

April 27, 2010

Members of the MAG Specifications and Details Committee

Jesse Gonzales, City of Peoria, Chairman

**SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF AGENDA**

Wednesday, May 5, 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 April 7, 2010 Meeting Minutes</u>	2. Corrections and approval of April 7, 2010 minutes.
3. <u>2009 &amp; 2010 Cases</u>	3. Review of 2009 & 2010 cases. New cases.
4. <u>General Discussion</u>	4. ADA Webinar Announcement. 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

April 7, 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
Tom Kaczmarowski, Glendale	* Rodney Ramos, Scottsdale
* Troy Tobiasson, Goodyear, Vice Chairman	Jason Mahkovtz, Surprise
Bob Herz, MCDOT	Tom Wilhite, Tempe

ADVISORY MEMBERS

John Ashley, ACA	Jeff Hearne, ARPA
Jeff Benedict, AGC	Peter Kandararis, SRP
Kwigs Bowen, NUCA	Paul R. Nebeker, Independent
Tony Braun, NUCA	Mike Smith, ARPA
Brian Gallimore, AGC	

MAG ADMINISTRATIVE STAFF

Gordon Tyus

\* Members not attending or represented by proxy.

GUESTS/VISITORS

Phil Cisneros, Southwest Gas  
Arturo Chavarria, Hanson Pipe and Precast  
Bill Davis, NUCA  
Brian Platten, Garney Construction  
Kenny Pollock, Southwest Gas  
Mike Sanders, NUCA  
Ann Seiden, Southwest Gas  
Niranjan Vescio, Stronggo

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 March 3, 2010 meeting minutes. John Ashley introduced a motion to accept the minutes as written. Tom Kaczmarowski 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 has continued to work on the proposed details and to get feedback from the access board. He also provided copies of a letter from the Department of Justice to Victor Mendez at the FHWA stating the department's position that all street resurfacing requires sidewalk ramps to be updated to meet current ADA standards. He also described his attendance at a webinar conducted at the City of Phoenix regarding transition plans. Such plans are required for organizations with more than 50 employees. An article from the *APWA Reporter* on transition plans was provided for reference. Mr. Gonzales asked the committee for additional feedback.

**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 an updated drawing for Detail 232 for Curb Ramp –Type 'B' with minor updates. He said updates to the other details are in progress and requested additional feedback from the committee.

**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 Whilhite provided updates to Section 610.4 based on discussions at previous meetings about how to protect water pipe. The update included the option of tarping and described other methods of preventing foreign materials from entering pipe during storage and construction. Mr. Whilhite asked for additional feedback.

4. 2010 Cases (new cases)

**d. Case 10-01a – Miscellaneous Bloopers:** *Correct typographic errors in Section 317 Asphalt Milling.* No comments were provided on Section 317; however, Bob Herz provided a handout that noted typographic corrections were needed for Table 715-1 and Section 340.2.1. He stated that these updates were passed in the 2010 update, but the errors were missed in the publication process and should be corrected and updated immediately for the online publication and future reprints. Jesse Gonzales moved and

Dennis Teller seconded a motion to accept these corrections and update the 2010 publication online. A voice vote of all ayes and no nays was recorded.

**e. Case 10-02 – Utility Pothole Repair:** *Revise and add keyhole repair to Detail 212 and add new Sections 355 and 708.* Phil Cisneros of Southwest Gas gave a short presentation on the keyhole repair process. He described a short history of its use in the region including photos of tests done in various cities. He also described the process and equipment used including a hand-held testing device that records the compaction of fill. Mr. Cisneros described other uses and benefits of the process. The complete presentation is posted on the MAG web site: <http://www.mag.maricopa.gov/detail.cms?item=11790>

Discussions during the presentation focused on quality control issues such verifying compaction data, and more information about how the device works. It was noted that it records the amplitude of the compaction hit, and that different soils would compact differently, so the data would need to be correlated to match the soil type.

Peter Kandaris provided updated specifications for Section 355 and revisions to Detail 212 based on feedback from Maricopa County. Changes included references to backfill specifications and noting the smallest keyhole size allowed is equal to two times the tamper size. Detail 212 was revised to make types A and B consistent and to better organize and clean up the details and notes.

**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 handed out a color version of Section 336 and said it was now available in Microsoft Word format for easier editing. He said that most of the changes to the section were reorganizing it to match the flow of the process, and making it consistent with details 200-1 and 200-2 that were revised last year. A few other minor typographic corrections were made. He asked the committee to review the case and said he would make the Word version available.

**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 said no changes have been made or comments received since the last meeting.

**h. Case 10-05 – Revise FOREWORD:** *The purpose of this change is to clarify use of the MAG Specifications and Details for Public Works document.* Jesse Gonzales asked for the committee to look at it again and provide feedback.

Mr. Gonzales also discussed the proposed document that supplements the MAG Specifications for “Public Works Construction Not in the Right of Way.” He noted that the need for such a document was growing, and could address such issues as how to use reclaimed water in areas not currently covered in the MAG specifications. He also said that many parts of the MAG specifications were appropriate to use for these types of projects, as well as many city supplements. The possibility of forming a working group for this project was discussed.

