

May 24, 2010

Members of the MAG Specifications and Details Committee

Jesse Gonzales, City of Peoria, Chairman

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF AGENDA

Wednesday, June 2, 2010 at 1:30 p.m.  
MAG Office, Second Floor, Cholla Room  
302 North First Avenue, Phoenix

A meeting of the MAG Specifications and Details Committee has been scheduled for the time and place noted above. Members of the MAG Specifications and Details Committee may attend the meeting either in person, by videoconference or by telephone conference call. If you have any questions regarding the meeting, please contact Committee Chair Jesse Gonzales at 623-773-7548 or Gordon Tyus, MAG staff at 602-254-6300.

Please park in the garage under the building, bring your ticket, parking will be validated. For those using transit, Valley Metro/RPTA will provide transit tickets for your trip. For those using bicycles, please lock your bicycle in the bike rack in the garage.

In 1996, the Regional Council approved a simple majority quorum for all MAG advisory committees. If the MAG Specifications and Details Committee does not meet the quorum requirement, no action can be taken. Your attendance at the meeting is strongly encouraged.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Gordon Tyus at the MAG office. Requests should be made as early as possible to allow time to arrange the accommodation.

It is requested (not required) that written comments on active cases be prepared in advance for distribution at the meeting.

AGENDA

<u>ITEM</u>	<u>COMMITTEE ACTION REQUESTED</u>
1. <u>Call to Order</u>	1. No action required.
2. <u>Approval of May 5, 2010 Meeting Minutes</u>	2. Corrections and approval of May 5, 2010 minutes.
3. <u>2009 &amp; 2010 Cases</u>	3. Review of 2009 & 2010 cases. New cases.
4. <u>General Discussion</u>	4. ASTM Portal Presentation. Open general discussion.
5. <u>Request for Agenda Items</u>	5. Request desired new agenda items
6. <u>Adjournment</u>	6. No action required.

MEETING MINUTES FROM THE  
MARICOPA ASSOCIATION OF GOVERNMENTS  
STANDARD SPECIFICATIONS AND DETAILS COMMITTEE

May 5, 2010

Maricopa Association of Governments Office, Cholla Room  
302 North First Avenue  
Phoenix, Arizona

AGENCY MEMBERS

Jim Badowich, Avondale	Mike Samer, Mesa
* Scott Zipprich, Buckeye	Jesse Gonzales, Peoria, Chairman
Warren White, Chandler	Syd Anderson, Phoenix (St. Trans.)
* Dennis Teller, El Mirage	Jami Erickson, Phoenix (Water)
Edgar Medina, Gilbert	Mark Palichuk, Queen Creek
John Flatt, Glendale (proxy)	Rodney Ramos, Scottsdale
Troy Tobiasson, Goodyear, Vice Chairman	Jason Mahkovtz, Surprise
Bob Herz, MCDOT	Tom Wilhite, Tempe

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John Ashley, ACA	Jeff Hearne, ARPA
Jeff Benedict, AGC	Peter Kandaris, SRP
Tony Braun, NUCA	Paul R. Nebeker, Independent
Bill Davis, NUCA (proxy)	Mike Smith, ARPA
Brian Gallimore, AGC	

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Gordon Tyus

\* Members not attending or represented by proxy.

GUESTS/VISITORS

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1. Call to Order

Chairman Jesse Gonzales called the meeting to order at 1:30 p.m.

## 2. Approval of Minutes

The members reviewed the April 7, 2010 meeting minutes. Tom Wilhite noted his name was misspelled twice under Case 09-15. Bob Herz introduced a motion to accept the minutes with the correction noted by Mr. Wilhite. Jason Mahkovtz seconded the motion. A voice vote of all ayes and no nays was recorded.

## 3. 2009 Cases (old cases)

**a. Case 09-13 – ADA-Compliant Dual Sidewalk Ramps:** *Develop ADA-compliant details for 35-foot and 20-foot corner radius dual sidewalk ramps.* Jesse Gonzales said he met with staff from the City of Phoenix regarding the dual ramp design Phoenix has developed, but not yet published. He said the Phoenix detail has most of the same design elements as the draft design he previously submitted, but was further along in development. Mr. Gonzales proposed to substitute the Phoenix dual ramp detail (with some modifications) as a replacement for the previous submission at the next committee meeting.

**b. Case 09-14 – Revise Ramps for ADA Compliance:** *Revise Details 231, 232, 233 and 234 to obtain compliance with ADA requirements.* Bob Herz provided two new details for Curb Ramp – Type ‘C’ to replace the current MAG Detail 233. The new details modify ramps to include a 5’ landing. *Option A* shows ramps for sidewalks adjacent to curbs, and *option B* illustrates ramps for sidewalks set back from the curb. The width of the ramps would vary depending on the curb height. Rod Ramos noted that the ramps could have a slope greater than 12-1 for some installations if you only go by the table that determines dimension ‘D’. He promoted the use of an elevation worksheet as is done in Scottsdale, or the use delta elevations to determine an allowable range for the use of the detail. Jesse Gonzales suggested that a note could be added to clarify slope requirements. Members agreed that the slopes need to be checked, and the detail may need to be modified depending on site conditions. Mr. Herz asked for additional feedback from the committee on these details as well as the previously submitted Detail 232.

**c. Case 09-15 – Revisions to Section 610.4 for Water Line Handling:** *Modify Section 610.4 to clarify water line pipe protection measures at the job site prior to placement (during storage or staging) to help prevent contamination.* Tom Wilhite said he had not received any comments since last month. Jesse Gonzales said that many aspects of this case were discussed during the first Pipe/Water Working Group meeting on April 21, such as the proper handling of pipes and potential possibilities for contamination. Mr. Gonzales said he would summarize the discussion and forward his notes to Mr. Wilhite.

## 4. 2010 Cases (new cases)

**d. Case 10-01 – Miscellaneous Bloopers:** *Correct typographic errors.* Bob Herz provided a new blooper Case 10-01c to correct a typographical error in Section 321.10.2. The incorrect table is referenced in the top paragraph of page 321-7. The reference to Table 321-6 is to be changed to Table 321-5. Members discussed whether this simple

change could be voted on during the meeting. Peter Kandaris said the practice in the past has been to announce the vote a month prior to action. Members agreed to schedule a vote on Case 10-01c at the next committee meeting.

**e. Case 10-02 – Utility Pothole Repair:** *Revise and add keyhole repair to Detail 212 and add new Sections 355 and 708.* Peter Kandaris said he had not received comments since the last meeting. Jesse Gonzales said he thought the case was in good shape and asked if members were ready for a vote. Bob Herz said he would like to review it further, and since he will not be able to attend the June meeting, suggested the vote be postponed a couple months so Maricopa County and other agencies can complete a final review of the proposed changes.

**f. Case 10-03 – Modify Section 336 Pavement Matching and Surfacing Replacement:** *Revise Section 336 to be in conformance with changes made last year to Detail 200-1 and Detail 200-2.* Peter Kandaris said he has not received any additional comments. There was some discussion on whether references to Detail 200 should be updated to specify Detail 200-1 or 200-2 since the details now occupy two sheets.

**g. Case 10-04 – Revise Section 109.8:** *Remove quotations of Arizona Revised Statutes from text located in Section 109.8 PAYMENT FOR DELAY.* Bob Herz proposed to schedule a vote on the case at the next committee meeting.

**h. Case 10-05 – Revise FOREWORD:** *Clarify use of the MAG Specifications and Details for Public Works document.* Jesse Gonzales said he received comments from a professional engineer on the language referencing professional judgment. He also gave an example of landscape architect that refused to use MAG details because he did not know who or how they were created. Peter Kandaris said that according to the AZ Board of Technical Registration, registrants are not required to seal agency details, but they are required to provide a disclaimer that they didn't prepare the details. Bob Herz mentioned that problems also occur when engineers are not using the details appropriately.

**i. Case 10-06 – Revise Controlled Low Strength Materials (CLSM) Specifications:** *Update the CLSM specifications in Sections 604, 701 and 728 to match current industry standards.* Jeff Hearne of ARPA provided updated revisions based on feedback received from Maricopa County. He then led the committee through the changes for each section. For section 701, there was much discussion about whether the C-33 grading size No. 57 aggregate should be added back into the specifications as a default. Bob Herz said that Maricopa County liked the current specification, and knew the CLSM would work with this aggregate. Several other members agreed to have it as the default. Mr. Hearne explained that the reason the working group took it out was to allow more flexibility in the mix design. Other members suggested that the engineer could still specify a custom mix if they wanted. Mr. Hearne suggested that Section 701.3.5 remain as it currently is in MAG to retain the No. 57 aggregate as the default.

For section 728, Mr. Hearne went through the minor changes. Rod Ramos suggested moving the word “generally” in the note for Table 728-1. Several members provided

comments about the compressive strength column in Table 728-1. Mr. Hearne said there was much discussion about this in the Concrete Working Group meetings. It was thought that if you didn't have a "recipe" to follow, guidelines would be needed when creating new mix designs. Maximum values for ½ sack and 1 sack were to ensure excavability, whereas for 1 ½ sack, a minimum strength was needed for its use in encasement applications. Members were concerned about the testability of these strengths and that the table may be misused for acceptance criteria. Since the No. 57 aggregate and the amount of cement used are now the defaults, it would follow a recipe that provides acceptable strength. Syd Anderson said Phoenix has specific product codes for the mixes they accept. Paul Nebeker said it would be nice to be able to call out a MAG CLSM mix rather than many different city mixes. Mr. Hearne agreed to remove the third column of Table 728-1.

