb along the back of the Sidewalk Ramp shall match the elevation of the adjacent back of sidewalk and run parallel to the Sidewalk Ramp, the Ramp Curb along the side of the Sidewalk Ramp shall match the elevation at the back of the Curb & Gutter and the back of Ramp Curb.
5. Drainage inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
6. Concrete shall receive a rough broom finish as shown.
7. See Std Dwgs C-05.10 and C-05.20 for joint details.
8. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

For use where sidewalk is not continuous.
4. The top of the Ramp Curb along the back of the Sidewalk Ramp shall match the elevation of the adjacent back of sidewalk and run parallel to the Sidewalk Ramp, the Ramp Curb along the side of the Sidewalk Ramp shall match the elevation at the back of the Curb & Gutter and the back of Ramp Curb.
5. Drainage inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
6. Concrete shall receive a rough broom finish as shown.
7. See Std Dwgs C-05.10 and C-05.20 for joint details.
8. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

10" Maximum to Face of Pedestrian Push Button

LEGEND

PERSPECTIVE

DEPRESSED CURB AT SIDEWALK RAMP

GENERAL NOTES
1. For use where sidewalk is not continuous.
2. Ramp centerline shall be radial from the face of the curb at the Sidewalk Ramp Control Point.
3. The top of the Ramp Curb along the back of the Sidewalk Ramp shall match the elevation of the adjacent back of sidewalk and run parallel to the Sidewalk Ramp. The Ramp Curb along the side of the Sidewalk Ramp shall match the elevation at the back of the Curb & Gutter and the back of Ramp Curb.
4. Drainage inlets should not be located within marked crosswalks, or if crosswalks aren’t marked, within an area a standard marked crosswalk would enclose.
5. Concrete shall receive a rough broom finish as shown.
6. See Std Dwgs C-05.20 and C-05.20 for joint details.
7. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

**GENERAL NOTES**

**LEGEND**

- Minimum Slope = 100:1 (0.01 '/ft)
- Maximum Slope = 50:1 (0.02 '/ft)

**SECTION A-A**

- Detectable Warning Strip
- See Sheet 7 of 7

**SECTION B-B**

- Depressed Curb & Gutter (Typ)
- Std Dwg C-05.10

**PERSPECTIVE**

- Ramp Curb
- See Ramp Curb Detail Sheet 1 of 7

**DETAIL**

- Sidewalk Ramp
- Orientation

**SIDEWALK RAMP AT SIDEWALK TERMINUS**

**SIDEWALK BEHIND BARRIER**
GENERAL NOTES

1. For use at mid-block locations.

2. Ramp centerline shall be perpendicular to the face of the curb at the Sidewalk Ramp Control Point.

3. The 15:1 ramp slope shown is the steepest slope allowed for a ramp 10 ft long or less. Where the 15:1 slope would require the ramp to extend longer than 10 feet, the ramp may be limited to a 10 ft length with slope steeper than 15:1. Ramp length is measured along the back of the sidewalk.

4. For sidewalk widths greater than shown on C-05.20, the overall Sidewalk Ramp depth shall match the sidewalk width.

5. Ramp curb height to match elevation at back of adjacent sidewalk.

6. Drainage inlet should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.

7. Concrete shall receive a rough broom finish as shown.

8. See Std Dwgs C-05.20 and C-05.40 for joint details.

9. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

LEGEND

- Minimum slope: 100:1 (0.01 '/ft)
- Maximum slope: 50:1 (0.02 '/ft)
- Minimum slope: 15:1

DEPRESSED CURB AT SIDEWALK RAMP

Ramp Curb
See Ramp Curb Detail
Sheet 1 of 7

Detectable Warning Strip
See Sheet 1 of 7

ROUGH BROOM FINISH

DEPRESSED Curb & Gutter
Std Dwg C-05.20

SECTION A-A

PERSPECTIVE
1. For median widths 5'-5" and less, the Detectable Warning Strip shall be continuous from back-of-curb to back-of-curb. The Detectable Warning Strip shall not extend beyond the back of curb. Modular units such as bricks or tiles shall be used to construct the Detectable Warning Strip. Partial domes at the edge of the strip shall be ground flush with the brick or tile surface.

2. Use Type A1 curb if median is to be landscaped.

3. Single curb shown; see plans for Curb & Gutter application.

4. When installing brick detectable warning strips, the contractor shall take measures to avoid damaging the truncated domes. Bricks with damaged domes shall be replaced by the contractor at no additional cost.

Pedestrian Push Button Pole When Shown on Plans.

See Traffic Signal Plans for Additional Information

10" Maximum to Face of Pedestrian Push Button
GENERAL NOTES
1. Drain shall be placed in low corner and filled with coarse aggregate (AASHTO #4 Size 7) securely tied in a long-life geotextile sack.

LEGEND
- 1/8" Minimum (Typ) 0.65" Minimum ADA Actual
- 3/16" to 3/8" (Typ) 0.6" to 2.4" ADA Actual
- 1/16" to 1/8" (Typ) 0.09 to 1.4" ADA Actual
- 50% to 65% of A

TEXTURE PATTERN DETAIL
- Sand
- Thickness Varies
- 4" Waste Slab

DETECTABLE WARNING STRIP BRICK OPTION
- Brick (Typ)
- Thickness Varies
- Plan
- Section

DETECTABLE WARNING STRIP
- Plan
- Section

TRUNCATED DOME DETAIL
- Plan
- Elevation
GENERAL NOTES
1. Traffic signal foundations, traffic sign foundations, and pull boxes for traffic signs and traffic signals shall be installed prior to placement of median paving,

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

3. Decorative median paving may be stamped 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"x6" concrete header shall be used to end decorative paving at locations where concrete sidewalk ramps are not present.

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

7. See Bridge Group Plans for raised median on structures.

8. Median paving shall be Class B concrete.
The PCCP surfaces within the bus bay area shall be textured transversely. Surface texturing to conform to Std Spec 401.

Transverse weakened-plane joints shall be constructed at a maximum spacing of 15' and shall align with joints in the concrete curb and gutter.

For additional data on slotted drains, see Std Dwg C-13.60.

For 1/2" expansion joint with preformed joint fillers, see Detail A.

Concrete pad to be poured separately from concrete bus bay pavement.

For sidewalk construction details, see Std Dwg C-05.20.

See Plans: match the adjacent gutter depression.
GENERAL NOTES

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 containing more than five dwelling units.
   Industrial - one directly serving a substantial number of truck movements 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 share the driveway, especially if both properties are zoned for similar uses. The property line between divided properties should be located no closer than 30 feet from the centerline of the driveway, and 20 feet from the centerline of the driveway.

3. Driveways for high volume traffic generators shall be approved individually by Regional Traffic Engineering or the Traffic Engineering Group.

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

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.

7. Dimensions indicated as minimum shall be avoided whenever possible in favor of those indicated as desirable.

8. The Type "A" turnaround is the preferable turn around design. Type "B" shall only be used where absolutely necessary.

9. Paved turnouts & final notations will be X 30", surface material, type and standards. Examples: 20 X 30" ACFG, type A, 5th grade C-06.03. Show radius both graphically.

10. Construction of curbs, gutter, sidewalks and drainage facilities in urban areas by the permittee along that portion of the highway frontage under permit approval, may be a stipulation of the permit approval if there appears to be reasonable need.

11. Excavation or embankment for turnouts shall be included in quantities for main roadways.

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

13. Desirable grades for rural turnouts is 6%.

RURAL DEVELOPMENTS

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URBAN DEVELOPMENTS

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STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

DRIVEWAY & TURNOUT LAYOUTS

C-06.03
Sheet 1 of 2
GENERAL NOTES

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.

• Break angle greater than 63 requires a vertical curve. U Curve minimum, vertical curve shall not encroach on roadway or sidewalk.

URBAN CROSS SECTION

(UP GRADE)

DESIABLE URBAN CROSS SECTION
Load transfer dowel assemblies are to be placed at each transverse weakened plane joint on the traveler lane as shown on the plans.

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

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

- Dowel bars - 1 1/2" diameter x 1'-6" plain round bars with coating. See Special Provisions.
- Intermediate legs - 2 gauge or W-5.5 wire.
- End legs - 2 gauge or W-5.5 wire.
- Upper space bar - 2 gauge or W-5.5 wire x 12. See Dimension Table.
- Lower space bar - 2 gauge or W-5.5 wire x 16. See Dimension Table.
- Tie bars - W-1.5 wire x 16.
- Anchor strap - 1"x3" steel strap, 0.079 thick.

Load transfer dowel assembly shall be used with non-skewed, mainline PCCP joints.

See plans or Std Dwgs C-07.03 through C-07.04 for transverse joint spacing.

See Std Dwgs C-07.01 through C-07.04 for additional information.

See Note 1

Std Dwg C-07.01

1. Load transfer dowel assemblies shall be used with non-skewed, mainline 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 Dwgs C-07.01 through C-07.04 for additional information.

4. See plans or Std Dwgs C-07.03 through C-07.04 for transverse joint spacing.

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

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- Tie bars - W-1.5 wire x 16.
- Anchor strap - 1"x3" steel strap, 0.079 thick.

LOAD TRANSFER DOWEL ASSEMBLY

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**QUANTITY TABLE**

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**GENERAL NOTES**

1. LC and LMP joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the engineer in accordance with Subsection 401-3.03 of the Standard Specifications.

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

3. 'A' shall equal 4' minimum (Typ)
   'B' shall equal 2' minimum (Typ)
   'C' shall equal 2' minimum (Typ)

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

5. All transverse joints shall align with joints in adjacent slabs.

6. See Std Deg 2-07.10 for curb and gutter joint requirements.

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

8. The rebar in the LMP & LC joints shall be placed no greater than 1-3" from the TC joint.

9. LC and LMP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

10. Transverse Construction Joint (TC) Allowable Limits (Typ)
GENERAL NOTES

1. LC and LMP joint locations shown are typical. The actual paving pour or pour with joint locations shall be placed in accordance with the approved plans.

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

3. "A" shall equal 4" minimum (Typ)  "B" shall equal 3" minimum (Typ)  "C" shall equal 2" minimum (Typ)

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

5. At transverse joints shall align with joints in adjacent slabs.

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

7. 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.