Peter Kandaris said a working group would help to determine the scope and pieces that could be included in the document. Jeff Hearne added that other projects such as pervious concrete may be more appropriate for this document. Members Kandaris, Gonzales and Hearne agreed to get together for further discussion. Mr. Gonzales asked Brian Gallimore to ensure AGC participation.

**i. Case 10-06 – Revise Controlled Low Strength Materials (CLSM) Specifications:**

*The purpose is to update the CLSM specifications in Sections 604, 701 and 728 to match current industry standards.* Jeff Hearne of ARPA introduced this case that was the final draft prepared by the ARPA/MAG Concrete Working Group. Mr. Hearne briefly summarized the changes in each section. Section 604 was reorganized and makes references to current ACI standards. Section 604.4 was changed to be Performance Testing. Section 701.3.5 was updated to make CLSM aggregates match concrete aggregates specified in ASTM C-33 (same as the concrete section). Section 728 was updated to include current materials and additives. Notes under Table 728 were moved, with a new one added describing pumpability using additives such as fly ash. The mixing section now refers back to 725.7 (concrete). Also the specification does not allow rejected concrete to be used as CLSM. Mr. Hearne asked members to bring the document to their departments for feedback.

John Ashley asked about using materials on-site and availability of materials in remote areas. Discussion included past use of ABC. Mr. Hearne stated that although it may be specified on mix design tags, suppliers are now using concrete aggregates, and that the revised specification actually allows others sizes besides the #57 rock currently specified.

There was discussion about the balance the working group tried to make between having a performance-based specification and a recipe for the mix. The revised specification allows for greater variation in mixes, but there is difficulty in creating a performance standard due to the difficulty in testing low strength materials properly. Cylinders are not reliable at low strengths and easily damaged.

The methods of performance testing in 604.4 were discussed regarding when paving could be completed, and traffic allowed. Scott Zipprich said that plating requirements allowed traffic on the site until final patching could be done.

Discussion on the changes to Table 728-1 included the purpose for ½ sack, 1 sack and 1½ sack concrete mixes. Tom Whilhite asked about the appropriateness of the strength maximums and minimums in the third column. Discussion included that minimums were not needed for ½ sack and 1½ sack because the mix formula would guarantee that it would have a greater strength than the native soil it is designed to replace. Maximum strengths could help ensure excavability. A minimum strength for 1½ sack was added since it is used for protection purposes.

**j. Case 10-07 – Revise Detail 230 – Sidewalks to change minimum from 4’ to 5’:** *The purpose of the case is to 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 introduced this case which provided information and diagrams on ADA accessible routes requirements for passing and turning. The case included revisions to Detail 230 changing the sidewalk width dimension and notes. Jesse Gonzales said that many cities already use 5’ sidewalk widths. He also made a comment about using vertical curbs instead of roll curbs created the problem of having utilities under concrete since the sidewalks are moved back to allow ADA access around driveways. Mr. Herz asked members to review the case and send him comments.

5. General Discussion:

Chairman Gonzales introduced Syd Anderson as the new representative from the City of Phoenix to replace Jeff Van Skike who recently retired. He said that Syd has many years experience as the lab supervisor in Phoenix, and welcomed him to the committee.

*American Society for Testing and Materials (ASTM) Portal Access*

Gordon Tyus provided an update on the ASTM web portal based on discussions with Jim Thomas at ASTM. He described an online demonstration of the ASTM web portal given by Mr. Thomas which allows users to make and read notes and commentary on ASTM specifications. It also provides easy cross linking and access to past and present specifications. He also discussed possible custom configurations to allow MAG member agencies to access ASTM standards via a MAG portal, and possible costs and features.

Mr. Tyus investigated the ASTM web portal project further by searching the MAG specifications for all references to ASTM standards. MAG references them over 400 times. This information was given to Mr. Thomas to help determine what sections of ASTM were needed. During this research, Mr. Tyus found that many of the references in MAG are to ASTM standards that have been removed or superseded. He suggested that members review the bolded entries to see how these references could be corrected, and that a future case may be warranted.

Gordon Tyus also described another discussion he had with Mr. Thomas on the previous day. The ASTM representative told Mr. Tyus most of the specifications MAG references are in Section 4, and said a custom portal with unlimited access to Section 4 as well as X number of downloads to other sections could be set-up. Access can be determined by computer IP recognition or user name and password. Although the total costs will vary depending on the number of agencies, what sections are needed, and the number of users, Mr. Thomas gave Mr. Tyus a ball-park figure of about \$25,000. A typical portal for a single organization, for one library was about \$3,000, and another 1.75 times that for network access to other computers. The ASTM access portal would meet lab requirements to maintain certification.

Mr. Tyus told the committee that Mr. Thomas was willing to give a similar demonstration and proposal along with their web development partner Citation (based in Scottsdale) at the June 2, 2010 committee meeting. Mr. Tyus also asked members to survey their organizations

to see what ASTM specifications they required and how many users they would need, to help get a better estimate of the portal requirements and costs. He also said he would investigate other funding sources at MAG.

Several members commented on the ASTM access they currently use and how a shared portal could save costs, and provide other advantages. It was agreed to add the ASTM presentation by Mr. Thomas to the agenda of the June 2, 2010 meeting.

6. Adjournment:

The meeting was adjourned at 3:07 p.m.