For section 604, discussion focused on how to clearly note if and when ready-mix concrete would be allowed as a replacement for CLSM. It was suggested to include language that required prior approval from the engineer for its use as a CLSM substitute. Jeff Hearne said he would revise the case based on the committee's feedback and provide an update prior to the next meeting for further review.

**j. Case 10-07 – Revise Detail 230 – Sidewalks to change minimum from 4' to 5':** *Revise the minimum sidewalk width to match the minimum ADA requirements for two wheel chairs to pass, and to allow a wheel chair to u-turn.* Bob Herz provided an updated detail that showed the grade break at the back of the sidewalk since it is included in Maricopa County's detail. One comment noted the grade break would not be needed for areas with zero setbacks from the sidewalk. Rod Ramos said Scottsdale has a supplement that uses a thicker concrete sidewalk that can support the weight of emergency vehicles that may drive over them. John Ashley asked if the 1" drop from the sidewalk to the planter area could cause a tripping hazard. Mr. Herz said it is not designed for pedestrians to walk in that area and other supplemental details also have the 1" elevation difference.

**k. Case 10-08 – Revise Section 717 Asphalt Rubber.** *Revise Section 717 ASPHALT-RUBBER to obtain a uniform specification.* Bob Herz presented a new case to update the Asphalt-Rubber section of MAG to match Maricopa County's current supplement. He said he will be coordinating efforts with Phoenix to try and incorporate their rubberized asphalt supplement as well. It was noted the ADOT has their own asphalt-rubber specifications but they are designed for highway/freeway use.

**l. Case 10-09 – Revise Safety Rail Detail 145.** *Adjust Detail 145 to comply with AASHTO pedestrian loading requirements.* Bob Herz submitted a new case that updates MAG's safety rail detail to meet the AASHTO loading requirements of 50 plf applied at the top of the rail. This is done by decreasing the distance between posts and specifying a higher grade B steel post. Committee members asked if it was necessary to change the spacing if the rail is used as intended. Mr. Herz said on a project in Maricopa County the railing was used along a bridge and had to meet AASHTO standards. He said the revisions would also meet building code standards. Jami Erickson asked if the railing shown on the scupper detail should also be updated.

**m. Case 10-10 – Proposed New Detail 122 – Pavement Marker for Fire Hydrants.** *The new detail would standardize placement of fire hydrant markers and enhance public safety.* Bob Herz submitted a new Detail 122 that identified standard locations of fire hydrant pavement markers for local streets (including those with left turn lanes and medians), cul-de-sacs, and types of intersections. He asked for members to take the detail back to their agencies and fire departments to see if they will work as shown.

**n. Case 10-11 – Revise Detail 110 – Plan Symbols.** *Update and expand graphic standards to have plans be more uniform among MAG agencies.* Bob Herz presented a case that summarized the recommendations of the Symbols Working Group. Many additional linetypes and symbols are proposed to be added to MAG based on a consensus of their uses by different agencies participating in the working group. He said that existing and proposed symbols could be designated by gray shading or by using dashed lines as determined by current agency practices. Rod Ramos had questions about traffic related symbols such as standard pole symbols, push buttons and the video camera and if additional symbols were needed. Mr. Herz explained some weren't added since traffic signal symbols were typically on a separate drawing and not needed for normal plan drawings, however, some symbols such as the video camera were added when there was a consensus among agencies. Mr. Ramos also questioned whether lines needed to be shown coming out of symbols such as water valves and manholes. Since the linetypes that go to them identify what the symbol is, additional notation may not be required. Bob Herz asked members to review the new symbols and provide comments.

**o. Case 10-12 – New Section 361 – Shallow Depth Fiber Optic Micro-Conduit Installation.** *Provide specifications for the installation of underground fiber optic micro-conduit telecommunications facilities within the public right-of-way.* Rod Ramos introduced this case with a brief outline of the proposed specification. He said he would submit a more comprehensive version at a future meeting, but welcomed comments and additions from members.

5. General Discussion:

Chairman Gonzales introduced Shimin Li of the Maricopa County Environmental Services Water and Waste Water division to fill the position left vacant. Members welcomed him to the committee.

*Potential Speed Hump Case*

Warren White said Chandler has developed additional speed hump details and asked if the committee was interested in reviewing them. General discussion about the use of speed humps and the drainage issues that can result when installed on existing streets followed.

*AASHTO and ASTM Standards*

Jeff Hearne commented that AASHTO was considering developing a web portal similar to ASTM. Gordon Tyus said that for the ASTM web portal, MAG has placed the project in the

FY 2011 MAG Budget and Work Program currently under review by the Management Committee and Regional Council, and that if approved, may allow MAG to fund the project.

#### *Specifications and Details Outside the Right-of-Way Working Group Update*

Peter Kandaris provided a report on the first meeting of this working group which was convened to address issues of public works construction outside of the right-of-way, up to the building envelope area addressed by building codes. Currently this gray area does not have any standardized specifications and details. Mr. Kandaris handed out a memo summarizing the discussions from the April 28 kick-off meeting. The memo has been posted on the MAG website. <http://www.mag.maricopa.gov/detail.cms?item=11976>

He explained that the working group planned to involve many outside agencies and vendors on different issue areas, and that ASU was interested in participating on the sustainability aspect of the types of projects where these standards may be used. He said the working group planned to use a format similar to the supplements that Phoenix produces. He was working on a check list used to determine whether a MAG specification should be included or not, and if so, should it be modified. Other items that could be included are new specifications such as the pervious concrete or parking lot construction. Many agency supplements could contribute sections that are not applicable in the right-of-way such as landscaping.

Jesse Gonzales said his agency wanted to make sure that tax dollars are not spent on private development work. Mr. Kandaris said that although developers may use them, the intention is as standards for public works projects. Mr. Gonzales also mentioned that he is working on an updated draft of the 616 Reclaimed Water specifications that has been modified for use outside the right-of-way.

#### *Rubber Gasket Requirements*

Bob Herz said MAG 618.2 requires rubber gaskets to use 60% rubber, however AASHTO does not make this requirement. He asked if anyone knew the rationale for the MAG requirement, and if one was not found he would consider a case to revise 618.2 to match the AASHTO standard.

#### *Debris Caps*

Jesse Gonzales asked if there was interest among the committee in removing the debris cap requirements from MAG specifications. Jami Ericson and other members believe the cost and hassle of using the caps may exceed their maintenance benefits.

#### *Local Government Contracts for Federal Projects/MAG Sample Contracts*

Gordon Tyus said he received a call from the ADOT Civil Rights office inquiring about local project contracts referencing the MAG Specifications and Details. A representative from the ADOT office told Mr. Tyus that projects funded with federal dollars such as ARRA need to meet additional requirements. Mr. Tyus told the committee that the MAG specifications do not provide for this, and additional contract language would be required. Jami Ericson said that Phoenix is doing many paving projects with ARRA funds and they can assist other agencies with meeting federal requirements if necessary. Gordon Tyus also said that MAG's sample contracts have not been updated recently, and asked if any agencies refer to them, or

if the committee should consider their removal. Tom Wilhite said Tempe does use them. Mr. Tyus said MAG's attorney is going to review them for possible changes. Peter Kandaris submitted typographic corrections to the table of contents for the sample contracts/forms section.

*Arizona Utility Coordinating Committee Project Improvement Project Guide*

Jesse Gonzales said a member of the AUCC asked him to consider incorporating or referencing the project guide above in the MAG specifications. Members commented that the guide mainly referred to the design process, not the construction specifications, so much of it may not be applicable. Jami Ericson said she sat in on the AUCC meetings and could report on areas where references may be appropriate.

6. Adjournment:

The meeting was adjourned at 3:48 p.m.

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May 2010

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February 2010

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## 2010 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=11284> )

CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE	
09-13	<a href="#">Case 09-13</a> : Dual Curb Ramp Details	Peoria	Jesse Gonzales	07/01/2009 02/03/2010		0 0 0	Yes No Abstain
09-14	<a href="#">Case 09-14</a> : Revise Ramps for ADA Compliance, Details 231, 232, 233 and 234	MCDOT	Bob Herz	07/01/2009 05/05/2010		0 0 0	Yes No Abstain
09-15	<a href="#">Case 09-15</a> : Revisions to Section 610.4: Pipe Protection	Tempe	Tom Wilhite	07/01/2009 04/07/2010		0 0 0	Yes No Abstain
10-01	Miscellaneous Bloopers: <a href="#">Case 10-01A</a> : Revisions to Section 317 Asphalt Milling <a href="#">Case 10-01B</a> : Correct Table 715-1 and Section 340.2.1 <a href="#">Case 10-01C</a> : Correct table reference in Section 321.10.2	MCDOT	Bob Herz	01/06/2010 05/05/2010	10-01B 4/07/10 (approved)	0 0 0	Yes No Abstain
10-02	<a href="#">Case 10-02</a> : Utility Pothole Repair: Revise and add keyhole repair to Detail 212. New Sections 355 and 708.	Chandler	Warren White	02/03/2010 04/07/2010		0 0 0	Yes No Abstain
10-03	<a href="#">Case 10-03</a> : Modifications Section 336 Pavement Matching and Surfacing Replacement.	SRP	Peter Kandararis	03/03/2010 04/07/2010		0 0 0	Yes No Abstain
10-04	<a href="#">Case 10-04</a> : Revise Section 109.8: Remove quotations of ARS from text located in Section 109.8 PAYMENT FOR DELAY.	MCDOT	Bob Herz	03/03/2010		0 0 0	Yes No Abstain
10-05	<a href="#">Case 10-05</a> : Revise FOREWARD to clarify use of the <i>MAG Specifications and Details for Public Works Construction</i> document.	Peoria	Jesse Gonzales	03/03/2010 05/05/2010		0 0 0	Yes No Abstain
10-06	<a href="#">Case 10-06</a> : Revise Controlled Low Strength Material Specifications in Sections 604, 701 and 728.	ARPA Peoria	Jeff Hearne	04/07/2010 05/05/2010		0 0 0	Yes No Abstain
10-07	<a href="#">Case 10-07</a> : Revise Detail 230 - SIDEWALKS to change the minimum sidewalk width from 4' to 5'.	MCDOT	Bob Herz	04/07/2010 05/05/2010		0 0 0	Yes No Abstain