8. The rebar in the LMP & LC joints shall be placed no greater than 1"-3" from the LC joint.

9. LC and LMP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

Transverse Construction Joint (TC) Allowable Limits (Typ)
GENERAL NOTES

1. LC and LWP joint locations shown are typical. The actual paving pour plan with joint locations and
   location/size of dowel assemblies will be determined by the contractor and approved by the Engineer
   in accordance with Subsection 401-3.3 of the Standard Specifications.

2. Skewed PCCP joints shall be used when transfer dowels are not required.

3. *A* shall equal 4" minimum (Typ)
   *B* shall equal 1" minimum (Typ)
   *C* shall equal 2" minimum (Typ)

4. See 3rd Dwg C-07.01 for PCCP Joints and
   additional notes.

5. All transverse joints shall align with joints in
   adjacent slabs.

6. See 3rd Dwg C-05.10 for curb and gutter
   joint requirements.

7. 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.

8. The rebar in the LWP & LC joints shall
   be placed no greater than 1/3" from
   the LC joint.

9. LC and LWP joints shall be located on the
   edge of traffic lanes unless otherwise
   shown on the project plans.
   ■ Transverse Construction Joint (TC) Allowable
   Limit (Typ)
GENERAL NOTES

1. LC and LWP joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401.3 of the Standard Specifications.

2. Skewed PCCP joints shall be used when load transfer dowels assemblies are not required.

3. "A" shall equal "F" minimum (Typ)

4. See 5th Deg C-07-01 for PCCP joints and additional notes.

5. All transverse joints shall align with joints in adjacent slabs.

6. See 5th Deg C-07-02 for curb and gutter joint requirements.

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

8. The rebar in the LWP & LC joints shall be placed no greater than 5/3" from the LC joint.

9. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

Transverse Construction Joint (TCJ Allowable Limits (Typ)
GENERAL NOTES

1. LC and LWP joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401-30.1 of the Standard Specifications.

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

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

4. At transverse joints shall align with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.

5. 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.

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

7. The rebars in the LWP & LC joints shall be placed no greater than 3'-3" from the LC joint.

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

9. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.
1. LC and LWP joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401-1.30 of the Standard Specifications.

2. Non-skew PCCP joints shall be used with load transfer dowel assemblies.

3. See Std Dwg C-07.03 for PCCP joints and additional notes.

4. At transverse joints shall align with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.

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

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

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

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

9. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

GENERAL NOTES
PLAN 84.25' PCCP

GENERAL NOTES

1. LC and LWP joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401.3.01 of the Standard Specifications.

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

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

4. All transverse joints shall align with joints in adjacent slabs and be perpendicular (90°) to the longitudinal joints.

5. 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.

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

7. The rebar in the LWP & LC joints shall be placed no greater than 1/3" from the LC joint.

8. Transverse weakened plane joints shall be constructed at least 0-0" from a transverse construction joint.

9. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.
GENERAL NOTES

1. All joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401-3.30 of the Standard Specifications.

2. See Std Dwg C-07.01 for joint Information.

3. See plans for ramp dimensions.

4. For ramp joint spacing sequence, see Sheet 4 of 5.

5. LC and LMP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

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STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

PCCP JOINT LOCATIONS
PARALLEL, TYPE ENTRANCE RAMP WITH AUXILIARY LANE

C-07.04
Sheet 1 of 5
GENERAL NOTES

1. At joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401-3.01 of the Standard Specifications.

2. See Std Dwg C-07.01 for Joint information.

3. See plans for ramp dimensions.

4. For ramp joint spacing sequence, see Sheet 4 of 5.

5. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.
GENERAL NOTES

1. All joint locations shown are typical. The actual paving joint plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401-32(1) of the Standard Specifications.

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

3. See Std Dwg C-07.01 for joint information.

4. See plans for ramp dimensions.

5. For ramp joint spacing sequence, see Sheet 4 of 5.

6. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

   a. Transition, See Std Dwg C-05.12
   b. 12" Face of Curb to Face of Curb on Entrance Ramp

   c. Mainline Structural Section: See Plans
   d. Ramp Structural Section: See Plans
   e. Gore Structural Section: See Plans

SECTION A-A
RAMP TAPER

SECTION B-B
GORE AREA
GENERAL NOTES

1. All joint locations shown are typical. The actual paving pour plan with joint locations shall be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Section 401-1001 of the Standard Specifications.

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

3. See Std Dwg C-0701 for joint information.

4. See plans for ramp dimensions.

Transition, See Std Dwg C-0512
20' Face of Curb to Face of Curb on Exit Ramp

Mainline Structural Section
See Plans
Ramp Structural Section
See Plans
Gore Structural Section
See Plans

TYPICAL TRANSVERSE WEAKENED PLANE
JOINT LAYOUT AT GORE AREAS

Exit Ramp Shown
Entrance Ramp Similar

RAMP WITHOUT CURB & GUTTER

RAMP WITH CURB & GUTTER
GENERAL NOTES

1. All joint locations shown are typical. The actual paving pour plan will be based upon the project paving plan submitted by the contractor and approved by the Engineer in accordance with Subsection 401.35 of the Standard Specifications.

2. See Std Dwg C-07.01 for Joint Information.

3. The ratio of transverse to longitudinal joint spacing shall be greater than 1/3 but not more than 1/2.

4. LC and LWP joints shall be located on the edge of traffic lanes unless otherwise shown on the project plans.

5. See Plans for Dropseam Paving. Type E or F Joint 1/2 PCC Paving. 5 Joint 1/4 AC Paving.

6. Transverse joints shall be perpendicular (90°) to the longitudinal joints, except as shown at the ramp termini.

   - 6' Minimum
   - Varies - 18' Maximum
   - 11' Minimum
   - Varies - 12' when adjacent gutter widths are 2 or less
   - 15' when adjacent gutter widths are greater than 2
   - Without curb and gutter

   - Transition, See Std Dwg C-05.12
   - Varies - 12' Typical or As Shown on Plans
   - 17' Maximum
GENERAL NOTES

1. Bedding per Section 502 of the Standard Specifications.
2. Asphalt concrete shall be in accordance with the requirements of the Standard Specifications.
3. 12" lip is required on the sides of trenches that are not parallel to the center line of the street.
4. Type G requires 9" of AB or top of trench when there is an existing base.
5. See Std Dwg C-1305 for typical pipe installation.

LEGEND

Compacted Backfill or Slurry Per Section 502 of the Standard Specifications

AB, Granular Backfill or Native Backfill Per Sections 502 and 501 of the Standard Specifications

AB Per Sections 502 and 501 of the Standard Specifications
GENERAL NOTES

1. All embankment curb shall be protected by guardrail.

2. Guardrail shall extend beyond the limits of embankment curb.

3. See Std Dwg C-10001 for measurement limits.

4. See Std Specs 703, 905 and 1002-3 for reflector tab and snow marker materials, reflective sheeting, and spacing requirements.

Top of Rail = 28"
See General Note 1
Std Dwg C-10003

REFLECTOR TAB DETAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

Guards, Installation
Type A and Reflector Tab

Type A Section
GENERAL NOTES

1. All embankment curb shall be protected by guardrail.

2. Guardrail shall extend beyond the limits of embankment curb.

3. See Std Dwg C-10.00 for measurement limits.

4. See Std Specs 703, 905 and 1002-3 for reflector tab and snow marker materials, reflective sheathing, and spacing requirements.

Use appropriate End Treatment

Reflective Sheeting

See Subgrade/Slope Hinge Treatment Detail
Std Dwg C-40.00, C-40.01, or C-40.35

Normal Shoulder Width

Hinge Point

Normal Shoulder

Embarkment Curb (Typ)

Subgrade

Slope as Required

Embarkment Slope

Reflector Tab Detail

See Plans

TYPE B SECTION

PLAN

Traffic

2' Widening

Use Appropriate End Treatment

Normal Roadway Shoulder
GENERAL NOTES

1. The control height for guardrail system is 38" to the top of rail measured at the face of rail from the normal finished shoulder elevation.

2. Guardrail shall be stepped in the direction of adjacent traffic.

GENERAL NOTES

1. Height of curb shall not exceed 4 inches.

2. Guardrail shall be lapped in the direction of adjacent traffic.

- Indicates AASHTO, AGC & ARTBA task Force 13 report designation.

PLAN

Traffic

ELEVATION

G4/(S-MODIFIED)
GENERAL NOTES

1. Use Type 3 Nested W-Beam to span downspout or spillway inlets as shown in the plan view.

2. Use Type 3 Nested W-Beam to span multiple obstructions as shown in the elevation view.

3. Guardrail shall be lapped in the direction of adjacent traffic.

4. For Type 3, a maximum of two posts may be uninterrupted within a span of nested guardrail.

- Indicates AASHTO, AGC & ARTBA Task Force Report 13 Post designation

72' Timber Post

See Sheet 1 of 2 for Sections A-A and B-B

PLAN

ELEVATION

NESTED STEEL W-BEAM - TYPE 3 - LONG SPAN
LENGTH = 37'-6"
GENERAL NOTES

1. See Std Dwg C-10.03 and C-10.04 for additional information and dimensions.

2. Guardrail shall be lapped in the direction of adjacent traffic.

- 72" Timber Post

ELEVATION

BOLTED ANCHOR
BOX CULVERT INSTALLATION
GENERAL NOTES

1. The cable assembly shall be tightened to remove slack.
2. One wrap of 14 gauge galvanized steel wire shall be wrapped around the terminal post near the top of the bearing plate.
3. See Std Dwg C-10.00 for measurement limits.

1. Curb is 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.

3. Thrie-beam terminal connector to thrie-beam splice shall be lapped in the direction of adjacent traffic.

- Indicates AASHTO, AGC & ARTBA Task Force Report designation

PLAN

LIP CURB DETAIL

ELEVATION

GENERAL NOTES

Curb is not required when drainage flows transversely away from barrier. Treatment at back of lip curb modified for constructability purposes. Front slope and height of lip curb shall not be exceeded.

Thrie-beam terminal connector to thrie-beam splice shall be lapped in the direction of adjacent traffic.