## 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 04/07/2010		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	<a href="#">Case 10-01A</a> : Miscellaneous Bloopers: Section 317 Asphalt Milling <a href="#">Case 10-01B</a> : Update Table 715-1 and Section 340.2.1	MCDOT	Bob Herz	01/06/2010 04/07/2010	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 Kandarlis	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		0 0 0	Yes No Abstain
10-06	<a href="#">Case 10-06</a> : Revise Controlled Low Strength Materials Specifications in Sections 604, 701 and 728.	ARPA Peoria	Jeff Hearne	04/07/2010		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		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	Case 10-08: Revise Specification Section 717 ASPHALT-RUBBER to obtain a uniform specification.	MCDOT	Bob Herz	05/05/2010		0 Yes 0 No 0 Abstain
10-09						0 Yes 0 No 0 Abstain
10-10						0 Yes 0 No 0 Abstain
10-11						0 Yes 0 No 0 Abstain
10-12						0 Yes 0 No 0 Abstain

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



U. S. Department of Justice

Civil Rights Division

Office of the Assistant Attorney General

Washington, D.C. 20035

JAN 5 2010

Victor M. Mendez, Administrator  
Federal Highway Administration  
Department of Transportation  
1200 New Jersey Avenue, S.E.  
Washington, D.C. 20590

Dear Mr. Mendez:

We wish to bring to your attention a conflict between longstanding Department of Justice (Department) policy with respect to the application of the requirements of 28 C.F. R. § 35.151(e), which requires the provision of curb ramps when roads are being altered, and recent guidance provided by the Federal Highway Administration (FHWA). We are seeking your assistance in resolving this conflict.

The Department is the Federal agency authorized by Congress to promulgate and interpret regulations implementing title II, Subtitle A, of the Americans with Disabilities Act (ADA). The Department enforces title II in conjunction with designated Federal agencies that are authorized to investigate and resolve title II complaints in their respective program areas. The Department's regulation is published at 28 C.F.R. part 35. The regulation requires the Assistant Attorney General to coordinate the compliance activities of Federal agencies with respect to the activities of state and local governments and to "provide policy guidance and interpretations to designated agencies to ensure the consistent and effective implementation of the requirements of this part."<sup>1</sup>

The title II regulation makes it clear that alterations that affect or could affect the usability of a facility shall be made in such a manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities and specifies that newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway. It has been the Department's longstanding position that street resurfacing is considered an

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<sup>1</sup> Under Executive Order 12250, the Department is also responsible for coordinating Federal agency enforcement of section 504 of the Rehabilitation Act of 1973. Section 504 imposes requires Federal agencies to ensure that recipients of Federal financial assistance (including state and local governments), meet accessibility standards when making alterations.

alteration that triggers ADA requirements for curb ramps.<sup>2</sup> The one appellate court decision that addresses this issue held that resurfacing “requires the laying of a new asphalt bed spanning the length and width of a city block. Kinney v. Yerusalim, 9 F 3d 1067 (3<sup>rd</sup> Cir. 1993) (cert. denied), 511 U.S. 1033 (1994).

Over the past decade, under the Department’s Project Civic Access initiative, the Department has entered into a number of title II voluntary settlement agreements with state and local governments that specifically acknowledge the obligation to install curb ramps where roads have been resurfaced. None of these agreements have provided exceptions for road resurfacing projects that involved asphalt layers of less than a particular depth.<sup>3</sup>

The Department recently became aware that the FHWA takes the position that road resurfacing projects that involve asphalt overlays of no more than 1.5 inches qualify as normal maintenance, and therefore do not constitute alterations.<sup>4</sup> The Department is deeply concerned that the FHWA’s position on asphalt overlays of less than 1.5 inches directly conflicts with the Department’s legal interpretations of title II. There have been several instances recently, in which localities have challenged the Department’s title II enforcement efforts with respect to curb ramps, arguing that, because of the FHWA policy in this regard, they do not have to install curb ramps, so long as they are not installing more than 1.5 inches of new road surface.

We would like to meet with you as soon as possible to discuss mechanisms for restoring consistency between the Department’s interpretation of its title II regulation and the FHWA’s

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<sup>2</sup> See, e.g., “ADA Best Practices Tool Kit,” Chapter 6 [“Resurfacing a roadway beyond normal maintenance is an alteration.” By contrast, filling potholes is not.”] See also, “The ADA and City Governments: Common Problems.”

<sup>3</sup> See, e.g., Settlement Agreement Between the United States and Newark, NJ (<http://www.ada.gov/NewarkNJpca.htm>) . See also, Settlement agreement with the Delaware Department of Transportation, which specifically involved a claim that the respondent failed to install curb ramps for all road resurfacing projects that involved removal of less than three inches of asphalt, and required the addition of curb ramps for those projects. (<http://www.ada.gov/deldot.htm>.)