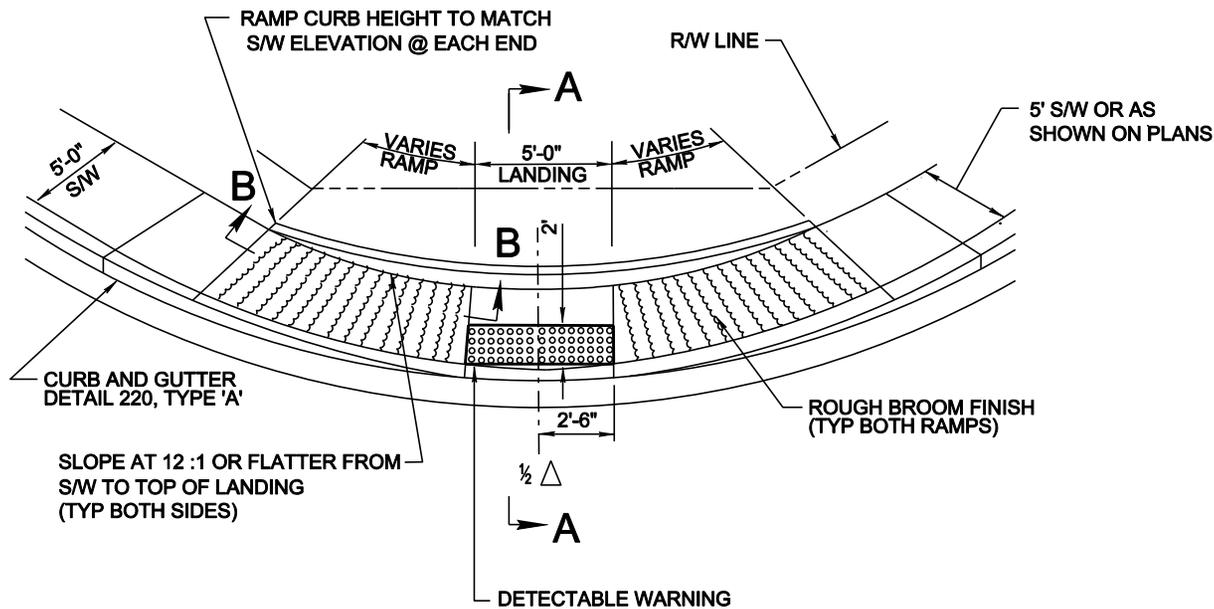
\* Case was approved with verbal modifications at time of voting.

## 2010 PROPOSED REVISIONS TO MAG SPECIFICATIONS AND DETAILS

(Updated information can be found on the website: <http://www.mag.maricopa.gov/detail.cms?item=11284> )

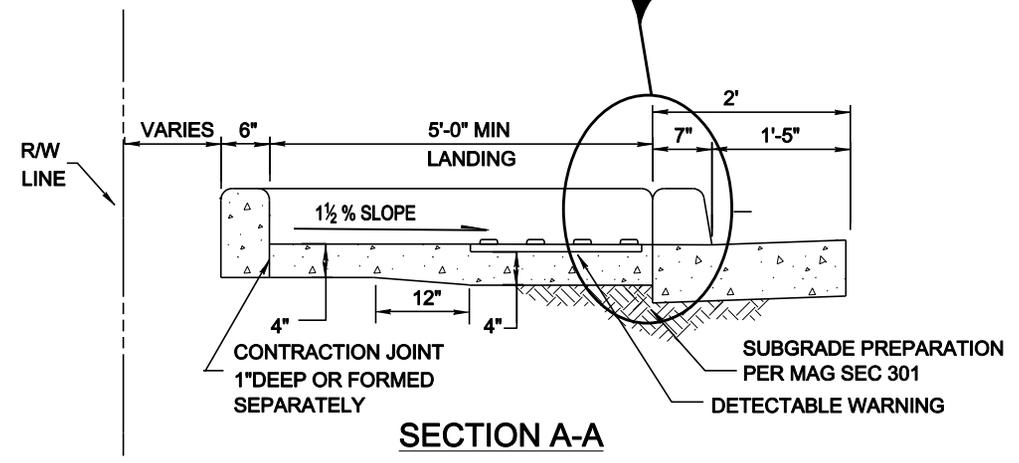
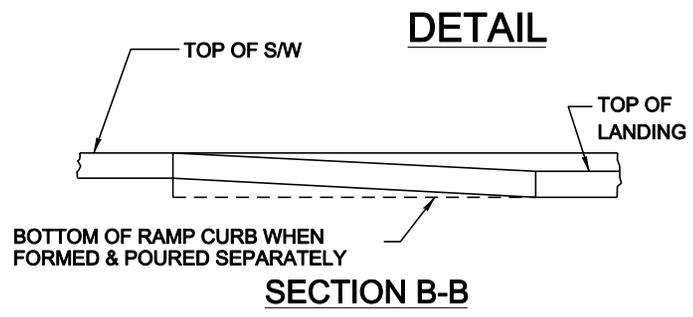
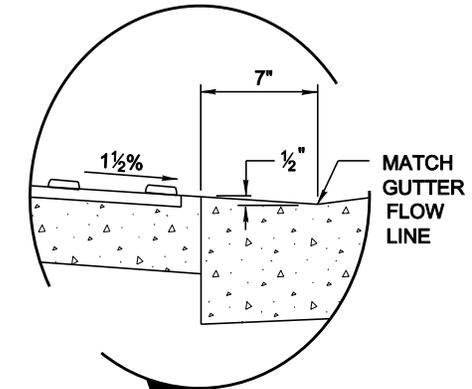
CASE	DESCRIPTION	PROPOSED BY	MEMBER	SUBMITTAL DATE Last Revision	VOTE DATE	VOTE
10-08	<a href="#">Case 10-08</a> : Re-write Section 717 ASPHALT-RUBBER.	MCDOT	Bob Herz	05/05/2010		0 Yes 0 No 0 Abstain
10-09	<a href="#">Case 10-09</a> : Revise Detail 145 SAFETY RAIL to comply with AASHTO pedestrian loading requirements.	MCDOT	Bob Herz	05/05/2010		0 Yes 0 No 0 Abstain
10-10	<a href="#">Case 10-10</a> : New Detail 122 PAVEMENT MARKER FOR FIRE HYDRANTS.	MCDOT	Bob Herz	05/05/2010		0 Yes 0 No 0 Abstain
10-11	<a href="#">Case 10-11</a> : Revise Detail 110 PLAN SYMBOLS. Update and expand graphic standards and symbols.	MCDOT	Bob Herz	05/05/2010		0 Yes 0 No 0 Abstain
10-12	<a href="#">Case 10-12</a> : New Section 361 – Shallow Depth Fiber Optic Micro-Conduit Installation.	Scottsdale	Rod Ramos	05/05/2010		0 Yes 0 No 0 Abstain

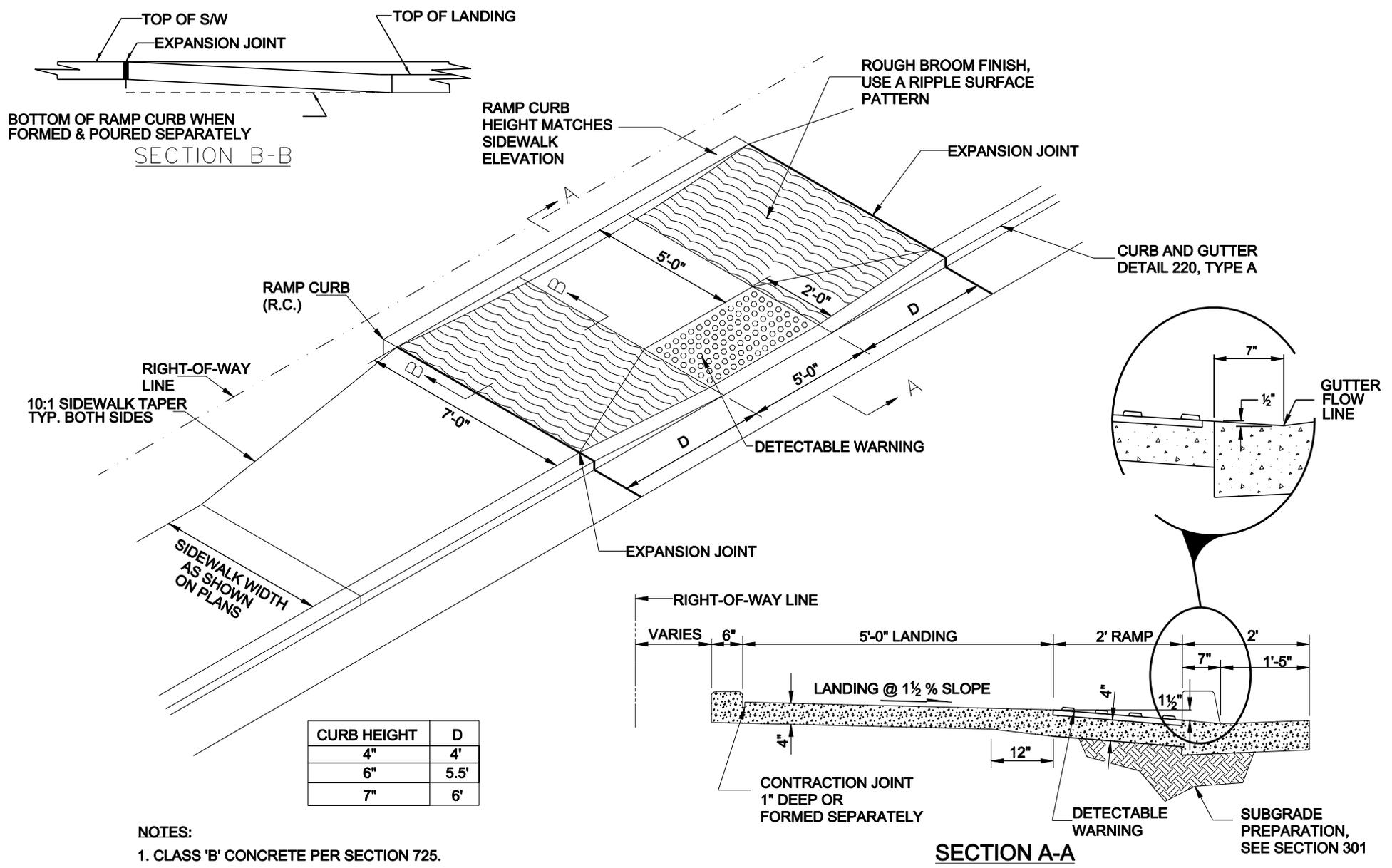
\* Case was approved with verbal modifications at time of voting.