- Indicates AASHTO, AGC & ARTBA Task Force Report designation

\[
\begin{align*}
&\text{Thrie-Beam Terminal Connector (\(\bullet\))} \\
&\text{For Anchor Plates and Hardware See Sheet 2 of 2} \\
&\text{Concrete Barrier Transition} \\
&\text{Types \(\theta\) to Thrie Beam} \\
&\text{Std Dwgs C-10.70, C-10.71, C-10.72 \\
&\text{& C-10.73} \\
&\text{Thrie-beam terminal connector to thrie-beam splice shall be lapped in the direction of adjacent traffic.} \\
&\text{Lip Curb (When Called for on Plans) See AC or Concrete Option} \\
&\text{Concrete Barrier Transition} \\
&\text{Type \(\theta\) to Thrie Beam} \\
&\text{Std Dwgs C-10.70, C-10.71, C-10.72 \\
&\text{& C-10.73} \\
&\text{Thrie-beam terminal connector to thrie-beam splice shall be lapped in the direction of adjacent traffic.} \\
\end{align*}
\]
1. Anchor plate shall conform to ASTM specification A36. Bolts, washers, and anchor plate shall be galvanized or, at the contractor's option, stainless steel bolts and washers may be used.

2. Two-inch deep contraction joints shall be placed in the curb and the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement. Joints shall be either hand-tooled or sawn.


---

**GENERAL NOTES**

10.50

1'-8"

2 3/8"

2 3/8"

2"

5/8"

4 Equal Spaces

12"

ANCHOR PLATE - DETAIL A


---

**NEW STANDARD DRAWING**

Sheet 2 of 2

**SECTION A-A**

AC OPTION

**SECTION A-A**

CONCRETE OPTION

**SECTION B-B**

ANCHOR PLATE - DETAIL A

---

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MADE BY

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**GUARDRAIL TRANSITION**

THRIE-BEAM TO CONCRETE HALF BARRIER

32" TYPE 'F'
GENERAL NOTES

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

2. When obstacles prevent the use of slip form equipment, stationary forms shall be used.

3. Concrete shall be Class S, f'c=4000 PSF.

4. If the footing and barrier are cast monolithically, #6 S shape rebars are not required.

5. Barrier width shall not exceed the barrier footing width nor overhang the adjacent pavement.

6. #4 Rebar shall extend 1⁄2 past the construction joint at the completion of the day's pour.

   ▲ Depth to match adjacent PCCP thickness (8" minimum).
GENERAL NOTES

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

2. When obstacles prevent the use of slip form equipment, stationary forms shall be used.

3. Concrete shall be Class 5, f'=4000 PSI.

4. If the footing and barrier are cast monolithically, #6 5 Shape rebars are not required.

5. Barrier width shall not exceed the barrier footing width nor overlap the adjacent pavement.

6. #4 rebar shall extend 12" past the construction joint at the completion of the day's pour.

• Depth to match adjacent PCPP thickness (8" minimum).

WITH AC
SECTION A-A

WITH PCPP
SECTION A-A
GENERAL NOTES

1. Posts shall be 12'-6" center to center. Structural steel shall conform to ASTM A36, galvanized in conformance with ASTM A123.

2. Hex head bolt shall conform to ASTM A325, galvanized in conformance with ASTM A923 Class C.

3. Helical spring lock washer shall conform to ASTM A325, galvanized in conformance with ASTM A923 Class C.

4. Tension wires AWC number 50,2481 galvanized in conformance with ASTM A10 Class A.

5. Hog ring AWC number 19,10,052 galvanized in conformance with ASTM A10 Class 2.

6. Glare screen 18 gauge steel, ASTM A526, galvanized in accordance with ASTM A252/G235L expanded to the following dimensions: 13" width of diamond and 4.0" length of diamond center to center of bridge with a 3.75" diameter, angled at approximately 20° to the plane of the original sheet. Top edge to be shop cut and clipped on 12" center to center. 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 one full diamond overlap.

8. Glare screen shall be constructed without interruption to the greatest degree possible.

ELEVATION

TENSION WIRE ROUTING DETAIL
GENERAL NOTES

1. Half barrier shall be constructed by the slip on or fixed form method.
2. When obstacles prevent the use of slip form equipment, stationary forms shall be used.
3. Concrete shall be Class S, F=4000 PSI.
4. If the footing and barrier are cast monolithically, #6 S shape rebar will not be required.
5. #4 rebar shall extend 1/2 past the construction joint at the completion of the day's pour.
6. Rebar holes shall be placed wherever barrier is backfilled unless otherwise indicated on the plans.

Depth to match adjacent PCP thickness 18" minimum.
GENERAL NOTES
1. Concrete half barrier shall be precast.
2. Concrete shall be Class 5, f'c=4000 psi.
3. Pavement thickness adjacent to half barrier shall be 5" minimum.
4. The half barrier shall be placed upon a bed of granular material to provide a uniform bearing.
5. Dowelled joints shall be grouted under pressure until all of the openings and the joints are filled.
6. All bend dimensions for rebar are out-to-out of rebar.
7. Weep holes shall be placed whenever half barrier is backfilled unless otherwise indicated on the plans.
**GENERAL NOTES**

1. Concrete shall be Class S, f'c=4000 PSI.
2. Rebar shall conform to Std Spec 1003.
3. Rebar shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Departure termination may be substituted for Std Dwg C-05.20 barrier transition under departure conditions.
6. See Std Dwg C-05.20 for sidewalk construction.
7. All bend dimensions for rebar are out-to-out of rebars.

**SECTION B-B AT CATCH BASINS**

- 8' Rebars
- 12" Center to Center
- 3" Clear of Bottom

**SECTION A-A**

- 6 Rebars
- 12" Center to Center
- 3" Clear of Bottom

- 5 Rebar (Typ)

**BARRIER GUTTER DETAIL**

- See Dowel Installation and Construction Joint Detail Std Dwg C-07.01
- See Barrier Gutter Detail
- See Barrier Gutter Detail

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**CONCRETE HALF BARRIER**

- 32' TYPE 'F'
- WITH SIDEWALK

**PLAN**

- Concrete Bridge Barrier
- Concrete Sidewalk
- See Plans

**ELEVATION**

- Top of Curb
- 1'-0"
- 35^2
- 2'-8"
- 2'-0"
- 3" Clear of Sidewalk
- 2'-0"

- Construction Joint
- 32' TYPE 'F'
- WITH SIDEWALK

**DEPARTURE TERMINATION WITHOUT GUARDRAIL**

- New Curb
- Back Edge of Sidewalk
- See Plans

- Transition Sidewalk
- Slope to Match Bridge Sidewalk
- Sidewalk Cross Slope = 0.020/1 (Toward the Barrier)

- Sidewalk
- See Plans

- Barrier Transition
- Std Dwg C-05.20

- Top of Sidewalk
- Std Dwg C-05.20

- Construction Joint

- Sidewalk

- Slotted Drain
- See Plans

- Horizontal Line
- B Joint when Adjacent to PCCP
- Std Dwg C-07.01

- Back Edge of Sidewalk
- Std Dwg C-05.20

- Top of Curb
- Std Dwg C-05.20

- Traffic

- RLF

**DEPARTURE TERMINATION WITHOUT GUARDRAIL**

- Top of Curb
- 1'-0"
- 35^2
- 2'-8"
- 2'-0"
- 3" Clear of Bottom

- Construction Joint

- Sidewalk

- See Plans

- Top of Sidewalk
- Std Dwg C-05.20

- Construction Joint

- Sidewalk
**GENERAL NOTES**

1. The Barrier Barrier shall be constructed by the slip or fixed form method.
2. When obstacles prevent the use of slip form equipment, stationary forms shall be used.
3. Concrete shall be Class S, <=4000 PSL.
4. #4 rebar shall extend 12" past the construction joint at the completion of the day's pour.
5. Gutter thickness may 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. At bridges, the cross slope of the gutter shall transition to match the cross-slope of the bridge. Length of the transition is 15'.
8. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP. Joints shall be hand-tooled or sawn.
9. Whenever Half Barrier is backfilled, see Std Dwg C-10.50 for weep hole details, unless otherwise specified on the plans.

**SECTION A-A**

- Gutter Width: Varies 2'-8" or 4'-6" (Typ) See Plans
- Surface: 10" R
- Base Material: See Plans
- Traffic: 4" R
- Construction Joint: See Barrier Gutter Detail
- Section: AB See Plans
- Pavement: See Barrier Gutter Detail
- B Joint: Std Dwg C-07.01
- PCCP: See Plans
- Horizontal Line: Varies
- Topsoil Plating: Varies
- #6 Rebar: S Shape (Typ)
- #4 Rebar: Continuous

**BARRIER GUTTER DETAIL**

- Half Barrier shall be constructed by the slip or fixed form method.
- Concrete shall be Class S, <=4000 PSL.
- #4 rebar shall extend 12" past the construction joint at the completion of the day's pour.
- Gutter thickness may be adjusted to match the PCCP thickness, as approved by the Engineer.
- 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.
- At bridges, the cross slope of the gutter shall transition to match the cross-slope of the bridge. Length of the transition is 15'.
- Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP. Joints shall be hand-tooled or sawn.
- Whenever Half Barrier is backfilled, see Std Dwg C-10.50 for weep hole details, unless otherwise specified on the plans.

**DEPARTURE TERMINATION WITHOUT GUARDRAIL**

- Topsoil Plating: Varies
- #6 Rebar: S Shape (Typ)
- #4 Rebar: Continuous
- PCCP: See Plans
- Horizontal Line: Varies
- Traffic: 4" R

**PLAN**

- Plan View
- 1'-0" RLF
- 2'-0" RLF
- 3'-0" (Typ) RLF
- 1'-10" RLF
- 4" RLF
- 6" RLF
- 8" RLF

**ELEVATION**

- Elevation View
- Traffic: 4" R
- Construction Joint: See Barrier Gutter Detail
- Base Material: See Plans
- PCCP: See Plans
- Horizontal Line: Varies
- Topsoil Plating: Varies
- #6 Rebar: S Shape (Typ)
- #4 Rebar: Continuous

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**CONCRETE HALF BARRIER**

**3'-0" TYPE 7**

**WITH GUTTER**

**C-10.52**
GENERAL NOTES

1. Half Barrier shall be constructed by the slip or fixed form method.

2. When obstacles prevent the use of slip form equipment, stationary forms shall be used.

3. Concrete shall be Class S, 1/4000 PSI.

4. # 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

5. Thickness of gutter, 0" can be adjusted to match the PCPP 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. At bridges, the cross slope of the gutter shall transition to match the cross slope of the bridge. Length of the transition is 15'.

8. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCPP. Joints shall be hand troweled or sawn.

9. Wherever Half Barrier is backfilled, see Std. Sec. C-10560 for wse & hole details, unless otherwise indicated on the plans.