<sup>4</sup> In its “Questions and Answers on Section 504 and the ADA,” posted on the FHWA’s website, the FHWA advises the public that maintenance activities include, but are not limited to, “*thin surface treatments (nonstructural)*, joint repair, pavement patching, (filling potholes) shoulder repair, signing, striping minor signal upgrades, and repairs to drainage systems.” (Question 18, emphasis added). The Questions and Answers do not define “thin surface treatments.” However, in a Letter of Finding issued to the City of Sandpoint, Idaho in response to a title II complaint, the FHWA found that the City had not violated the ADA for failing to provide curb ramps at certain road improvement projects because “[t]he FHWA has determined that overlays of up to 1.5 inches could be considered maintenance, rather than alterations or improvements.”(See LOF, dated June 02, 2009, copy attached.)

application of this regulation in its investigations of title II complaints as well as in the technical assistance it provides to state transportation agencies. We believe that it is essential that there be no conflicts between the positions of our two agencies on this issue. Please have your staff contact John L. Wodatch, Section Chief, or Janet L. Blizzard, Deputy Chief, of the Division's Disability Rights Section to arrange this meeting. Mr. Wodatch and Ms. Blizzard may be reached at 202-307-0663.

We also request that, in the future, the FHWA consult with the Department before publicly announcing policy provisions intended to have general application. This will enable our agencies to avoid creating the appearance of conflicting enforcement policies that will undermine both of our enforcement efforts. We look forward to working with you to resolve this matter.

Sincerely,

A handwritten signature in black ink that reads "Thomas E. Perez / SB". The signature is written in a cursive style with a large, sweeping initial "T".

Thomas E. Perez  
Assistant Attorney General

# Transition Plans: It's the law

## *It's never too late to devise a plan*

**Scott A. Swiderski, P.E.**  
Senior Construction Manager  
H.R.Gray  
Austin, Texas

**B**y law, every public entity in the United States with 50 or more employees is responsible for implementing a transition plan. This plan identifies areas in the community that have barriers to accessibility for persons with disabilities and outlines the steps to correct them. This is not an engineering law—it is a civil rights law and falls under the Americans with Disabilities Act (ADA). Although enforcement has been spotty, it is a smart move since a transition plan is your first line of defense against complaints and provides your community with an outline of items to plan, budget for and correct.



**Unusable curb ramp due to uneven running slopes and control joints**

The transition plan has been part of the Americans with Disabilities Act since it was passed in 1990—some 20 years ago—yet many municipalities are still unaware of the requirements or fail to encompass all ADA aspects including sidewalks and curb ramps. While it's hard to pinpoint an exact reason for this, it tends to be due to the lack of publicity of the details of the ADA and the lack of understanding the functionality of a transition plan. But not knowing is not a defense with the courts. A law that has been around for 20 years should be known and implemented by all communities.

## **How to implement**

There are two key, independent processes in assessing existing ADA issues. The first is to perform a self-evaluation of all existing programs, activities and services, while the second is to implement a transition plan. Often they are confused to be one and the same, even mistaken as one process handling both; reasonably so, since one is not a benefit unless the other is performed. It is important for municipalities to go through a self-evaluation process that addresses barriers within their programs and facilities, as well as describes how they will be made accessible and compliant. It is a time-consuming effort that involves staff members going through the whole community in search of areas that are not compliant. Without a doubt, it can be expensive and time-consuming, but it is required.



**Reconstructed curb ramp meeting ADA guidelines, including a detectable warning system**

The transition plan describes the structural modifications that will be made to correct the barriers found in the self-evaluation process and how it will ensure that programs and services are accessible to persons with disabilities. The purpose of the transition plan is to document the barriers to persons with disabilities and to propose the structural modifications that will be undertaken to provide program acces-

sibility. The transition plan will also outline a time frame for these modifications. The number of years it will take to complete the plan and the funding that will be required each year on modifications are determined by what a community can feasibly afford. The transition plan should be adjusted yearly so there is always an updated record of the modifications and funding needed. When a transition plan is complete, the municipality simply keeps it on record as there is no requirement to file it with any government agencies.

### Key elements of the plan

The basic elements of the transition plan are fairly simple. After the transition plan is developed, it is just a matter of reevaluating and updating it each year. Elements of the plan include:

- A list of obstacles to ADA compliance and the procedure for removing and/or accommodating these obstacles.
- A list of the structural modifications that are needed.
- The timeline when these changes will be accomplished.
- Estimated costs of each change outlined in the plan.
- The name of the staff member who will regularly report on the progress of the plan.
- At least an annual update and revision of the transition plan.



Compliant ADA accessible corner location with shared landing

When developing a plan, use the government online resources. Information on transition plans and the requirements can be found under the Title II Technical Assistance Manual, section 8.0000 Administrative Requirements, paragraph 8.3000 Transition Plans of the ADA. ([www.ada.gov/taman2.html](http://www.ada.gov/taman2.html))

A transition plan is a safety net when a complaint is issued. A municipality can then prove that the issue has already

been identified and there is a plan to correct it. If necessary, the modification can be moved up to an earlier stage in the plan. It can potentially protect a community against possible fines and unplanned construction. The best practice is to keep the plan updated and continually monitor and work on achieving the milestones so, if a complaint is issued, the municipality can demonstrate to the designated federal agency that there is an active, working plan in progress.