**NOTES:**

1. CLASS 'B' CONCRETE CONSTRUCTION PER SECTION 725.
2. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENT.
3. RAMP LONGITUDINAL SLOPE SHALL BE 12:1 OR FLATTER.
4. RAMP CROSS SLOPE SHALL BE 1½%.





- NOTES:**
1. CLASS 'B' CONCRETE PER SECTION 725.
  2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
  3. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.

**SECTION A-A**

CASE 09-14 REV 4/29/2010

DETAIL NO.  
233



STANDARD DETAIL  
ENGLISH

CURB RAMP - TYPE 'C'  
OPTION A

REVISED  
01-01-2011

DETAIL NO.  
233





**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

**Date:** May 5, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Miscellaneous Bloopers

**Case 10-01 C**

**PURPOSE:** Correct typographical error in section 321.10.2.

**REVISION:** The incorrect table is referenced in the top paragraph of page 321-7. The reference to Table 321-6 is to be changed to Table 321-5.

See attached sheet

321-5

**SECTION 321**

accordance with AASHTO T312. The maximum theoretical density shall be tested in accordance with the requirements of AASHTO T209. Effective voids determined on the laboratory compacted specimens will be determined at a minimum of once per lot in accordance with the requirements of AASHTO T269. Should the testing for effective air voids not meet the "Full Payment" or "No Corrective Action" requirements of Table 321-6, additional testing for laboratory air voids on the remaining sublots will be performed as necessary to determine the extent of the deficiency. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the acceptance laboratory.

The allowable deviations for acceptable production of each measured characteristic from the values established in the JMF for each subplot are as follows:

<b>TABLE 321-3</b>	
<b>ACCEPTANCE LIMITS FOR ASPHALT CONCRETE</b>	
Maximum Aggregate Size	100% passing
Nominal Maximum Aggregate Size	±7%
No. 8 Sieve to the Nominal Maximum Aggregate Size	±6%
No. 100 and No. 30 Sieves	±4%
No. 200 Sieve	±2%

If the results from a single acceptance sample fall outside of the acceptance limits in Table 321-3 a second sample shall be taken and if the second acceptance sample is also outside of the acceptance limits in Table 321-3 the Contractor shall cease production of asphalt concrete. Production shall not begin again until calibration test results verify that adjustments made to materials or proportions yield a gradation that falls within acceptance limits in Table 321-3.

The asphalt binder content shall be considered acceptable if it is within ± 0.40% of the mix design target value.

<b>TABLE 321-4</b>		
<b>ASPHALT BINDER CONTENT CORRECTIVE ACTION FOR DEVIATIONS</b>		
	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Deviation from that permitted		
0.0 to 0.1% points	\$2.00	EA (see 321.10.6)
Over 0.1 to 0.2% points	\$6.00	EA (see 321.10.6)
Over 0.2% points	Removal*	Removal*

Note: Removal\* refers to Section 321-10.6

<b>TABLE 321-5</b>		
<b>LABORATORY VOIDS ACCEPTANCE AND PENALTIES</b>		
	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Laboratory Air Voids (Measured at $N_{des}$ or 75 blows as applicable)		
Less than 1.5%	Removal*	Removal*
1.5-2.0%	\$2.50	EA (see 321.10.6)
2.1-2.7%	\$1.00	EA (see 321.10.6)
2.8-6.2%	Full Payment	No corrective action
6.3-6.9%	\$1.00	EA (see 321.10.6)
7.0-8.0%	\$2.50	EA (see 321.10.6)
Greater than 8.0%	Removal*	Removal*

Note: Removal\* refers to Section 321-10.6

## PLACEMENT OF CONTROLLED LOW STRENGTH MATERIAL

### 604.1 DESCRIPTION:

The work covered by this specification consists of furnishing all materials, labor and equipment for the placement of controlled low strength material (CLSM).

The type of backfill to be used shall be as specified in the special provisions, plans or by the Engineer.

The following is a brief description of the types of ~~controlled low strength material (CLSM)~~ and their intended uses:

**1/2 SACK:** General trench backfill in areas where future excavation into the backfill with conventional hand tools is anticipated or in areas of low loading such as streets, parking areas, behind retaining walls, etc.

**1 SACK:** General trench backfill and backfill behind retaining walls where additional strength is required above that of 1/2 sack CLSM.

**1-1/2 SACK:** Structural backfill under foundations and as thermal fill and/or mechanical protection of duct banks and conduits.

~~The type of backfill to be used shall be as specified in the special provisions, plans or by the Engineer.~~

### 604.2 MATERIALS:

CLSM shall conform to the requirements of Section 728. Ready-mixed concrete shall not be used in lieu of CLSM without prior approval from the Engineer and shall be subject to rejection.

### 604.3 PLACEMENT:

The controlled low strength material shall be placed directly into the excavation. The CLSM shall be placed in a uniform manner that will prevent voids in or segregation of the material. Foreign material which falls into the trench prior to and during placing of the CLSM shall be immediately removed. The CLSM shall have consistency, workability, plasticity, flow characteristics and pumpability (when required) such that the material when placed is self-compacting. Mechanical compaction or vibration may be used to consolidate around structures, pipes, multiple conduits, etc., otherwise no mechanical compaction or vibration shall be required. The total elapsed time between the initial addition of water to the CLSM and the completed placement shall not exceed 90 minutes.

When CLSM is used for backfill around pipes or conduits, the CLSM shall be placed equally on both sides of pipe or conduit to prevent lateral displacement. Also, the CLSM shall be placed in lifts. The height of each lift shall not exceed the depth that will

## SECTION 604 – Revision 5-5-10

cause floating of the pipe or conduit. When placing the CLSM in greater lift depths, sufficient anchorage shall be provided so the pipe or conduit will not float.

Where CLSM is used for backfill around pipes or conduits with a depth less than 20 feet, the width of the excavation shown on the plans or in Section 601 may be reduced so that the minimum clear distance between the outside of the pipe or conduit and the side of the excavation (each side) shall be 12 inches for pipes or conduits 42 inches and larger, 6 inches for pipes or conduits between 4 inches and 42 inches and 3 inches for pipes or conduits 4 inches and smaller.

When CLSM is used behind retaining walls, the depth of each lift shall be limited so it will not induce hydraulic loads greater than the design loads.

For long trenches or installations which require a large amount of CLSM, bulkheads of wood, dirt, sand bags, etc. can be used to control the material's flowability. The bulkhead shall be removed prior to the continuation of the backfilling.

CLSM shall NOT be permitted to come in contact with any aluminum, copper or brass materials, e.g., aluminum pipes or culverts, copper water pipe, saddles, fittings, etc. Protection shall be any combination of the following: place a layer of noncorrosive material around the pipe e.g., native material, import material, etc. or provide a protective covering or wrapping such as polyethylene wrap per Section 610.5. Pipes smaller than 4 inches can be completely wrapped with tape as per Section 610.5 or approved equal.

Generally, CLSM does not resist freezing and thawing and in some cases may propagate the condition. CLSM mixes must be modified where long term freeze-thaw durability is indicated as a concern. The mix design shall have an air content of no less than six percent by volume, when tested in accordance with ASTM C-6023.

### **604.4 PERFORMANCE TESTING:**

CLSM placed within the traveled way or otherwise to be covered by paving or embankment materials, shall not be covered until one of the following performance criteria have been met:

- A) When a person of average weight and shoe size can walk on the surface of the CLSM without creating greater than 1/8-inch indents in the material, or
- B) When the in-place CLSM has reached a strength of 30 psi, when tested in accordance with ASTM D-4832, or
- C) When a ball drop indentation of 3-inches or less is obtained, when tested in accordance with ASTM D-6024, or
- D) When a penetration resistance reading of 650 is achieved, when tested in accordance with ASTM C-403.

## SECTION 604 – Revision 5-5-10

Additionally, CLSM shall not be covered if proof rolling by pneumatic-tired or steel wheel vibratory roller results in the bringing of free water to the surface or results in surface undulation (pumping).

When CLSM is placed in foundation excavations, the material shall be protected from foundation loading and placement of foundation concrete prior to having reached initial set per ASTM C-403, or allowed to set in place for 24 hours, whichever occurs first.