ELEVATION

DEPARTURE TERMINATION WITHOUT GUARDRAIL
GENERAL NOTES

1. Concrete shall be Class S, f'c=4000 PSI.

2. If the footing and Half Barrier are cast monolithically, #6 S shape rebars are not required.

3. Longitudinal rebar shall extend 12" past the construction joint at the completion of each incremental pour.

REVISED GENERAL NOTE 3

REVISED SECTION A-A: ADDED CONCRETE CAP & NOTES

If the footing and Half Barrier are cast monolithically, #6 S shape rebars are not required.

Concrete shall be Class S, f'c=4000 PSI.

Longitudinal rebar shall extend 12" past the construction joint at the completion of each incremental pour.
GENERAL NOTES

1. Concrete shall be Class S, <=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. All bend dimensions for rebar are out-to-out of rebars.

Concretes shall be Class S, <=4000 PSI.

Concrete shall be Class S, <=4000 PSI.
GENERAL NOTES

1. Transition median paving cross slope to meet level foundation pad. See plans for length and location.

2. Compacted backfill and Class B concrete shall be placed between bridge columns or piers only.

3. Slope as shown on Plans

PLAN

SECTION C-C

SECTION A-A

SECTION B-B
GENERAL NOTES

1. Concrete shall be Class S, f'c=4000 PSI.

2. If the footing and barrier are cast monolithically, #6 shape rebars are not required.

3. Barrier width shall not exceed the barrier footing width nor overhang the adjacent pavement.

4. #4 rebar shall extend 12" past the construction joint at the completion of the day's pour.
1. Concrete shall be Class S, Ty4000 PSL.
2. The half barrier shall be placed upon a bed of grout in order to provide a uniform bearing.
3. Dowelled joints shall be grouted under pressure until all of the openings and the joints are filled.
4. All bend dimensions for rebar are out-to-out of bars.
5. Rebar shall have 2" minimum clear cover unless otherwise noted.

See Construction Joint Detail

See Construction Joint Detail

Pressure Grout Hole

1" Diameter x 18" Dowel (Typ)

Trench - Minimum

Median Pavement

WITH AC

SECTION A-A

WITH AC

SECTION B-B

ELEVATION

PLAN

CONSTRUCTION JOINT DETAIL

KEYWAY DETAIL

See Sheet 3 of 3

VIEW 1 OF 3 - B TYPE 9" AT PIERS PRECAST

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ROADWAY STANDARD DRAWINGS

C-10255
Sheet 2 of 3

9/04
GENERAL NOTES

1. Transition median paving cross slope to meet levee foundation pad. See plans for length and location.

2. Compacted backfill and Class B concrete shall be placed between bridge columns or piers only.

3. Slope as shown on Plans

PLAN

SECTION C-C

SECTION A-A

SECTION B-B
GENERAL NOTES

1. Concrete shall be Class S, 4000 PSI.
2. All rebar shall have 2" minimum clear cover unless otherwise noted.
3. All bend dimensions for rebar are out-to-out of rebars.
4. "P"-"F" Minimum or Match Thickness of Adjacent PCCP

CONCRETE HALF-BARRIER TRANSITION
TO VERTICAL
32" TYPE ‘F WITH CAISSONS

ELEVATION
BARRIER WITHOUT CURB
Concrete Half-BARRIER Transition

Existing Concrete Barrier

1" Diameter 38" Dowel (Typ)

Epoxy Grout (Typ)

Joint Assembly

Dowel Locations

CONSTRUCTION JOINT DETAIL (OPTIONAL)

Caisson Reinforcement
GENERAL NOTES

1. Concrete shall be Class S, f'c=4000 PSL.

2. All rebar shall have 2" minimum clear cover unless otherwise noted.

3. All bend dimensions for rebar are out-to-out of bars.

4. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement. Joints shall be either hand tooled or sawn.

5. 2 3/8" minimum or match thickness of adjacent PCCP.

Concrete shall be Class S, <=4000 PSI.

1'-0" Minimum or Match Thickness of Adjacant PCCP

BARRIERS

1. Type 'F' Barrier
2. See Optional Construction Joint Detail Sheet 2 of 3
3. Thrie-Beam Terminal Connector
4. For Anchor Plate and Hardware
   See Std Dwg C-10.30
5. Thrie-Beam Guardrail
   Transition System
   See Std Dwg C-10.32
6. See Barrier End Detail

BARRIER WITH CURB AND GUTTER

ELEVATION

20'-10"
GENERAL NOTES
1. Concrete shall be Class S, f'\leq 4000\,\text{PSI}.
2. All rebar shall have 2\,\text{in} minimum clear cover unless otherwise noted.
3. All bend dimensions for rebar are \text{out-to-out} of rebars.

\begin{itemize}
  \item \(1\,-\,0\,\text{in}\) Minimum or Match Thickness of Adjacent PCCP
\end{itemize}
GENERAL NOTES

1. See Section B-B for caisson reinforcement.
2. See Optional Construction Joint Detail, Sheet 3 of 3
3. 1-3/4" Minimum or Match Thickness of Adjacent PCCP
GENERAL NOTES

1. Concrete shall be Class S, f'c=4000 PSI.

2. All rebar shall have 2" minimum clear cover unless otherwise noted.

3. All bend dimensions for rebar are cut-to-cut of rebars.

4. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement. Joints shall be either hand routed or sawn.

1'-0" Minimum or Match Thickness of Adjacent PCCP

Concrete shall be Class S, <=4000 PSI.

CONCRETE HALF-BARRIER TRANSITION TO VERTICAL
42" TO 32" TYPE 'F' WITH GUTTER

1'-0" Minimum or Match Thickness of Adjacant PCCP

See Barrier End Detail
GENERAL NOTES

1. Half-Barrier Transition shall be constructed by the forced cast-in-place method.

2. Concrete shall be Class S, f'c=4000 PSI.

3. If the footing and barrier are cast monolithically, #6 S shape rebar are not required.

4. Barrier width shall not exceed the barrier footing width nor overhang the adjacent pavement.

5. #4 rebar shall extend 2" past the construction joint at the completion of the day's pour.

6. Thickness of gutter, "D" can be adjusted to match the PCCP thickness, as approved by the Engineer.

7. Two-inch deep construction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement, joints shall be either hand tooled or sawn.
GENERAL NOTES

1. All concrete shall be Class S, f'c=4000 PSI.
2. All rebar shall conform to Std Spec 1003.
3. All rebar 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 Dwg C-05.20 for sidewalk construction.
7. All bend dimensions for rebar are out-to-out of rebars.
8. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement. Joints shall be either hand tooled or sawn.

9/10' to 8'
1'-0" to 10 3/8"
GENERAL NOTES

1. All concrete shall be Class S f'c=4000 PSI.
2. All rebar shall conform to Std Spec 1003.
3. All rebar 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 adjoining curb and gutter and concrete half barrier.
6. All bend dimensions for rebar are cut-to-out of bars.
7. Two-inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent PCCP and at approximate 15' centers when adjacent to AC pavement. Joints shall be either hand-tooled or sawn.

---

Concrete Curb & Gutter
Type B or C
Std Deg C-05.10

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Traffic

---

Top of Curb

---

Gutter Line

---

Lip of Gutter

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Section A-A

---

Section B-B

---

Section C-C
GENERAL NOTES

1. All concrete shall be Class S, fc=4000 PSI.
2. All rebar shall conform to Std Spec 1003.
3. All rebar 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 the adjoining concrete half barrier.
6. See Std Dwg C-05.20 for sidewalk construction.
7. All bend dimensions for rebar are out-to-out of bars.
   - 10\% to 8\%
   - 7-0\% to 10\%

See Construction Joint Detail Std Dwg C-10.71

See Plans Sheet 4 of 7

See Barrier Gutter Detail

See Barrier Gutter Transition

See Barrier Transition Control Point

PLAN

ELEVATION

Sidewalk Ramp
Type D
Std Dwg C-05.30
Sheet 4 of 7

Curb & Gutter Transition
Type A
Std Dwg C-05.13

Gutter Line & Top of Sidewalk

Concrete Half Barrier
See Plans

Gutter Line

Barrier Gutter Transition

Barrier Transition Control Point

Sidewalk

1/2" Preformed Expansion Joint Filler

5/8" Bituminous Joint Filler

R (2") Minimum

See Plans Sheet 2 of 2

Traffic

STATE OF ARIZONA
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REVISED SECTION VIEW GRAPHICS TO SHOW TYPE 'F' BARRIER

DESCRIPTION OF REVISIONS

MADE BY

DATE

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GENERAL NOTES

1. See plans for type and location of drainage facilities.

2. See Std Dwg C-05.10, 05.12, 10.01 and 10.02 for dimensions and details not shown.

3. Type B guardrail installation shown. For Type A guardrail installation, use Type D-1 Curb and Gutter instead of the Type D-2 Curb and Gutter shown.

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

5. Bituminous joint filler (1/2") shall be placed when the curb & gutter or concrete widening abuts slotted drains, catch basins, ditches, barrier, etc. Scored joints, 2" in depth, shall be placed to match adjacent joints in PCCP or at 15’ intervals when adjacent to AC or continuously reinforced concrete pavement.

SECTION A-A

1. Concrete Barrier Transition, Type 2
   Std Dwg C-10.76
   Sheet 2 of 2

2. Curb & Gutter Transition, Type 5
   Std Dwg C-05.04

3. Concrete Half Barrier Transition
   Std Dwg C-05.05

4. Curb & Gutter Transition
   Std Dwg C-05.05

SECTION B-B

1. Concrete Half Barrier Transition
   Std Dwg C-10.71

2. Concrete Barrier Transition, Type 2
   Std Dwg C-10.76
   Sheet 2 of 2

3. Curb & Gutter
   Std Dwg C-05.03
   Sheet 1 of 2

4. Lip of Gutter

5. Concrete Gutter

6. Curb & Gutter Transition
   Std Dwg C-10.30

7. Thrie-beam to Concrete Half Barrier Transition
   Std Dwg C-10.30

8. Guardrail Transition
   Thrie-beam to Concrete Half Barrier Transition
   Std Dwg C-10.30

9. Curb & Gutter Transition
   Type B, C or Cl
   Curb with Variable Width Gutter
   Guardrail Depression Varies
   See Std Dwg C-05.10

10. Length Varies
    See Appropriate End Treatment Detail

11. Payment Limits for Variable-Width Gutter
    See Appropriate End Treatment Detail

12. Length Varies
    See Appropriate End Treatment Detail

13. Lip of Gutter

14. Concrete Gutter

15. Curb & Gutter Transition
   Type B, C or Cl
   Curb with Variable Width Gutter
   Guardrail Depression Varies
   See Std Dwg C-05.10

16. Length Varies
    See Appropriate End Treatment Detail

17. Payment Limits for Variable-Width Gutter
    See Appropriate End Treatment Detail

PLAN

Traffic
GENERAL NOTES

1. Cattle guard shall include two (2) clamps per Sheet 4 at each gap between two (2) grill units, one at each end. Clamps shall be adjusted to provide a ¼-inch plus or minus ¼-inch gap between adjacent grill units.