### Know the whole law

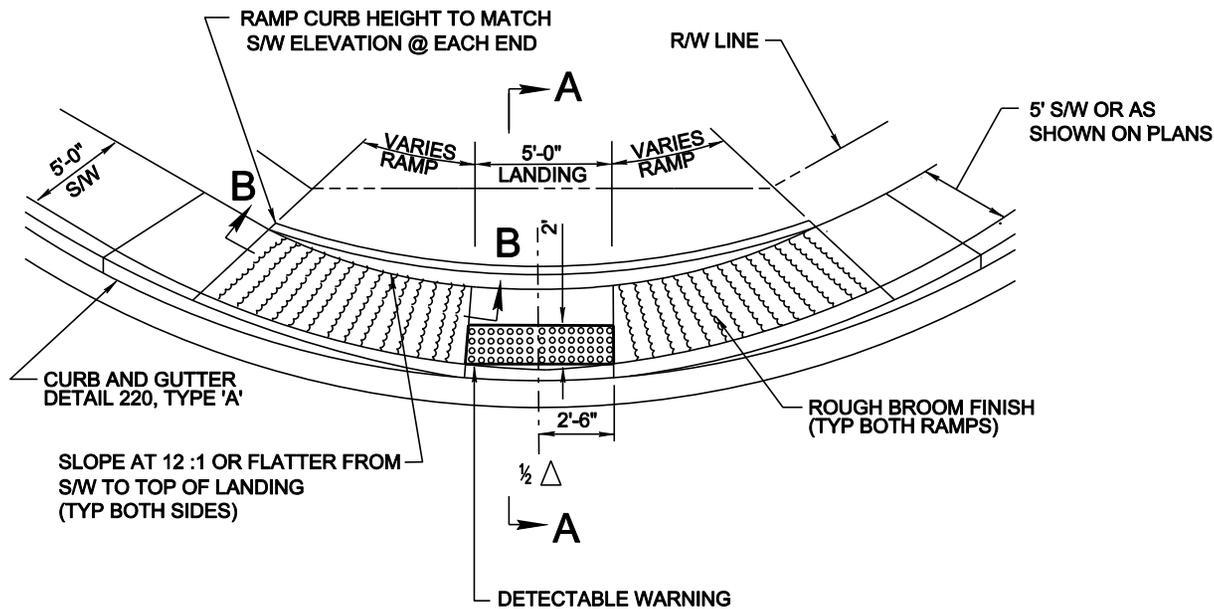
Understanding the details of what ADA covers is essential. To illustrate, a municipality thought they had compiled a good transition plan, but they didn't realize that rights-of-way were included as well. A well-informed community activist filed numerous complaints against the community for lack of compliance. The community had no defense against the claims since they had not developed a plan for the rights-of-way. In this case, it was disappointing for a community that thought they were in compliance to be caught unaware. What ADA covers is clearly specified, so diligence to the details is important.

The best defense is to understand and pay attention to all ADA requirements. Be proactive about keeping up with the regulations and how to comply. Many communities are not aware of all regulations or are incorrectly complying with them. This is not an excusable defense as public entities, by law, bear all the responsibility for knowing the information and following it correctly. Communities need to learn about the transition plan and realize it is in their best interest to make a plan for these expenditures—just as they would plan for road repair. The protection the plan affords them could potentially save the community money in the long run, instead of having to pay out if sued.

It's going to take a long time for total awareness of transition plans. Knowledge of transition plans is low in some areas, especially smaller communities. Hopefully through word of mouth, more and more communities will realize that this is the law and they need to comply.

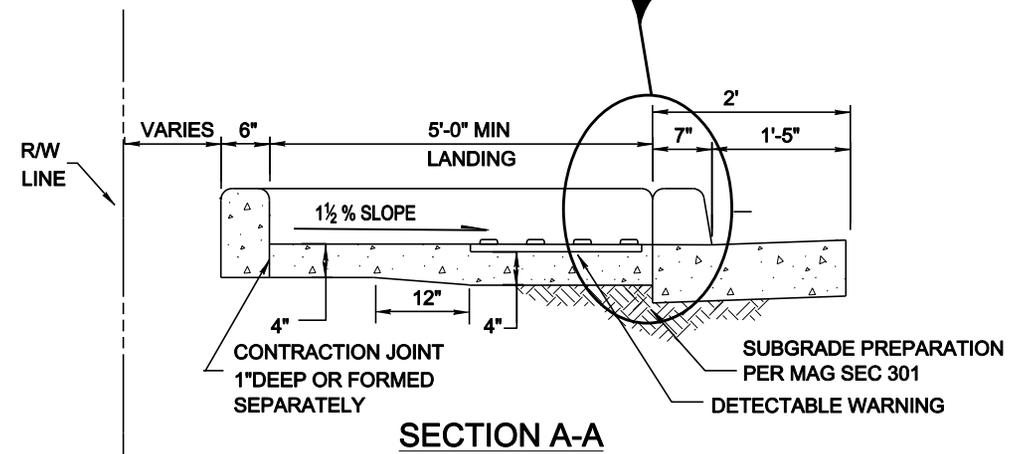
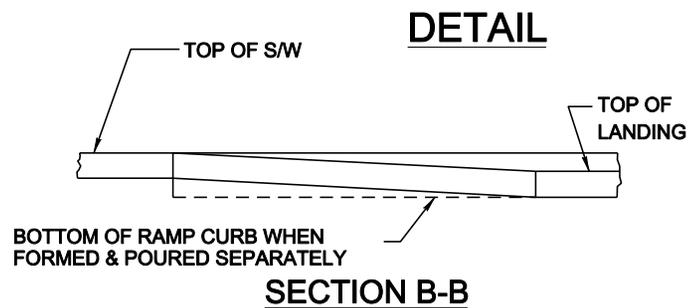
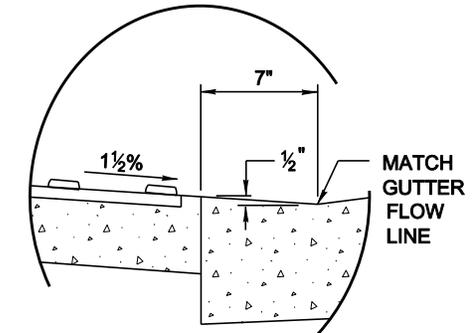
*Scott A. Swiderski, Senior Construction Manager for H.R. Gray, has more than 15 years of experience in the construction industry performing project management and engineering tasks for a variety of public and private sector clients. He has effectively managed the overall coordination of numerous multi-million-dollar projects in both the design-bid-build and design-build structures. Furthermore, he has extensive expertise in achieving compliance requirements for the Americans with Disabilities Act (ADA) from implementing planning programs to managing curb ramp layout and construction projects. He can be reached at [sswiderski@hrgray.com](mailto:sswiderski@hrgray.com).*