### **604.5 ACCEPTANCE:**

CLSM shall be considered deficient and may be rejected at the discretion of the Engineer if:

- A) The CLSM is outside of the limits specified in Table 728-1 and/or
- B) The aggregate gradation is outside the limits specified in Section 701.3.5.

Rejected material not placed shall be immediately removed from the job site. Rejected material placed shall be removed and replaced with acceptable material. Removing and disposing of the rejected material shall be at no additional cost to the Contracting Agency.

### **604.6 PAYMENT:**

No pay item will be included in the proposal nor direct payment made for CLSM unless specifically included in the Project Specifications and Fee Proposal. The cost for placing the material shall be included in the unit price for the specific work function (laying pipe, placing structure foundation, construction retaining wall, etc.).

**SECTION 728 - Revision 5-5-10**

**CONTROLLED LOW STRENGTH MATERIAL**

**728.1 GENERAL:**

Controlled Low Strength Material (CLSM) is a mixture of cementitious materials, aggregates, admixtures\additives, and water that, as the cementitious materials hydrate, forms a soil replacement. CLSM is a self-compacting, flowable, cementitious based material ~~that is~~ primarily used as a backfill, ~~or~~ structural fill, or a replacement for in-lieu of compacted fill or unsuitable native material. Placement and usage of each type of CLSM is described in Section 604,

**728.2 MATERIALS:**

Cementitious materials shall conform to Section 725.2.  
Coarse and fine aggregates shall conform to Section 701.3.5  
Water shall conform to Section 725.4.

**728.3 PROPORTIONING OF MIXTURES AND PRODUCTION TOLERANCES:**

Proportioning of the mixture shall comply with Section 725.6 and Table 728-1. The CLSM shall have consistency, workability, plasticity, and flow characteristics such that the material when placed is self-compacting. A minimum of 40% coarse aggregate shall be used. A mix design shall be submitted with test data for the Engineer's approval prior to the excavation for which the material is intended for use. Sampling shall be in accordance with ASTM D-5971. The flow consistency shall be tested in accordance with ASTM D-6103. Unit weight (when applicable) shall be obtained by ASTM D-6023. Compressive strength shall be tested in accordance with ASTM D-4832.

<b>CONTROLLED LOW STRENGTH MATERIAL REQUIREMENTS</b>			
	Portland Cement Content, Sack/cu yd	Flow, inches	Compressive Strength at 28 days, psi
	1/2 Sack	9±2	150 maximum
	1 Sack	9±2	500 maximum
	1 1/2 Sack	9±2	400 minimum

Note for Table 728-1:

~~4.~~ CLSM mixes meeting the table requirements ~~for Portland Cement Content generally~~ will not generally be placeable by means of a concrete pump or may not provide the needed workability for certain conditions. When pumpable mixes or increased workability are required, the addition of fly ash or a natural pozzolan in excess of the required Portland Cement Content may be used.

**SECTION 728 - Revision 5-5-10**

**728.4 MIXING:**

CLSM mixing shall comply with Section 725.7. Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Mixes shall be homogenous, readily placeable and uniformly workable.

DRAFT



MARICOPA COUNTY
Department of Transportation

MEMORANDUM

Date: April 7, 2010

To: MAG Specifications and Details Committee

From: Robert Herz, MCDOT Representative

Subject: Proposed revision to Standard Detail 230 - SIDEWALKS Case 10-07

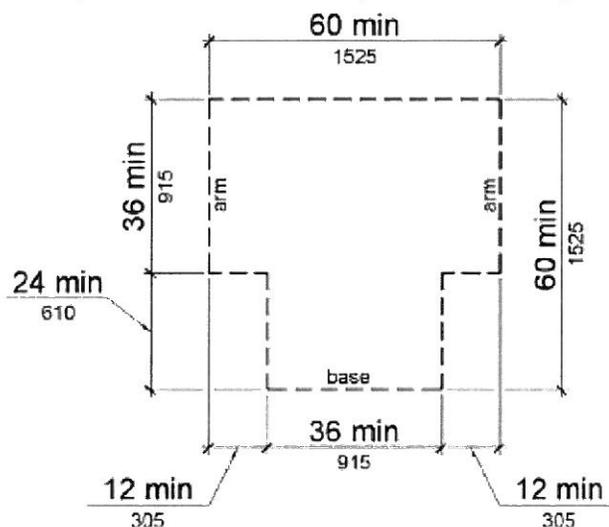
PURPOSE: Revise minimum sidewalk width to match the minimum ADA requirements for two (2) wheel chairs to pass and to match minimum ADA requirements for a wheel chair to u-turn.

REVISION: Revise minimum sidewalk width from 4' to 5'.

ADA Accessible Routes Requirement:

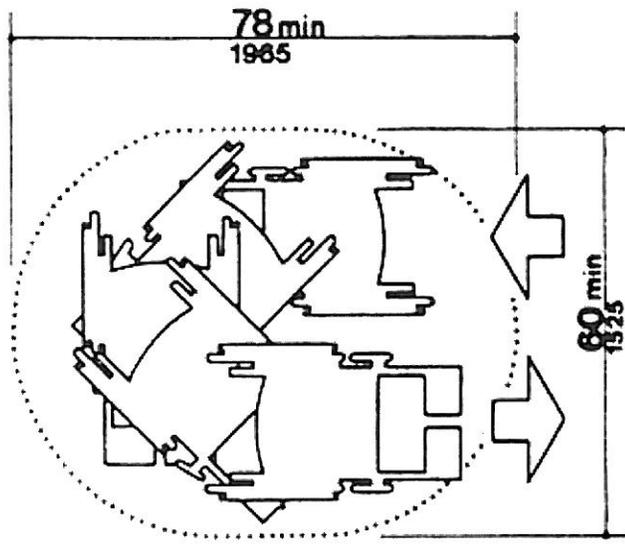
403.5.3 Passing Spaces. An accessible route with a clear width less than 60 inches shall provide passing spaces at intervals of 200 feet maximum. Passing spaces shall be either: a space 60 inches minimum by 60 inches minimum; or, an intersection of two walking surfaces providing a T-shaped space complying with 304.3.2 where the base and arms of the T-shaped space extend 48 inches minimum beyond the intersection..

Figure 304.3.2 T-Shaped Turning Space

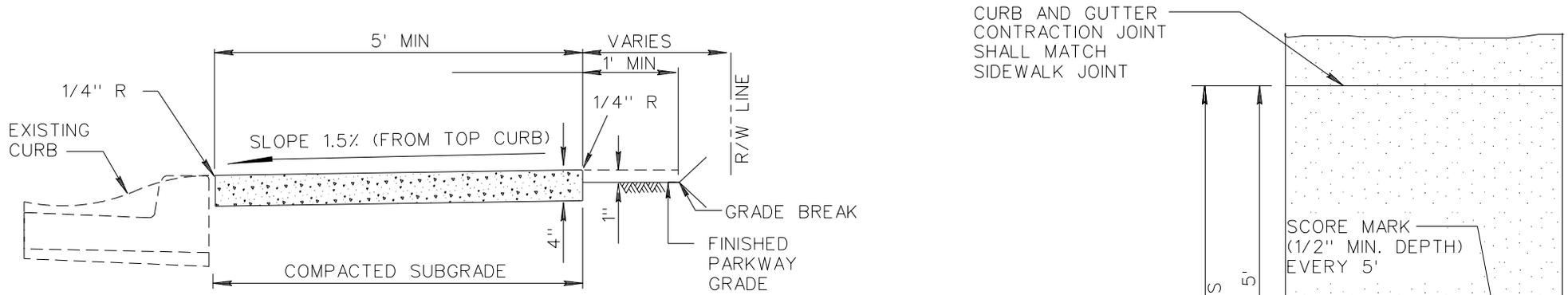


From Code of federal regulations 28 CFR Part 36:

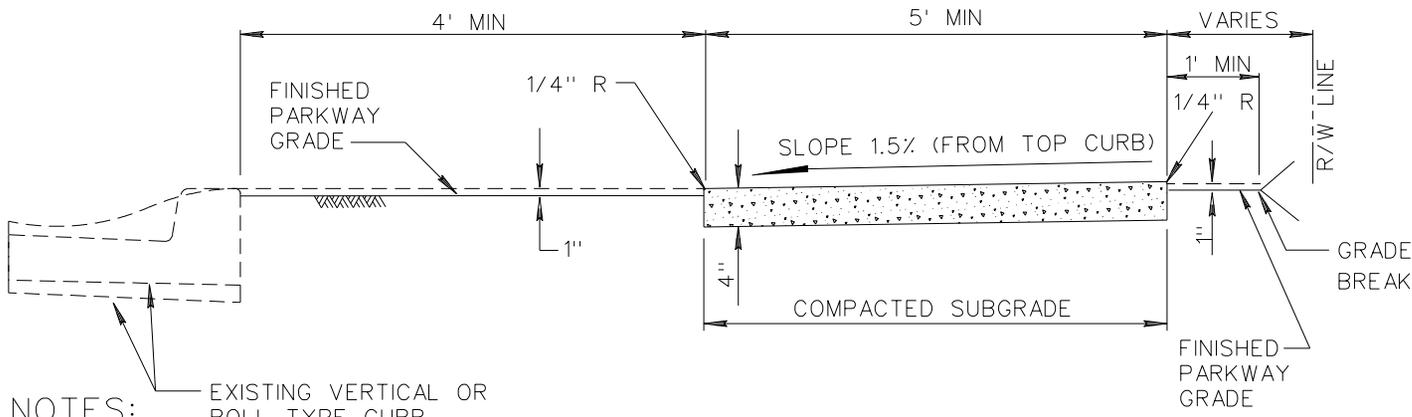
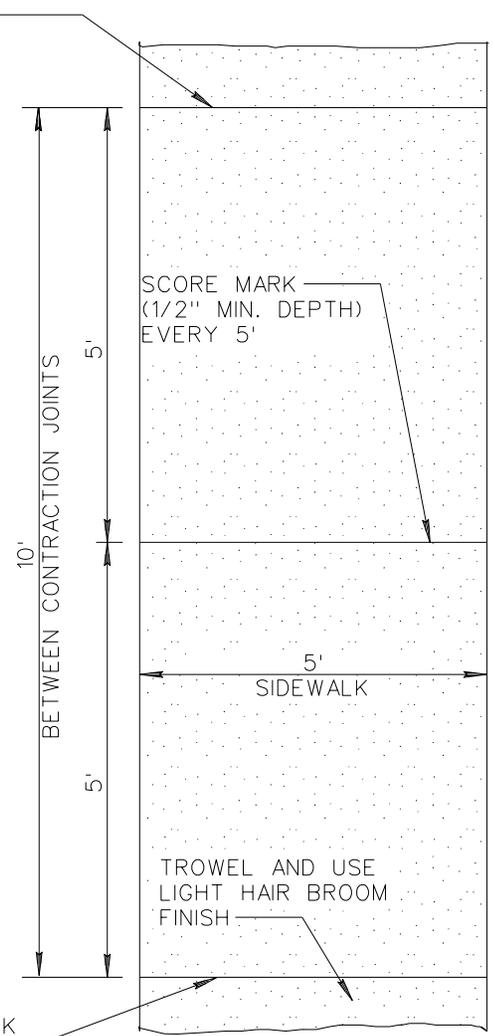
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**Fig. A2**  
**Space Needed for Smooth U-Turn in a Wheelchair**