2. Grill units shall be set on an angle iron assembly consisting of one piece of 6"x3½"x⅜" angle iron and studs with a head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail 2.

3. 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.

4. Where the adjacent roadway is paved, an angle iron assembly shall consist of one piece of 4"x4"x⅜" angle iron and studs with a head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail 1.

5. Where the adjacent roadway is unpaved, an angle iron assembly shall consist of one 4"x4"x⅜" angle iron, one 2"x2"x⅜" angle iron, and connected with 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 3.

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

7. All rebar shall have a minimum cover of 3", or as shown on the plans. Cattle guard beams shall be HS-20 loading unless otherwise shown on the plans.

8. Quantities shown for concrete and rebar are approximations for informational purposes only.

9. When a gate is to be installed, it shall be called out on the plans.

10. All rebar shall have a minimum cover of 3", or as shown on the plans.

UNIT TABLE

<table>
<thead>
<tr>
<th>Roadway Width (ft)</th>
<th>Grill Units Required</th>
<th>Concrete (Cu Yd)</th>
<th>Rebar (lbs)</th>
</tr>
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<tr>
<td>12</td>
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<td>179</td>
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<td>3</td>
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<td>4</td>
<td>10.3</td>
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<td>28</td>
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<td>34</td>
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<td>38</td>
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<tr>
<td>40</td>
<td>7</td>
<td>16.9</td>
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</tr>
</tbody>
</table>
PLAN

ELEVATION

SECTION C-C

BEAMS

RAIL GRILL UNIT

PLAN

ELEVATION

SECTION C-C

BEAMS

RAIL GRILL UNIT
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 AB shall be used. When the roadway is unpaved, a material equivalent to the existing roadway shall be used.

2. On steeper grades, the post shall be installed plumb to align with adjacent fencing. The brace assembly may be modified as necessary to support the post.

* Indicates AASHTO, AGC & ARTBA Task Force 13 designation

---

DESCRIPTION OF REVISIONS

MADE BY

DATE

ROADWAY CATTLE GUARD

SHOULDER TRANSITION AT CATTLE GUARDS

SECTION D-D

Concrete Curb Footing

2" x 2" x 1/4" x 6'-11"

2" Square (Outside nominal dimension x 6'-3" Tubular Post

7/8" Diameter Hole

In 8" Wide Concrete Curb Footing, 4 Places

1/4" Diameter Hole

Post Cap

Remove 2" of Flange (Typ)

3/4"-10 UNC x 3 1/2" Hex Bolt (•) and Hex Nut (•) with Plain Round Washer (•) (Typ)

Cattle Guard

10:1 Taper Shoulder Transition (Typ)

Roadway Width

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 AB shall be used. When the roadway is unpaved, a material equivalent to the existing roadway shall be used.

On steeper grades, the post shall be installed plumb to align with adjacent fencing. The brace assembly may be modified as necessary to support the post.

* Indicates AASHTO, AGC & ARTBA Task Force 13 designation

END VIEW

SECTION E-E

Post and Brace Assembly

See General Note 2

Sheet 1 of 4

3/4"-10 UNC x 9 1/2" Hex Bolt (•) and Hex Nut (•) with Plain Round Washer (•)

Concrete Curb Footing

Roadway

SHOULDER TRANSITION AT CATTLE GUARDS

SECTION D-D

Concrete Curb Footing

2" x 2" x 1/4" x 6'-11"

2" Square (outside nominal dimension x 6'-3" tubular post

7/8" Diameter Hole

In 8" wide concrete curb footing, 4 places

1/4" Diameter Hole

Remo 2" of flange (Typ)

3/4"-10 UNC x 3 1/2" Hex Bolt (•) and Hex Nut (•) with Plain Round Washer (•) (Typ)

Cattle Guard

10:1 Taper Shoulder Transition (Typ)

Roadway Width

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 AB shall be used. When the roadway is unpaved, a material equivalent to the existing roadway shall be used.

On steeper grades, the post shall be installed plumb to align with adjacent fencing. The brace assembly may be modified as necessary to support the post.

* Indicates AASHTO, AGC & ARTBA Task Force 13 designation

END VIEW

SECTION E-E

Post and Brace Assembly

See General Note 2

Sheet 1 of 4

3/4"-10 UNC x 9 1/2" Hex Bolt (•) and Hex Nut (•) with Plain Round Washer (•)

Concrete Curb Footing

Roadway

SHOULDER TRANSITION AT CATTLE GUARDS

SECTION D-D

Concrete Curb Footing

2" x 2" x 1/4" x 6'-11"

2" Square (outside nominal dimension x 6'-3" tubular post

7/8" Diameter Hole

In 8" wide concrete curb footing, 4 places

1/4" Diameter Hole

Remo 2" of flange (Typ)

3/4"-10 UNC x 3 1/2" Hex Bolt (•) and Hex Nut (•) with Plain Round Washer (•) (Typ)

Cattle Guard

10:1 Taper Shoulder Transition (Typ)

Roadway Width

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 AB shall be used. When the roadway is unpaved, a material equivalent to the existing roadway shall be used.

On steeper grades, the post shall be installed plumb to align with adjacent fencing. The brace assembly may be modified as necessary to support the post.

* Indicates AASHTO, AGC & ARTBA Task Force 13 designation
3/4" Hex Nut (2 Required) with Plain Round Washer, Grade 3

3/4" Diameter

All-Thread x 11 5/8"

3/4" Hex Nut (1 Required) with Plain Round Washer, Grade 3

1/4" [ 1/16 "

3/4" Hex Nut (1 Required) with Plain Round Washer, Grade 3

1/4" (Typ)

1/4" R

3/16 " R

3/8 "

1 3/4 "

1 1/4 "

2 1/2 "

1" 

2"

3 1/2 "

6" (Typ)

3" (Typ)

6' (Typ)

See DETAIL A

ELEVATION

SECTION A-A

PLAN

DETAIL A

ELEVATION

ROADWAY CATTLE GUARD

GRILL HORIZONTAL CLAMP

STATE OF ARIZONA

DEPARTMENT OF TRANSPORTATION

ROADWAY STANDARD DRAWINGS

APPROVED FOR DISTRIBUTION

APPROVED FOR DESIGN

4/06
GENERAL NOTES

1. See Std Dwg C-0430 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.

SECTION A-A

SECTION B-B

SECTION C-C

Where used for through drainage - Cattle Guard open both ends
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 related wire stay shall be centered between posts.

GENERAL NOTES

TYPICAL WOVEN WIRE FENCE INSTALLATION-TYPE 1 WW SHOWN

TYPICAL WOVEN WIRE FENCE INSTALLATION-TYPE 1 WW SHOWN

FENCE FABRIC DIMENSIONS 
AND DESIGN NUMBERS

TYPE 1 WOVEN WIRE (WW)

TYPE 2 WOVEN WIRE (WW)

TYPE 3 WOVEN WIRE (WW)

TYPE 4 WOVEN WIRE (WW)
GENERAL NOTES

1. Intermediate Post Assemblies shall be located as shown and at intervals not to exceed 850, or midway between abutted posts.

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

3. The stays on game fence shall have their ends turned up to prevent injuries to game.

TYPICAL BARBED WIRE FENCE INSTALLATION-TYPE 2 BW SHOWN

TYPE 1 BARBED WIRE (BW) (4 WIRE)

BARBED WIRE GAME FENCE (GF)

TYPE 2 BARBED WIRE (BW) (5 WIRE)
FLOOD GATE

TYPE 1 SINGLE GATE

TYPE 1 DOUBLE GATE

TYPE 2 GATE
GENERAL NOTES
1. Post assemblies shall consist of an upright angle 2½"x2½"x½" at 4.0 lb/ft, and brace angles 2½"x2½"x½" at 3.19 lb/ft.

TYPICAL FENCE LOCATION AT CATTLE GUARD

TYPICAL FENCE LOCATION

DETAIL A
TYPICAL CROSS SECTIONS
OF LINE POST SHAPES

DETAIL B
INTERMEDIATE POST ASSEMBLY

DETAIL C
END POST ASSEMBLY

DETAIL D
CORNER POST ASSEMBLY

DETAIL E
FENCE CONNECTION TO WINGWALL
GENERAL NOTES

1. Posts shall be round, in sections, or re-formed and shall conform to the nominal dimensions requirements shown on the plans. Dimensional tolerances for all shapes shall be according to ASTM A500. In addition, the material of which posts are fabricated shall have a nominal thickness, before gavanizing, of not less than 0.132” for line posts and 0.170” for terminal posts.

2. Chain link fabric shall be either zinc-coated or aluminum-coated steel wire fence fabric. Zinc-coated steel fabric shall conform to the requirements of ASTM A1065, Class I coating. Aluminum-coated steel fabric shall conform to the requirements of ASTM A456, with a minimum weight of coating of 0.40 ounce per square foot of wire surface area. Fabric shall be 11 gauge for all fence fabrics or less. Steel posts shall be 0.170” in diameter and shall be 0.132” in diameter for fabrics greater than 60” in height.

3. Tension wires shall be 7 gauge (0.177” diameter) coil spring steel wire with a minimum tensile strength of 75,000 PSI and shall be zinc-coated or aluminum-coated.

4. Truss rods shall be 5/8” diameter adjustable rods. Truss tighteners shall have a strap thickness of not less than 1/8”.

5. Stretching bars shall be 3/8” by 3/16” steel flat bars. Stretching bar shanks shall be 3/8” by 1” preformed steel bands.

6. Bottom tension wire shall be 3” from top of crown on concrete footings.

7. Intermediate post assemblies shall be spaced at 500’ intervals or midway between pull posts when the distance between such posts is less than 1200’ and more than 500’.