**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%.





**MARICOPA COUNTY**  
*Department of Transportation*

MEMORANDUM

**Date:** April 7, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Miscellaneous Bloopers

**Case 10-01 B**

**PURPOSE:** Correct typographical errors from 2010 revisions.

**REVISION:** Correct Sieve size in Table 715-1  
Insert missing word in section 340.2.1

See attached sheets

## SECTION 715

TABLE 715-1			
SLURRY SEAL AGGREGATE			
SIEVE SIZE	Type I % PASSING	Type II % PASSING	Type III % PASSING
38053 3/8	100	100	100
No. 4	100	85/100	70/90
No. 8	90/100	65/90	45/70
No. 16	65/90	45/70	28/50
No. 30	40/60	30/50	19/34
No. 50	25/42	18/30	12/25
No. 100	15/30	10/21	7/18
No. 200	10/20	5/15	5/15
Emulsified Asphalt content as a % of Dry Wt. Of Aggregate (approx.) ASTM D-3910 (W.T.A.T. TEST)	18	16	14
Residual Asphalt Range requirements % of Dry Wt. of Aggregate ASTM D-3910 (W.T.A.T. TEST)	10-16	7.5-13	6.5-12
Pounds of Aggregate per Square Yard (approx.)	8-10	12-18	18-25

End of Section

## SECTION 340

### CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE

#### 340.1 DESCRIPTION:

The various types of concrete curb, gutter, sidewalk, sidewalk ramps, driveways, and alley entrances shall be constructed to the dimensions indicated on the plans and standard detail drawings.

#### 340.2 MATERIALS:

Concrete shall be class B unless otherwise noted. Concrete shall conform to the requirements of Section 725.

Expansion joint filler shall comply with Section 729. *INSERT 'INCHES'*

**340.2.1 Detectable Warnings** Detectable warnings shall consist of raised truncated domes aligned in a square grid pattern in conformity to the Americans with Disabilities Accessibility Guidelines. Truncated domes shall have the following nominal dimensions: base diameter of 1.0 (0.9 inches minimum) top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and height of 0.2 inches. Dome center-to-center spacing for radial installations shall be 1.6 inches minimum and 2.4 inches maximum with a base-to-base spacing of 0.65 inches minimum. Detectable warnings shall contrast visually with adjoining surfaces. Visual contrast shall be obtained by color, use safety yellow or other approved color. The color shall be an integral part of the material surface. The material is to be durable with a non-slip surface not subject to spalling, chipping, delamination, or separation. All detectable warnings shall be approved by the jurisdictional agency prior to installation.

#### 340.3 CONSTRUCTION METHODS:

Existing pavements and concrete, that are joined by new construction, shall be cut in accordance with Section 601.

The subgrade shall be constructed and compacted true to grades and lines shown on the plans and as specified in Section 301. All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade elevation and replaced with material satisfactory to the Engineer. When the Engineer determines that the existing subgrade consists of soils with swelling characteristics, the moisture content shall be brought as close as possible to the optimum required for compaction. This shall be done by the addition of water, by the addition and blending of dry suitable material or by the drying of existing material. The subgrade shall then be compacted to a relative density of 75% minimum to 85% maximum with 80% as ideal.

Material displaced in the construction shall not be placed on the base and/or surfacing material already in place on the roadway nor shall the excavated material be placed in such a manner as to interfere with access to property or traffic flow in the street.

Existing concrete sidewalks and driveways which abut the new sidewalks and driveway entrances shall be removed to a distance required to maintain a slope as indicated by standard details or not to exceed 1 inch per foot where sidewalks are concerned. Sawcutting is required at the match lines and payment will be made under the respective pay items as provided in the proposal.

Concrete curbs, gutters and sidewalks shall be constructed by the conventional use of forms, or may be constructed by means of an appropriate machine when approved by the Engineer.

If machines designed specifically for such work and approved by the Engineer are used, the results must be equal to or better than that produced by the use of forms. If the results are not satisfactory to the Engineer, the use of the machine shall be discontinued and the Contractor shall make necessary repairs at his own expense. All applicable requirements of construction by use of forms shall apply to the use of machines.