CURB AND GUTTER  
CONTRACTION JOINT  
SHALL MATCH  
SIDEWALK JOINT

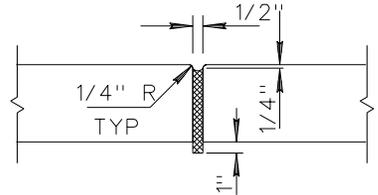


CURB AND GUTTER  
CONTRACTION JOINT  
SHALL MATCH SIDEWALK  
JOINT

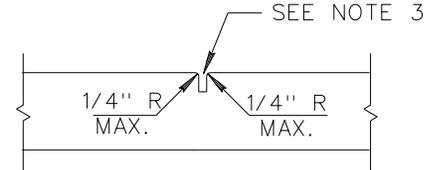
**NOTES:**

EXISTING VERTICAL OR  
ROLL TYPE CURB

1. SIDEWALK CONSTRUCTION SHALL CONFORM TO SECTION 340.
2. EXPANSION JOINTS SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, A.S.T.M. D-1751.
3. LARGE AGGREGATE, IN CONTRACTION JOINT SHALL BE SEPARATED TO A DEPTH OF 1", FINISH DEPTH SHALL BE A MINIMUM OF 3/4".
4. EXPANSION JOINTS SHALL CONFORM TO SECTION 340, BE INSTALLED PRIOR TO CONCRETE PLACEMENT, AND AT A MAXIMUM SPACING OF 50'. THE EXPANSION JOINT MUST PROVIDE COMPLETE SEPERATION OF THE SIDEWALK FROM ADJOINING CONCRETE.
5. CONCRETE SHALL BE CLASS 'B 'PER SECTION 725.
6. WHEN SIDEWALK AND ADJACENT CURB ARE INSTALLED MONOLITHICALLY, THE MID-POINT SCORE LINE SHALL EXTEND ACROSS THE CURB.



EXPANSION JOINT



CONTRACTION JOINT

DETAIL NO.  
230



STANDARD DETAIL  
ENGLISH

SIDEWALKS

REVISED  
01-01-2003

DETAIL NO.  
230



**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

**Date:** April 29, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Section 717 ASPHALT-RUBBER

**Case 10-08**

**PURPOSE:** Revise Specification Section 717 ASPHALT-RUBBER to obtain a uniform specification.

**REVISION:** The attached sheets represent a re-write of the current specification to match MCDOT's current requirements. Other agencies are requested to indicate how their requirements may differ so that the specification can be modified to accommodate the needs of all agencies.

## SECTION 717

### ASPHALT- RUBBER

#### 717.1 DESCRIPTION:

The work under this section shall consist of furnishing, proportioning and mixing all the ingredients necessary to produce asphalt-rubber material.

#### 717.2 MATERIALS:

##### 717.2.1 Asphalt-Rubber:

**Asphalt Cement:** Asphalt cement shall conform to the requirements of Section 711.

**Rubber:** Rubber shall meet the following gradation requirements when tested in accordance with Arizona Test Method 714.

Sieve Size	Percent Passing
#10 (2.00 mm)	100
#16 (1.18 mm)	65 - 100
#30 (600 $\mu$ m)	20 - 100
#50 (300 $\mu$ m)	0 - 45
#200 (75 $\mu$ m)	0 - 5

The rubber shall have a specific gravity of  $1.15 \pm 0.05$ , shall contain not more than 0.5 percent fabric and shall be free of wire or other contaminating materials. Calcium carbonate, up to four percent by weight of the granulated rubber, may be added to prevent the particles from sticking together.

Certificates of Compliance conforming to Arizona State Department of Transportation Standard Specifications for Road and Bridge Construction Section 106.05 shall be submitted. In addition, the Certificates shall confirm that the rubber is a crumb rubber, derived from processing whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced is taken from automobiles, trucks, or other equipment owned and operated in the United States. The Certificates shall also verify that the processing does not produce, as a waste product, casings or other round tire material that can hold water when stored or disposed of above the ground.

**717.2.2 Asphalt-Rubber Proportions and Properties:** Ground rubber in asphalt-rubber shall be a minimum of 20 percent and a maximum of 22 percent by weight of the asphalt cement.

Asphalt shall be Type 1 unless otherwise specified and conform to the following:

Property	Requirement		
	Type 1	Type 2	Type 3
<b>Grade of base asphalt cement</b>	<b>PG 64-16</b>	<b>PG 58-22</b>	<b>PG 52-28</b>
Rotational Viscosity*; 351°F (177°C); Pascal seconds (cps)	1.5-4.0 (1500-4000)	1.5-4.0 (1500-4000)	1.5-4.0 (1500-4000)
Penetration; 39°F (4°C), 200g, 60 sec. (ASTM D 5); in (dmm), min	0.04 (10)	0.06 (15)	0.10 (25)
Softening Point; (ASTM D 36); °F (°C), min.	135 (57)	129 (54)	126 (52)
Resilience; 77°F (25°C) (ASTM D 3407);%,min	25	20	15
* The Viscometer used must be a hand held rotational viscometer, such as a Rion (formerly Haake) Model VT – 04, or an equivalent, using Rotor No. 1. The rotor, while in the off position, shall be completely immersed in the binder at a temperature from 350°F to 355°F for a minimum heat equilibrium period of 60 seconds, and an average viscosity determined from three separate constant readings (± 0.5 pascal-seconds) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.			

**717.2.3 Asphalt-Rubber Design:** At least two weeks prior to the use of asphalt-rubber, the Contractor shall submit an asphalt-rubber design prepared by an ADOT approved laboratory. Such design shall meet the requirements specified herein. The design shall show the values obtained from the required tests, along with the following information: percent, grade and source of the asphalt cement used; and percent, gradation and source(s) of rubber used.

### 717.3 CONSTRUCTION REQUIREMENTS:

**717.3.1 Mixing of Asphalt-Rubber:** The temperature of the asphalt-cement shall be between 375°F (191°C) and 425°F (218°C) prior to the addition of rubber. No agglomerations of rubber particles in excess of 2" in the least dimension shall be allowed in the mixing chamber. The ground rubber and asphalt-cement shall be accurately proportioned in accordance with the design and thoroughly mixed prior to the beginning of the one-hour reaction period. Reaction time may be decreased to 45-minutes if documentation is provided that the physical properties of the mix design requirements are consistently met using a 45-minute reaction period. The Contractor shall document that the proportions are accurate and that the rubber has been uniformly incorporated into the mixture. Additionally, the Contractor shall demonstrate that the rubber particles have been thoroughly mixed such that they have been "wetted." The occurrence of rubber floating on the surface or agglomerations of rubber particles shall be evidence of insufficient mixing. The temperature of the asphalt-rubber immediately after mixing shall be between 350°F (177°C) and 400°F (204°C). Reaction time shall start after all of the material for the batch has been mixed and the minimum reaction temperature of 350°F (177°C) has been achieved.

Prior to use, the viscosity of the asphalt-rubber shall be tested by the use of a rotational viscometer, which is to be furnished by the Contractor or supplier. The Contractor shall provide a qualified person to perform the testing.

**717.3.2 Handling of Asphalt-Rubber:** Once the asphalt-rubber has been mixed, it shall be kept thoroughly agitated during periods of use to prevent settling of the rubber particles. During the production of asphaltic concrete the temperature of the asphalt-rubber shall be maintained between 325°F (163°C) and 400°F (204°C). However, in no case shall the asphalt-rubber be held for more than 10 hours at these temperatures. It shall be allowed to cool to a temperature of 250°F (121°C) or less and held at that temperature for not more than four days. The process of cooling and reheating shall not be allowed more than one time for a batch of asphalt rubber binder.