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 (ft)</th>
<th>Corner, End, Intermediate, Gate, Latch and Pull Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length (ft)</td>
<td>Round</td>
</tr>
<tr>
<td></td>
<td>(OD)</td>
<td>(ID)</td>
</tr>
<tr>
<td>26</td>
<td>6-0</td>
<td>2.175</td>
</tr>
<tr>
<td>48</td>
<td>1-0</td>
<td>2.175</td>
</tr>
<tr>
<td>60</td>
<td>8-0</td>
<td>2.175</td>
</tr>
<tr>
<td>72</td>
<td>9-0</td>
<td>2.175</td>
</tr>
<tr>
<td>Over 72</td>
<td>Height 1/4”</td>
<td>2.875</td>
</tr>
<tr>
<td></td>
<td></td>
<td></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 5" apart and shall be either zinc-coated or aluminum-coated. Zinc-coated steel wire shall conform to the requirements of ASTM A522, Class 1 coating. Aluminum-coated steel wire shall conform to the requirements of ASTM D58, Type 1, Class 1 coating.

2. Barbed wire support arm shall be of the type shown on the plans, and shall be fabricated from commercial quality steel, and shall be zinc-coated in accordance with the requirements of AASHO M112.

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

DETAiL G
BARBED WIRE SUPPORT ARM

TYPICAL POST DIMENSIONS

<table>
<thead>
<tr>
<th>Fabric Height (in)</th>
<th>Corner, End, Intermediate, Gate, Latch and Pull Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length @ Y=0 (lin)</td>
<td>Round (lin)</td>
</tr>
<tr>
<td>T2</td>
<td>8-6</td>
<td>2.375</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. All concrete shall be Class S, f_c=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 A525.


4. The 3⁄4" galvanized wire rope shall conform to AASHTO M207 Class H Type 2.

5. The wire fabric, ties, bands, stretcher bars, and other fittings and hardware shall conform to AASHTO M63.

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

7. The excavations for the concrete anchor blocks shall be to neat lines. Maximum excess shall be 3".

8. Perforated posts shall be square tube formed from 1/2" x 1/2" x 1/2" x 1/2" cold rolled carbon tube. The square tubes shall be welded directly in the corner by high frequency resistance welding on equal. The posts to be externally coated to agree with standard corner rail of 3⁄4" x 1 1/2".

9. Perforated posts shall be galvanized to the requirements of ASTM A653/A653M, Coating designator shall be 225G.

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 U-Bolt and clamp bars shall be spaced at 1/3 of the distance between posts.


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

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

NOTE: Shown C428M System without Curb. May use OTHER SYSTEMS with or without Curb.
GENERAL NOTES

1. See plans for any required inlet and/or outlet protection.

2. E dimension applies to both non-trench and trench conditions.

3. Minimum cover over pipe culverts shall be 1', measured from the top of pipe.

4. See Pipe Berm Requirement Detail for pipe berm requirements and Std. Spec. C-03.5 for installation. 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.

5. Slope plating shall conform to Std. Spec. 501.

MINIMUM SPACING FOR MULTIPLE PIPES WITH HEADWALL

<table>
<thead>
<tr>
<th>Diameter or Span (in)</th>
<th>E (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>2-6</td>
</tr>
<tr>
<td>24</td>
<td>3-0</td>
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<td>3-9</td>
</tr>
<tr>
<td>36</td>
<td>4-6</td>
</tr>
<tr>
<td>42</td>
<td>5-3</td>
</tr>
<tr>
<td>48 to 66</td>
<td>0.5 x 3-0</td>
</tr>
<tr>
<td>72 and Over</td>
<td>0.5 x 3-0</td>
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PIECE W/T BERM REQUIREMENT DETAIL

See General Note 4

PIPE CULVERT INSTALLATION

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

7/05

PIECE CULVERT INSTALLATION

PIPE W/T BERM REQUIREMENT DETAIL

See General Note 4
GENERAL NOTES

1. Minimum cover over pipe culverts shall be 12", measured from the top of pipe.

2. After welding, the damaged coating shall be cleaned by a wire brush and painted with at least one full coat of Paint Number 4, or given two coats of an approved hot asphalt paint, as directed by the Engineer.

SPECIAL MULTIPLE PIPE END SECTION DETAIL
FOR PIPE CULVERT EXTENSIONS ONLY

PERFORATED CMP INSTALLATION

PIPE AND CATCH BASIN INSTALLATION
AT SAG CONDITION OF CUT DITCH

PIPE AND CATCH BASIN INSTALLATION
AT BASE OF TRANSVERSE DIKE

PIPE AND CATCH BASIN INSTALLATION
AT FACE OF TRANSVERSE DIKE
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 bedding 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 to the limits shown in the details 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 taken or rise of arch pipe, elliptical pipe.

T – Minimum wall thickness for FRP/PEP. See Plans.

6. For D-6, D-6" each side, minimum D + 5" each side, maximum

O – 6 inches except when on ungraveled or unstable material. See 5th Spec.

---

TRENCH CONDITION

IN NATURAL GROUND OR IN EMBANKMENT

WITHOUT BRACING

---

TRENCH CONDITION

IN NATURAL GROUND OR IN EMBANKMENT

WITH BRACING SHOWN

---

TRENCH CONDITION

MCITP IN NATURAL GROUND

OR IN EMBANKMENT

---

NON-TRENCH CONDITION

---
GENERAL NOTES

1. End section joint type shall match the pipe joint type.
2. Embankment slope shall be warped to match slope of end section.

<table>
<thead>
<tr>
<th>Pipe Diameter (in)</th>
<th>Approximate Weight (lbs)</th>
<th>Dimensions (in)</th>
<th>Approximate Slope</th>
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<tbody>
<tr>
<td>24</td>
<td>1520</td>
<td>3 x 3 3/8 x 43/8</td>
<td>30 73 1/4 48</td>
</tr>
<tr>
<td>27</td>
<td>1920</td>
<td>3 1/2 x 4 1/2 x 49 1/2</td>
<td>24 73 1/4 54</td>
</tr>
<tr>
<td>30</td>
<td>2190</td>
<td>3 3/4 x 5 1/2 x 54 1/2</td>
<td>24 73 1/4 60</td>
</tr>
<tr>
<td>36</td>
<td>4100</td>
<td>4 x 6 1/2 x 34 1/2</td>
<td>97 1/4 72</td>
</tr>
<tr>
<td>42</td>
<td>5380</td>
<td>4 1/2 x 7 1/2 x 35 1/2</td>
<td>98 78</td>
</tr>
</tbody>
</table>

PLAN

SECTION A-A

RIGHT ANGLE CULVERT

SKewed CULVERT

SPACING FOR MULTIPLE INSTALLATION

1/4" Minimum

NORMAL Toe of SlopE

1/4" R (Typ)
GENERAL NOTES

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

2. The Type 1 connector is bolted or riveted. 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 only be used with annular or helical pipe with a minimum number of annular corrugations.

4. Type 4 connector shall only be used with helical pipe.

5. All steel end section components shall be galvanized.

6. Top of embankment shall be retained to top of paved end section.

7. A term shall be added to abnormal projections per Std 00G C-1870.

8. The foregoing applies to all cross-section configurations.

<table>
<thead>
<tr>
<th>Circular Pipe Dimensions (in)</th>
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<tr>
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<td>Diameter (in)</td>
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<td>16</td>
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<tr>
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<tr>
<td>42</td>
<td>12</td>
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</table>

<table>
<thead>
<tr>
<th>Pipe Arch Dimensions (in)</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Span (in)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>28</td>
<td>20</td>
</tr>
<tr>
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</tr>
<tr>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>49</td>
<td>33</td>
</tr>
</tbody>
</table>

PIE PROV FOR DESIGN DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS RE: 9/04 C-13.25

STATE OF ARIZONA
GENERAL NOTES

1. For lateral dimensions of invert paving, use 72º control for CWP and span for CWP2.

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 crest at intervals and in a manner approved by the engineer. Laps shall be 6" minimum.

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

6. Concrete shall be Class B.

HEADDWALL INSTALLATION
(SEE STANDARD DRAWING B-11.12)

PROJECTING INSTALLATION

SECTION A-A

SECTION B-B
GENERAL NOTES

1. This width 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 144" 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 wadded to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be a minimum of 64.

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

1. Pipe culverts are not required where direct catch-basin connections can be made within 7' of a normal 30° installation, either horizontally or vertically.

2. "I" connections direct to the main drainage trunk line should be avoided and used only where manhole connections are impractical.

SECTION A-A
TYPICAL CONNECTION BETWEEN CATCH BASIN AND MANHOLE

SECTION C-C
TYPICAL CONNECTION BETWEEN CATCH BASIN AND MAIN STORM DRAIN

SECTION B-B
Pipe Cross Connection

SECTION D-D

PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN INSTALLATION WITH MANHOLE

PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN INSTALLATION WITHOUT MANHOLE
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 "S" is shown on plans.
3. If θ is 45° or less, Type I connection shall be used.
4. All concrete shall be Class B.
5. All rebar shall conform to Std Specs 1003-1 & 2.
6. Rebar shall have 2" minimum cover.

SECTION A-A

CATCH BASIN ABOVE STORM DRAIN
TYPE 2

SIDE INLET
TYPE 1

CONNECTION DETAIL
TYPE 2
GENERAL NOTES

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'.
GENERAL NOTES

1. All concrete shall be Class B.
2. All rebar shall conform to Std Spec 1003-12.
3. All rebar shall have 3" minimum clear cover.
4. All concrete 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, "L" & "l" shall be those of the larger diameter.
6. The diameter of the circular ties shall be the outside diameter of pipe + 1/16.
7. Pipe ends to be trimmed such that the maximum distance between pipes at any point is 2".