Forms conforming to the dimensions of the curb, gutter, sidewalk, sidewalk ramps, driveway, and alley entrance shall be carefully set to line and grade, and securely staked in position. The forms and subgrade shall be watered immediately in advance of placing concrete.

Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil, or other releasing agent of a type which will not discolor the concrete. The concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. The concrete may be compacted by mechanical vibrators approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate is below the concrete surface.



**Chandler • Arizona**  
*Where Values Make The Difference*

**MEMORANDUM**

**Case # 10-02**

**DATE:** February 3, 2010

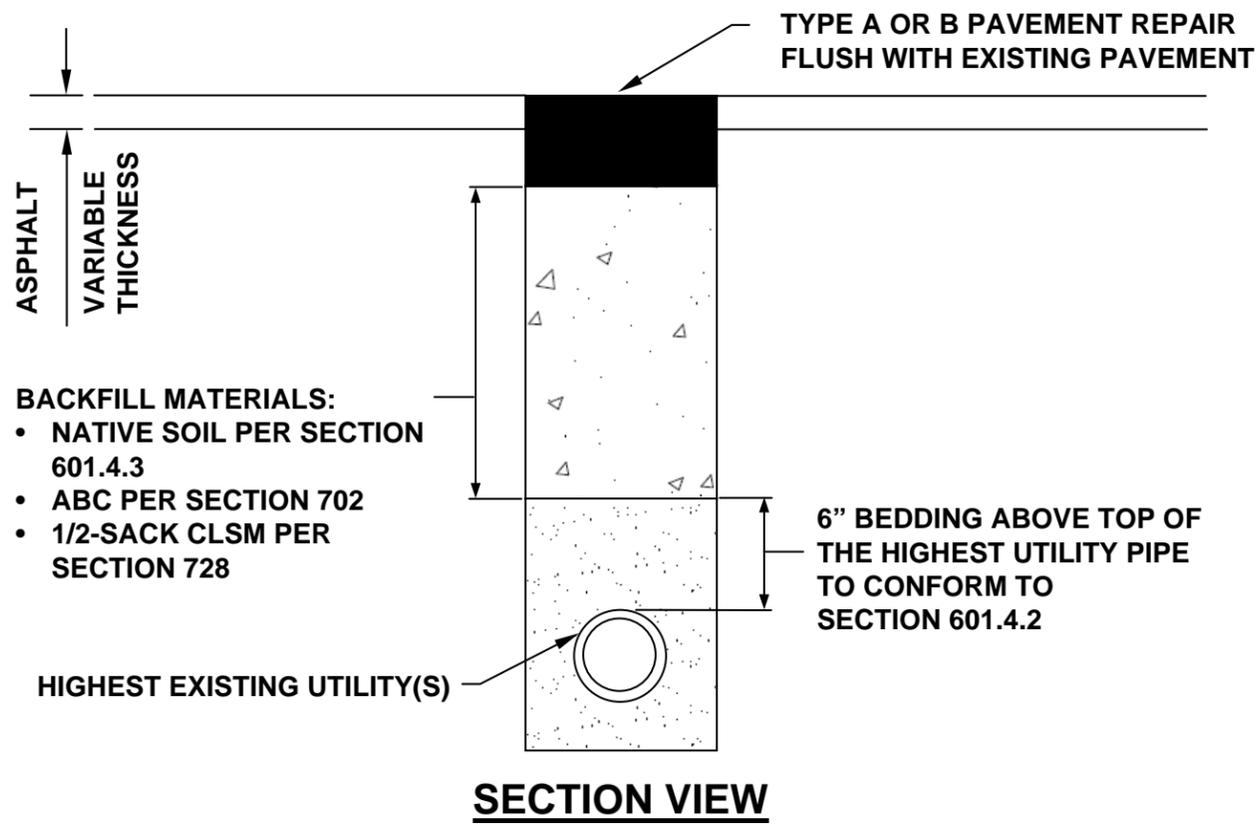
**TO:** MAG Specifications and Details Committee Members

**FROM:** Warren White, City of Chandler Representative

**SUBJECT:** Modifications to Detail 212: Utility Pothole Repair, Keyhole Repair Option

Attached is a revision to Detail 212 reorganizing and adding a Type B - Keyhole Repair option. The changes also include a spelling correction and addition of a MAG section backfill material reference. This repair methodology has been in place for a number of years and has been used within multiple municipalities within the Valley. The City of Chandler is currently accepting this technology on a case-by-case basis and wishes to have a standard in place. Our preference would be to incorporate this option into a MAG detail in lieu of adding supplemental agency standards.

Keyhole pavement cutting technology is a cleaner, quicker way to cut city streets in order to access underground facilities. The process involves cutting an 18-24" core, then backfilling the hole with native soil (or agency specific requirements) and reinstating the original core by bonding it to the cut pavement. The process is complete after a few hours at which time traffic lanes can be re-opened.