For each load or batch of asphalt-rubber, the Contractor shall provide the Engineer with the following documentation:

- (A) The source, grade, amount and temperature of the asphalt cement prior to the addition of rubber.
- (B) The source and amount of rubber and the rubber content expressed as percent by the weight of the asphalt cement.
- (C) Times and dates of the rubber additions and resultant viscosity test.
- (D) A record of the temperature, with time and date reference for each load or batch. The record shall begin at the time of the addition of rubber and continue until the load or batch is completely used. Readings and recordings shall be made at every temperature change in excess of 52°F (11°C), and as needed to document other events which are significant to batch use and quality.

**– End of Section –**



**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

**Date:** May 5, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

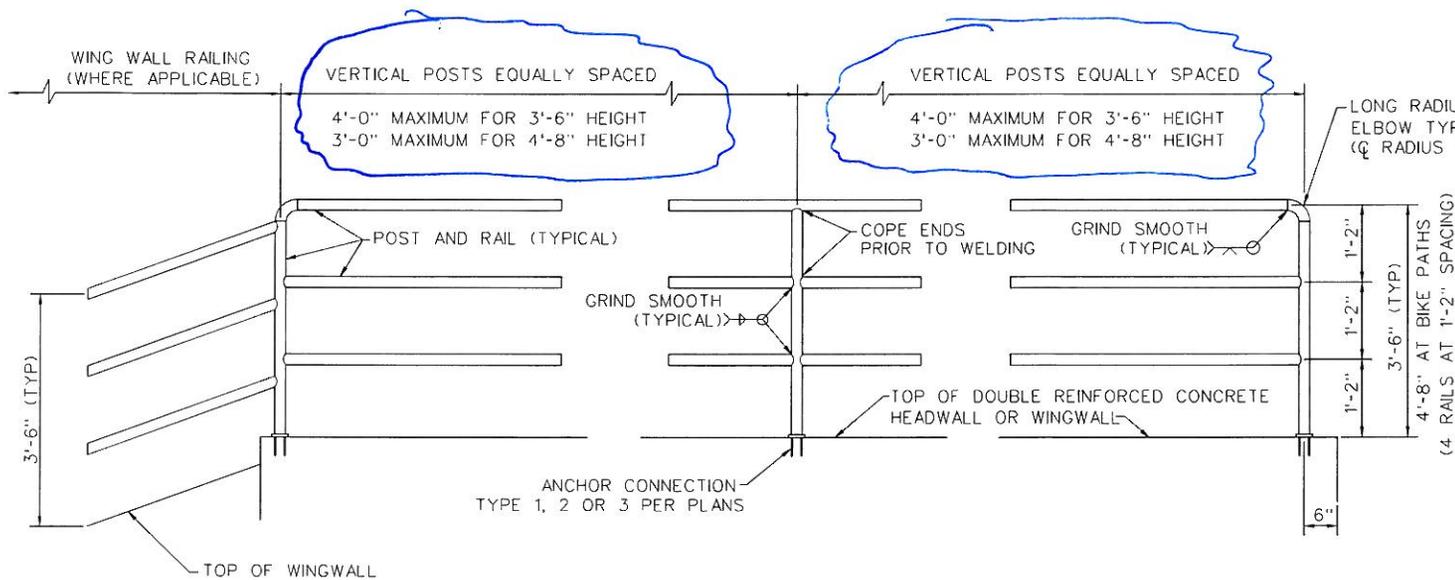
**Subject:** Proposed revision to Detail 145 – SAFETY RAIL

**Case 10-09**

**PURPOSE:** Adjust detail to comply with AASHTO pedestrian loading requirements.

**REVISION:** Revise in note 1 the grade of ASTM A53 steel pipe from grade A ( $F_y = 30\text{ksi}$ ) to grade B ( $F_y = 35\text{ksi}$ ). Revise post spacing from 8'-0" maximum to 4'-0" maximum for 3'-6" rail and to 3'-0" maximum for the 4'-8" rail.

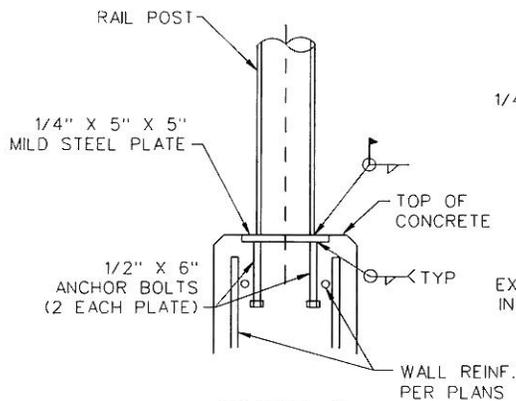
**DISCUSSION:** AASHTO pedestrian bridge rail loading is 50 plf applied to the top of rail. Keeping the 8'-0" maximum post spacing would required the post diameter to be increased to a 2" diameter schedule 80 pipe for a 3'-6" high rail and require a 2½" diameter schedule 40 pipe for a 4'-8" high rail.



ELEVATION

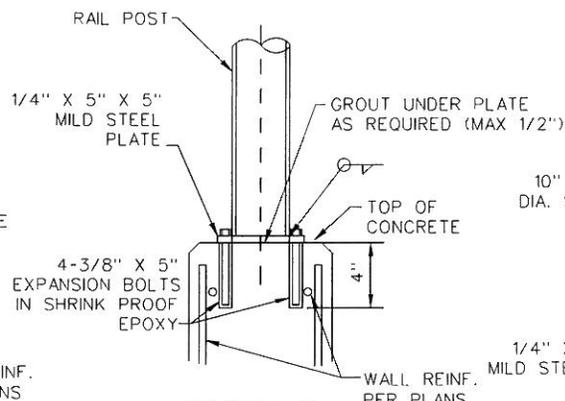
NOTES:

1. POSTS AND RAILS SHALL BE 1.5" SCHEDULE 40 HOT-DIPPED GALVANIZED STEEL PIPE ASTM A 53, **GRADE B** (2.72 ±.1/F, 1.9" O.D.). GALVANIZING SHALL BE IN ACCORDANCE WITH SECTION 771.
2. PAINT RAIL PER MAG SPECIFICATIONS SECTION 530 WHEN REQUIRED BY PLANS. SHOP PRIME WITH RUST INHIBITING PRIMER (FIELD REPAIR PRIMER AS NEEDED). COLOR PER PLANS.
3. VERTICAL POSTS TO BE EVENLY SPACED.
4. REMOVE ALL SHARP EDGES.
5. INSTALL SAFETY RAIL AS REQUIRED BY PLANS OR SPECIFICATIONS.
6. THE EMBEDMENT FOR ANCHOR TYPES 1, 2 AND 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE.



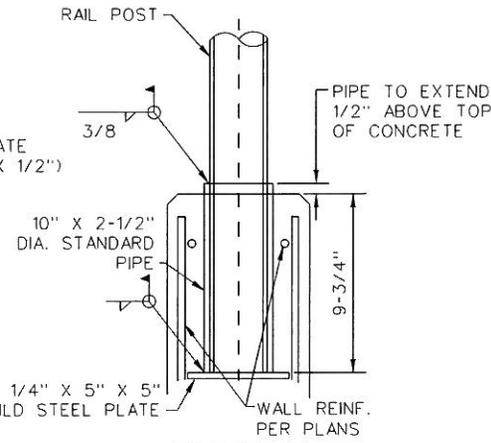
TYPE 1

ANCHOR PLATE DETAIL



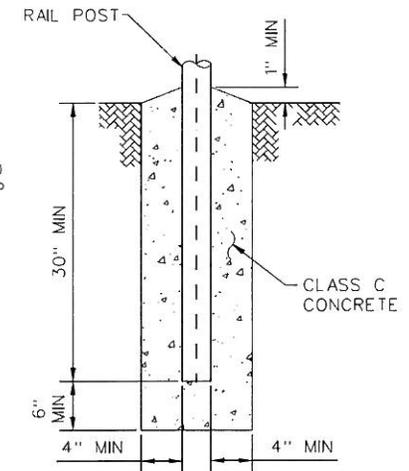
TYPE 2

EXPANSION BOLT DETAIL



TYPE 3

PIPE SLEEVE DETAIL



TYPE 4

GROUND INSTALLATION DETAIL

NOTE: SEE PLANS FOR ANCHORAGE DETAILS FOR ATTACHMENT TO SINGULARLY REINFORCED AND NON-REINFORCED WALLS.

DETAIL NO.

145



STANDARD DETAIL  
ENGLISH

SAFETY RAIL

REVISED

01-01-2011

DETAIL NO.

145



**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

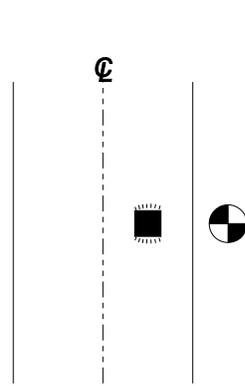
**Date:** May 5, 2010

**To:** MAG Specifications and Details Committee

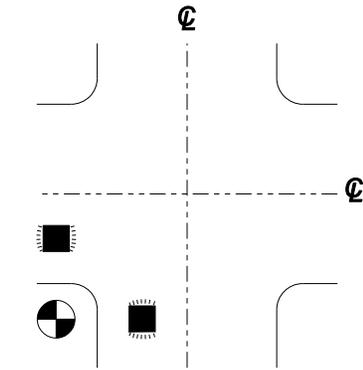
**From:** Robert Herz, MCDOT Representative

**Subject:** Proposed New Detail 122 – PAVEMENT MARKER FOR FIRE HYDRANTS **Case 10-10**

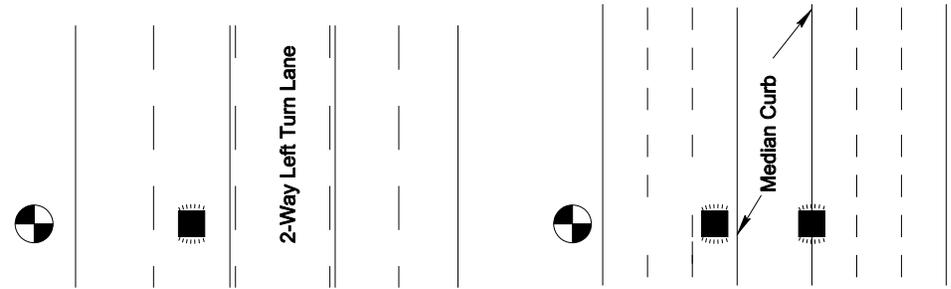
**PURPOSE:** Standardize placement of fire hydrant markers. Enhance public safety.