PIPE COLLAR TABLE

<table>
<thead>
<tr>
<th>Pipe Size (in)</th>
<th>Dia (in)</th>
<th># Ties</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1-0</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>1-0</td>
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<tr>
<td>24</td>
<td>1-0</td>
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<tr>
<td>30</td>
<td>1-6</td>
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<td>36</td>
<td>1-6</td>
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<td>2-0</td>
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</tr>
<tr>
<td>84</td>
<td>2-3</td>
<td>16</td>
</tr>
<tr>
<td>96</td>
<td>2-3</td>
<td>16</td>
</tr>
</tbody>
</table>
**GENERAL NOTES**

1. Catch basin used at roadway edge.
2. Pipes can be placed in any way.
3. Surf face shall be a wood troweled finish with a minimum 4" slope in all directions to outlet.
4. All rebar shall be ASTM A36.
5. All welding shall be in accordance with Std Spec 604-3.02b.
6. Grates, frame, beam and nose plates shall be given one shop coat of number 1 paint.
7. All concrete shall be Class B.
8. Construction joints and drains shall be placed to meet field conditions. See Std Dwg C-1570.
9. Any specified inlet depression shall be paved to opening, according to Std Dwg C-1570.
10. Concrete shall be placed between the grate frame and PCFP, recessed 1/4" from the pavement surface.
11. Curb opening areas, sq ft, for Type I single and Type I double equal 0.25 and 0.35, respectively, for each inch of "h" + inlet depression - 0.35". See Std Dwg C-1570.
12. See Std Dwg C-1550 for grate and frame details and grate opening areas.
13. \( h = 6" \) when "h" is 8" or less
   \( h = 8" \) when "h" is greater than 8
   See Section B-B
   \( h = 9" \) when pavement is AC
   Match pavement thickness when pavement is PCFP

---

**PLAN - CATCH BASIN TYPE I - SINGLE**

**PLAN - CATCH BASIN TYPE I - DOUBLE**

**SECTION A-A**

**SECTION B-B**

**DETAIL 1**

**DETAIL 2**

**DETAIL 3**

**DETAIL FOR WIDE GUTTER**

(SEE STD DWG C-0510)
**GENERAL NOTES**

1. Catch basin can be used on grade or at roadway edge.
2. Catch basin has three configurations:
   - Sump Only-Sump portion of catch basin (See Detail 4, Sheet 2 of 3).
   - Single Wing (Illustrated)-Sump with wing basin upstream.
   - Double Wing-Sump with symmetrical wing basins each side.
3. Pipes can be placed in any wall except wall adjacent to wing basin.
4. Floor shall be a wood troweled finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 4:1.
5. Any specified inlet depression shall be warped to opening according to Std Dwg C-15.70.
6. All rebar shall be ASTM A36.
7. Nose plate, access frame and cover shall be given one shop coat of Number 1 paint.
8. All concrete shall be Class B.
9. Curb opening area (sq ft) per inch of curb "h" + gutter depression x curb opening length (ft) = 0.0833.
10. All welding shall be in accordance with Std Spec K4-40.02.
11. Construction joints and drains shall be placed to meet field conditions. See Std Dwg C-15.70.
12. 6"-8" when H is 8' or less, 8" when H is greater than 8'.

---

**Section A-A**

Use this section when H≤5' or less.

**Section B-B**

---

**Section C-C**

---

**CATCH BASIN**

**TYPE 3**
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 fitted with concrete and broom finished.

PLAN

SECTION A-A FRAME

SECTION B-B COVER

26½''

Concrete
Fiber

2''

$\frac{1}{2}''$ Batter

$\frac{1}{8}''$ Diameter
Lifting hole.
GENERAL NOTES

1. Catch basin can be used on grade or at roadway sag.
2. Pipes can be placed in any well.
3. Floor shall be a wood traveled finish with a minimum 4:1 slope along the axis of the pipe toward the pipe. 
4. Curb over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.
5. Catch basin can be used with curb and gutter as shown or without.
6. See StDwG C-15.50 for grate and frame details and opening areas.
7. Any specified inset depression shall be warped to opening according to StDwG C-15.70.
8. All rebar shall be ASTM A616.
9. Grate, frame, and beam shall be given one shop coat of Number 1 paint.
10. All concrete shall be Class B.
11. Construction joints and drains shall be placed to meet field conditions, see StDwG C-15.70.
12. Silicone sealant shall be placed between the grate frame and PCP, recessed 7/8" from the pavement surface.
13. See Detail 2 for catch basin with wide gutter.
14. 9" when pavement is AC. Match pavement thickness when pavement is PCP.

PLAN - CATCH BASIN TYPE 4 - SINGLE

PLAN - CATCH BASIN TYPE 4 - DOUBLE

SECTION A-A

SECTION B-B

SECTION C-C

DETAIL FOR WIDE GUTTER
(SEE STD DWG C-05.10)
GENERAL NOTES

1. Catch basin can be used on grade or at roadway sag.
2. Catch basin has three configurations:
   Single wing illustrated—sump with wing basin upstream.
   Double wing sump with symmetrical wing basins on each side.
3. Pipes can be placed in any wall except wall adjacent to a wing basin.
4. Floor shall be a wood-traveled finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 4:1.
5. Any specified inlet depression shall be warped to opening according to Std Dwg C-15.70.
6. All rebar shall be ASTM A36.
7. Nosed plate shall be given one shop coat of No. 1 paint.
8. All concrete shall be Class B.
9. Curb opening area (in ft²) per inch of curb 1" + inlet depression + curb opening length (ft) x 0.0833.
10. All welding shall be in accordance with Std Spec 604-3.06.
11. See Std Dwg C-15.50 for grate and frame details and opening areas.
12. Construction joints and drainages shall be placed to meet field conditions. See Std Dwg C-15.70.
13. Silicone sealant shall be placed between the grate frame and PCP, recessed 1/4" from the pavement surface.
14. 1/4" when it is 1/4" or less.
15. 1/2" when it is greater than 1/4".
16. Vertical thickness when pavement is PCP.

SECTION A-A
USE THIS SECTION WHEN H/S OR LESS

SECTION B-B

SECTION C-C
USE THIS SECTION WHEN T+B

SECTION D-D

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

CATCH BASIN
TYPE B

C-15.40
Sheet 1 of 2
GENERAL NOTES

1. See Sheet 1 of 2 for other dimensions, notes and rebar.

2. $\phi = 6$" when $H$ is 8" or less
   $8$" when $H$ is greater than 8"

SECTION A-A
USE THIS SECTION WHEN $H$ IS GREATER THAN 5'

Curb Support Anchor
Max Maximum Anchor Spacing
See Detail 2

Construction Joint (Typ)
No Rebar in Bottom

Notes: Headers Shown are for Floor of Wing and Wall Only.
See Sections on Sheet 1 of 2 for Other Reinforcement

DETAIL 1
Nose Plate
8" x 6" Bent Plate
Lengths: 2-1/2" + 10 + 8 + 6"

Anchor #4 Rebar
6" Center to Center
See Detail 2

#3 Rebar (Typ)

DETAIL 3
#3 Rebar
2" to 3 1/2"

DETAIL 2
Curb Support Anchor

Details:

- Use Section A-A when $H$ is greater than 5'.
- See Sheet 1 for other dimensions, notes, and rebar.
- $\phi = 6$" when $H$ is 8" or less; $8$" otherwise.
- Headers shown are for floor of wing and wall only; see Sheet 1 for other reinforcement.

Drawing Elements:
- Anchor #4 Rebar
- Construction Joint (Typ)
- No Rebar in Bottom
- Notes for floor of wing and wall only.

Drawing Details:
- Nose Plate: 8" x 6" bent plate, lengths: 2 1/2" + 10 + 8 + 6".
- Anchor: #4 rebar, 6" center to center; see Detail 2.
- #3 Rebar (Typ).

Additional Notes:
- Rebar specifications
- Dimensional details
- Reinforcement notes
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 Std Spec 604-3.06.
3. The completed assembly shall be given one shop coat of number 1 paint.
4. Frames and grates shall fit to a maximum rock of 1/4" at any point.
5. Frame opening is 3.60 Sq Ft.
6. Bracing of frame is recommended for handling and placement purposes.
7. Frame and Grate to be used with Std Dwg C-15.32, C-15.33 and C-15.40.
8. Grate may be used with Std Dwg C-15.42 Frame.

SECTION A-A

SECTION B-B

TYPICAL INSTALLATION
C-15.30 Catch Basin Shown
Similar for C-15.32 and C-15.40
GENERAL NOTES

1. No inlet depression shall extend into a traffic lane.
2. Maximum combined inlet and gutter depression is 3". See Section A-A.
3. Maximum distance along curb between catch basins where full gutter depression is used is 10'.
4. See Std Dwg C-15.80 for aprons used with Std Dwg C-15.80 Catch Basin.

LEGEND

- Normal pavement or gutter flow line elevation.
- Depression elevation.
- Straight grade with downward slope.
- Normal gutter width per Std Dwg C-0510.
- For Types L, J, & S Catch Basins.
- For Type 4 Catch Basin & Std Dwg C-15.91.

CATCH BASIN SPACING AT ROADWAY SAG CONDITION

INLET DEPRESSION

CATCH BASIN WITH SLOTTED DRAIN

SECTION A-A
(Type D Curb & Gutter Shown)

SECTION B-B
(Type D Curb & Gutter Shown)
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 Sts Dwg C-1310.  
2. High point of headwall shall not project more than 3" above slope. 
3. All concrete shall be Class B.  
4. All rebar shall be #4, 1'-0" center to center, with 3" minimum clear to inside of wall and floor.
GENERAL NOTES

1. All concrete shall be Class B.
2. Grate and frame shall be fabricated of structural steel in accordance with ASTM A36.
3. All welding shall be in accordance with Std Spec 604-306.
4. Grate assembly shall be given one shop coat of number 1 paint.
   ▲ Apron slopes shall match the natural flow line of the ditch. No additional depression will be allowed.
   ▲ 91 = 6" when it is 8' or less.
   ▲ 8" when it is greater than 8'.

SECTION A-A

24" Outlet Pipe
(Typical Installation)

SECTION B-B

DITCH GRADE DETAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

5/04

CATCH BASIN
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 the Std Specs except water content shall be such that the consistency is proper for smooth troweling.

3. All welding shall be in accordance with Std Spec 604-3.03.

4. The completed grate shall be given one shop coat of Number 1 paint.

5. Foundation soil and backfill shall be in accordance with Std Spec 203-5.
GENERAL NOTES

1. All concrete shall be Class B.
2. All rebar shall have 2" minimum clear cover unless otherwise noted.
3. #4 rebar shall be placed 12" center to center horizontal & vertical in walls.
4. Pipe may be placed in any wall.
5. See Std Dwg C-13-60 and C-13-65 for more information and dimensions of slotted drains.

• Includes 1" Inlet Depression

6. When H is 8' or less
   8' when H is greater than 8’

NOTES:
Bend Rebars and Cover with
Two Layers of 4" x 4" Timbers

SECTION A-A

SECTION B-B
GENERAL NOTES

1. All structural steel shall be in accordance with ASTM A36.
2. All welding shall be in accordance with Std Weld 604-32.
3. The completed grate assembly (frame & grate) shall be given two shop coats of Number 1 paint.

NOTE TO DESIGNERS
Grate design is not suitable for locations subject to bicycle traffic.

GRATE AND FRAME DIMENSIONS

<table>
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<tr>
<th>Type</th>
<th>Curb Height (In)</th>
<th>Catch Basin Frame Width (Ft-In)</th>
<th>Catch Basin Grate Height (In)</th>
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<td>C</td>
<td>3</td>
<td>2-6</td>
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</table>

BRACE PLATE DETAIL

3 1/2"x 1/2 "x10" Bars
See Brace Plate Detail

SECTION A-A

SECTION B-B
**GENERAL NOTES**

1. See Std Dwg C-15.30 for dimensions, sizes and details not shown for construction of catch basin.

2. See Std Dwg C-10.52 and C-10.53 for dimensions, sizes and details not shown for construction of barrier.

3. See Std Dwg C-15.60 for dimensions, sizes and details not shown for construction of slotted drain.

4. Only longitudinal reinforcing steel shall be placed in half barrier within 1' of catch basin frame. S-shape bars shall not be placed in the rear wall of the catch basin.

   - 1-3' for 18' diameter slotted drain
   - 2-6' for 24' diameter slotted drain
   - Angle varies, approximately 45°
   - varies in increased height over catch basin and slotted drain inlet depression
   - Depressed elevation.
   - Normal pavement or gutter flow line elevation.
   - Match adjacent gutter depression. Additional inlet depression as specified.
   - Straight grade with downward slope.

**NOTE TO DESIGNERS**

Grate design shown is not suitable for locations subject to bicycle traffic. Use Std Dwg C-15.50 (G) frame Sheet 2 of 31 for locations with bicycle traffic.
1. All welding shall be in accordance with Std Spec 604-3.06.

2. Grate opening for grate shown is 4.75 Sq Ft.

- Bevelled side of grate toward barrier

Grate design shown is not suitable for locations subject to bicycle traffic. Use Std Dwg C-15.50 grate with Std Dwg C-15.92 frame (Sheet 2 of 2) for locations with bicycle traffic.
GENERAL NOTES

1. Irrigation sleeves shall be installed in a trench condition. See Std Dwg C-1312.

2. Bedding and backfill material shall be Class 2 AB.

3. Pipe installation shall conform to Section 501 of Std Specs.

4. The contractor shall imprint a 4" x 1-1/4" rubber with aluminum cap on the sleeve with the name of the contractor. The width of the letter shall be 1/2" and shall penetrate the concrete surface 1/16".

5. For non-continuous sleeves under crossroads, Std Dwg C-05-10 Type "A-1" curb shall be required where median is irrigated. See plans for locations. Dumbbell stop shall be at all expansion joints.

6. Materials used for caps and plugs shall be as recommended by the pipe supplier and approved by the Engineer.

Sees sleeves shall be installed parallel to the roadway subgrade. Slope may vary in super-elevated sections. Minimum slope nominal to 0.1-in.

\[ 2\text{-in} \text{ Back of Curb Median} \]

SLEEVE UNDER CROSSROAD

SLEEVE UNDER MAINLINE

SLEEVE UNDER RAMP

SLEEVE UNDER DRIVEWAYS AND PARKING AREAS

TYPICAL INSTALLATION

DUMBBELL WATERSTOP
GENERAL NOTES
1. Rock shall conform to Std Spec 913-2.01(A). The rock shall have a minimum nominal diameter no greater than the mesh opening, and a maximum nominal diameter of 12".
2. All mesh wire, tie wire, cable, bolts, washers and nuts shall be galvanized.
3. When other embankment slope rates are encountered, warp to 15:1 or 2:1.
4. High survivability filter fabric shall conform to Section 913-2.05 of the Standard Specifications.
5. All wire mesh on a single project shall have the same mesh opening.

ELEVATION AT CHORD POINT ON CURVE

ELEVATION ON STRAIGHT SECTION

SECTION A - A
WIRE MESH SPLICE DETAILS

PLAN OF CHANNEL BANK PROTECTION

TYPE 1 BANK PROTECTION

TYPE 2 AND 3 BANK PROTECTION

RAIL CONNECTION DETAIL
GENERAL NOTES

1. Rock shall conform to Section 9.3-3.01(A) of the Standard Specifications. The rock shall have a minimum nominal diameter no smaller than the mean opening, and a maximum nominal diameter of 12".

2. All wire, tie, wire, cable, bolts, washers, and nuts shall be galvanized.

3. When other embankment slope rates are encountered, wire to 15:1 or 20:1.

4. High survivability filter fabric shall conform to Section 9.3-2.05 of the Standard Specifications.

5. All wire mesh on a single project shall have the same mesh opening.

ELEVATION AT CHORD POINT ON CURVE

TYPICAL SECTION

See Perspective Std Dwg C-17,10

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<td>20</td>
</tr>
<tr>
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<td>16</td>
<td>50</td>
</tr>
</tbody>
</table>

ELEVATION ON STRAIGHT SECTION

SECTION

WIRE MESH SPLICE DETAILS

RAIL CONNECTION DETAIL
Burn hoops through rails in field and bolt together as shown.

Approval for Design
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
ROADWAY STANDARD DRAWINGS

Approval for Construction

Rail Bank Protection at Abutments Types 4, 5 & 6

Drawn by

04/17/15
GENERAL NOTES

1. Pipe sizes and elevations are shown on plans.

2. The manhole height, H, shall be measured from the lowest invert elevation to the top of the manhole frame.

3. Concrete for cast-in-place manholes shall be Class B.

4. All manholes deeper than 50 inches shall have steps. Manhole steps shall be constructed in accordance with AS4722 with precast manholes used.

5. Per OSHA requirements, special treatises to include landings are required for heights exceeding 30 ft.

6. Precast manhole sections shall be manufactured in accordance with AS4722, except that the compressive strength of each section shall be determined and accepted in accordance with 3rd Spec 1006-1.

7. Manhole location and elevation shall be as shown on plans. See Sheet 1 of 3 for station location reference point.

8. Backfill material shall be compacted to at least 95 percent of the maximum density for the applicable test method of the AASHTO Material Testing Manual.

   a. 4", 6", 8" or 12" (30" inside diameter) Grade Rings
   b. 3"/7'
   c. See Sheet 2 of 3

SECTION A-A

SECTION NORMAL INSTALLATION STANDARD BASE

SECTION SHALLOW INSTALLATION SLAB BASE
GENERAL NOTES

1. All frames, grates, and covers shall support HS20 loading, minimum.
2. Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.
3. Covers including grates shall conform to the following:
   A. Manhole covers to contain the agency name and utility, as directed;
   B. Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;
   C. Letters and words to be equally spaced;
   D. Letter font and layout shall be as approved by the Engineer.
4. Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

36" Nominal CMP Frame & Grate

Approximate Weight: Frame 204 Lbs
Cover 223 Lbs

36" Nominal CMP Frame & Grate

Approximate Weight: Frame 125 Lbs
Cover 167 Lbs

PRECAST ADJUSTING RING DETAIL

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.

Covers (excluding grates) shall conform to the following:

Manhole covers to contain the agency name and utility, as directed;

Letters shall be 2 inches in height and raised 1/8 inch above the plane of the cover;

Letters and words to be equally spaced;

Letter font and layout shall be as approved by the Engineer.

Details shown are typical. Alternative designs of manhole frames and covers may be used upon approval of the Engineer, as long as the minimum loading and weight criteria above are met.

Casting weights shown are minimum weights and are either for cast-iron or ductile-iron castings. Casting weight shall not exceed 110% of the weights shown.
CONCRETE SURFACE ROAD
CONCRETE WALLS

- Min Distance Below Stream Bed

BITUMINOUS SURFACE ROAD
CONCRETE WALLS

GENERAL NOTES

1. Ford walls shall be Class B concrete.

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

4. Depth gauge foundation may be utility concrete.

DEPTU GAUGE DETAIL

ELEVATION LOOKING UPSTREAM
WITH TREATED BASE

TYPE 1
BITUMINOUS SURFACE ROAD

ELEVATION - TYPE 2

TYPE 2
BITUMINOUS SURFACE FORD TIMBER CUTOFF WALLS

GENERAL NOTES
1. All timber shall be rough, pressure treated and unainted.
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.

DETAIL A
12" Diameter x 12" Deep Concrete Foundation
Full Circle for Type 1
Half Circle for Type 2
GENERAL NOTES

1. A survey monument and frame & cover, complete-in-place, shall be considered a unit.

2. A Right-of-Way marker, consisting of a survey monument and a reference marker, complete-in-place, shall be considered a unit.

3. All markers shall be placed as shown on the plans or as directed by the Engineer.

4. Frames may be either Type A or Type B.

5. Frames shall weigh at least 55 pounds.

6. Covers shall weigh at least 16 pounds.

7. Machined portions of the frame and cover are shown by the symbol "X". The allowable tolerance for machined areas is ±1/4". Concrete shall conform to Std Spec 922.

8. Survey monuments shall be magnetically detectable.

A 12" or pavement structure thickness, whichever is greater.
GENERAL NOTES

1. Survey marker may be used with survey monument, and as bench or R/W markers.
2. Survey marker will be furnished by the Department. Cast-in-latter format may vary.
3. When used to define section lines, the marker shall be stamped in accordance with BLM "Manual of Surveying Instructions."
4. When used to define R/W not consisting of section lines, the marker shall be stamped in accordance with Detail A, R/W Marker Information.
5. When used as a R/W marker or to define a section line, the land surveyor's registration number shall be stamped on the marker.
6. Bench marks shall be established on headwalls, bridge walls and other permanent structures, as shown on plans or as directed by the Engineer.
7. Station, elevation, year, and/or other information shall be hand stamped in field, as approved by the Engineer.
8. Survey marker shall be made of brass.
9. Shank cross-sectional area shall be a minimum of 0.31 square inches and a maximum of 0.60 square inches. Shank cross section may vary and is not a critical feature of this standard.
10. Shank geometry shall provide for secure anchorage in concrete.
11. Text shall not obscure survey point.

**Right-Of-Way Plan Number**
**Point Number**
**Registered Land Surveyor Number - see General Note 9**
**Year**