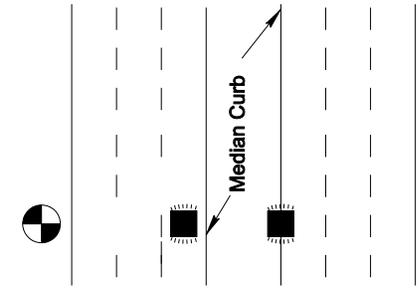
LOCAL STREET



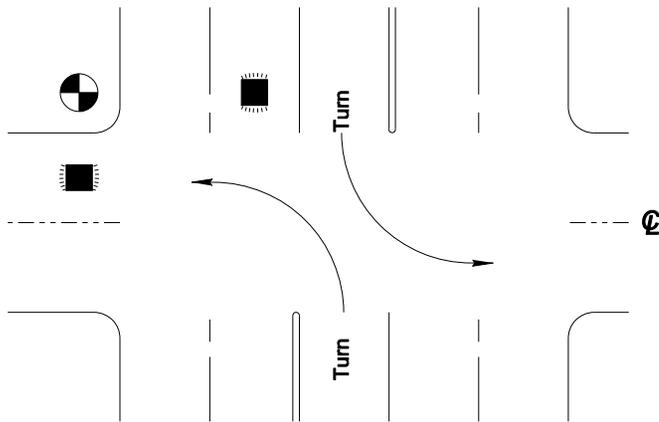
LOCAL CROSS STREET INTERSECTION



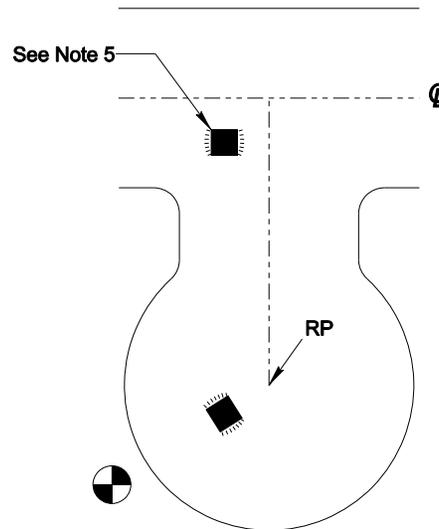
MULTI-LANE STREET W/ TWO WAY LEFT TURN LANE



MULTI-LANE STREET W/ RAISED MEDIAN



FOUR LANE STREET WITH TURN LANE AT INTERSECTION



CUL-DE-SAC

**NOTES:**

1. LOCATE PAVEMENT MARKER IN CENTER OF TRAVEL LANE AND ALIGN WITH HYDRANT.
2. FOR MULTIPLE LANE ROADS LOCATE PAVEMENT MARKER IN LEFT MOST THROUGH TRAFFIC LANE.
3. ADJUST MARKER LOCATION TO BE LOCATED OUTSIDE OF ANY DELINEATED CROSSWALK AREA.
4. FOR HYDRANT LOCATED ON FAR SIDE OF RAISED MEDIAN, LOCATE PAVEMENT MARKER ON TOP OF MEDIAN CURB ALIGNED WITH HYDRANT.
5. OMIT FOR CUL-DE-SAC GREATER THAN 250' IN LENGTH.
6. FIRE HYDRANT PAVEMENT MARKERS SHALL BE 2-WAY REFLECTIVE BLUE: ADOT TYPE BB, 911A-BLUE BY FIRE LITE AMERACE CORPORATION, OR APPROVED EQUAL.



**MARICOPA COUNTY**  
*Department of Transportation*

**MEMORANDUM**

**Date:** May 5, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Proposed revision to Detail 110 – PLAN SYMBOLS

**Case 10-11**

**PURPOSE:** Update and expand graphic standards to have plans be more uniform among MAG agencies.

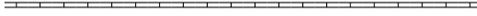
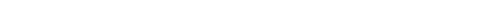
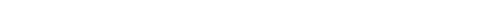
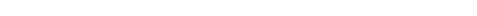
**REVISION:** Added line types and symbols, identify conduit material of underground utilities, require underground utility conduits greater than 12-inch diameter to be drawn to actual width.

Added line types:

- Right of way
- Property
- Easement
- Jurisdictional boundary
- Chain link fence
- Barbed wire fence
- Wood fence
- Block wall

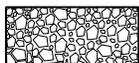
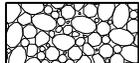
Added symbols:

- Utility meter
- Monitory well
- Wood utility pole
- Steel utility pole
- Concrete utility pole
- Pole mounted light
- Signal pole
- Double post sign
- Cellular tower
- Pull box
- Video detection camera
- Traffic signal indication
- Left turn signal indication
- Right turn signal indication

SECTION LINE		CHAIN LINK FENCE	
R/W		BARBED WIRE FENCE	
EASEMENT		BLOCK WALL	
PROPERTY LINE (OPTION 1)		WOOD FENCE	
PROPERTY LINE (OPTION 2)		GAS LINE (12" & SMALLER)	 4" G (MATERIAL)
JURISTICTIONAL BOUNDARY (OPTION 1)		GAS LINE * (GREATER THAN 12")	 15" G (MATERIAL)
JURISTICTIONAL BOUNDARY (OPTION 2)		SEWER LINE (12" & SMALLER)	 8" S (MATERIAL)
ROADWAY CENTERLINE		SEWER LINE * (GREATER THAN 12")	 18" S (MATERIAL)
UNDERGROUND ELECTRIC BURIED CABLE		NEW STORM DRAIN PIPE *	
UNDERGROUND ELECTRIC CONDUIT		STORM DRAIN * (GREATER THAN 12")	 18" SD (MATERIAL)
UNDERGROUND ELECTRIC DUCT BANK		IRRIGATION LINE (12" & SMALLER)	 4" IRR (MATERIAL)
OVERHEAD ELECTRIC		IRRIGATION LINE * (GREATER THAN 12")	 15" IRR (MATERIAL)
UNDERGROUND TELEPHONE LINE		NEW IRRIGATION LINE *	
OVERHEAD TELEPHONE LINE		WATER LINE (12" & SMALLER)	 4" W (MATERIAL)
FIBER OPTIC		WATER LINE * (GREATER THAN 12")	 36" W (MATERIAL)
CABLE TELEVISION			
OVERHEAD CABLE TELEVISION			
TELEPHONE DUCT BANK			

\* SCALE TO ACTUAL WIDTH

UTILITY METER   
 SEWER CLEANOUT   
 FIRE HYDRANT   
 WATER METER   
 UTILITY MANHOLE   
 IRRIGATION STANDPIPE   
 UTILITY VALVE   
 SEWER SERVICE CONNECTION   
 MONITORING WELL   
 REDUCER   
 WOOD UTILITY POLE   
 STEEL UTILITY POLE   
 CONCRETE UTILITY POLE   
 STREET LIGHT ON MAST ARM   
 POLE MOUNTED LIGHT   
 ELECTRIC, GAS METER   
 TRANSFORMER 

DOWN GUY & ANCHOR   
 CELLULAR TOWER   
 BITUMINOUS (SECTION)   
 CONCRETE (SECTION)   
 AGGREGATE BASE COURSE (SECTION)   
 RIPRAP (PLAN & SECTION)   
 OBLITERATE PAVEMENT   
 TAPERED MILL   
 UNIFORM MILL   
 EARTH (SECTION)   
 SURVEY MONUMENT   
 SURVEY MONUMENT IN HANDHOLE   
 MAIL BOX   
 SIGNAL POLE   
 SINGLE POST SIGN   
 DOUBLE POST SIGN   
 STREET NAME SIGN 

TRAFFIC SIGNAL INDICATION   
 LEFT TURN SIGNAL INDICATION   
 RIGHT TURN SIGNAL INDICATION   
 VIDEO DETECTION CAMERA   
 PULL BOX   
 'A' POLE W/TRAFFIC SIGNAL HEAD 

DETAIL NO.  
110-1



STANDARD DETAIL  
ENGLISH

PLAN SYMBOLS

REVISED

DETAIL NO.  
110-1

**SECTION 361**  
**SHALLOW DEPTH FIBER OPTIC MICRO-CONDUIT INSTALLATION**

**361.1 DESCRIPTION:**

This work shall consist of the installation of underground fiber optic micro-conduit telecommunications facilities within the public right-of-way.

**361.2 TRENCHING, BACKFILL AND RESTORATION:**

All work shall be done in accordance with Section \_\_\_\_\_

**361.3 MICRO-CONDUIT INSTALLATION:**

(A) "Trunk Lines" Cable providing telecommunications service by connecting regions or states or by connecting central offices within a metropolitan area. Such cable shall be installed as described below:

(B) Telecommunications cables other than "trunk lines" shall be installed as described below:

**361.4 CABLE LOCATING (FIBER OPTIC):**

Tracing or locating wire shall be installed with the cable.

**361.5 PAYMENT:**

Payment will be made at the contract unit price bid per lineal foot.