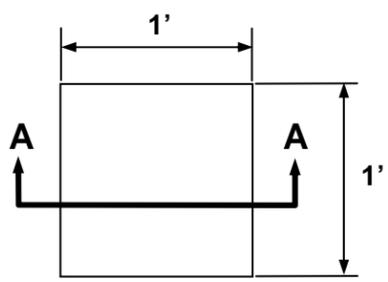


- BACKFILL MATERIALS:**
- NATIVE SOIL PER SECTION 601.4.3
  - ABC PER SECTION 702
  - 1/2-SACK CLSM PER SECTION 728

6" BEDDING ABOVE TOP OF THE HIGHEST UTILITY PIPE TO CONFORM TO SECTION 601.4.2

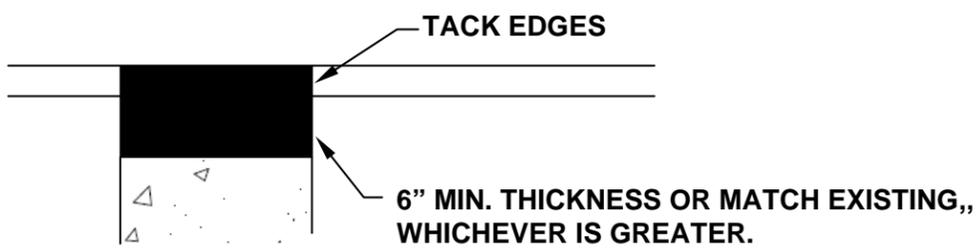
**SECTION VIEW**

**TYPE A – PAVEMENT REPAIR**



**PLAN VIEW**

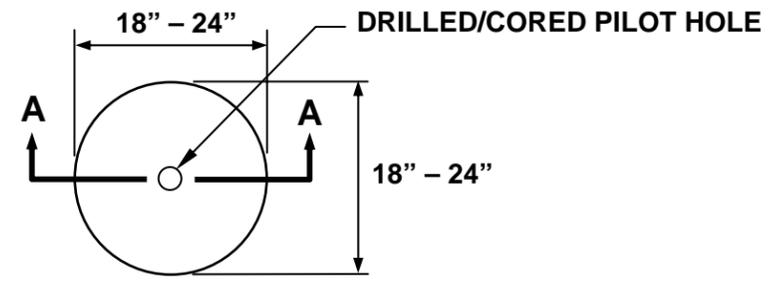
- NOTES:**
1. DIMENSIONS ARE NOMINAL.
  2. EDGES SHALL BE CUT TO A NEAT VERTICAL FACE.
  3. PLACE CLSM BACKFILL IN ACCORDANCE WITH SECTION 604.
  4. PLACE AGENCY-APPROVED ASPHALT CONCRETE IN MAXIMUM 2" LIFTS.



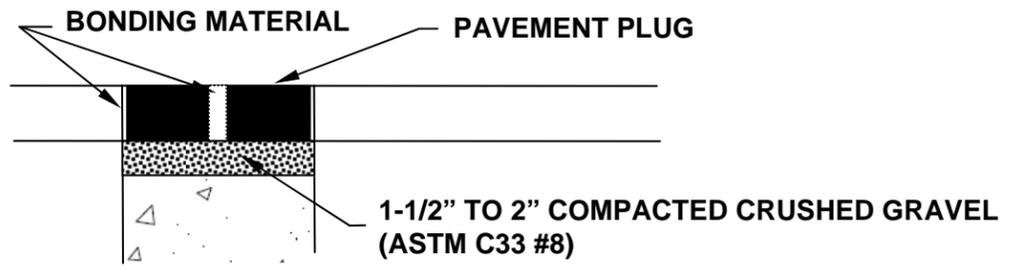
**SECTION A-A**

**TYPE B – PAVEMENT REPAIR**

- NOTES:**
1. CUT, REMOVE AND REPLACE PAVEMENT PLUG IN ACCORDANCE WITH SECTION 355.
  2. PLACE BACKFILL IN ACCORDANCE WITH SECTION 355.
  3. BONDING MATERIAL SHALL BE AS SPECIFIED IN SECTION 708.



**PLAN VIEW**



**SECTION A-A**

## **SECTION 355 KEYHOLE POTHoles**

### **355.1 DESCRIPTION:**

This specification covers the requirements for keyhole coring, vacuum excavation, backfilling, and reinstatement of the keyhole core in asphalt concrete pavements to allow for underground utility repairs.

### **355.2 KEYHOLE EXCAVATION**

Keyhole excavation shall be the operation of coring a circular hole through the roadway pavement using diamond drilling/coring equipment to remove the asphalt concrete courses of flexible pavement. The vertical alignment of the keyhole-coring saw shall be perpendicular to the horizon and the cutting shall be extended to the full depth of the existing pavement section.

Unless otherwise approved by the Engineer, keyhole cores shall not be greater than 24 inches in diameter, shall not be closer than 3 feet from each other (edge to edge), shall not contain a joint or any pavement cracks greater than 1/8-inch wide, and shall not be performed in pavements where the asphalt concrete section is less than 4 inches thick.

Cuts shall be performed with an approved keyhole-coring saw.

Contractor shall place a temporary mark (paint or chalk) on the keyhole core prior to cutting to insure that the keyhole core is replaced in the same orientation as originally found in the pavement.

Pavement cores shall be either removed from the work site or stored in a safe and secure on-site location. The cores shall be made readily available for restoring the keyhole.

Soils within potholes shall be removed by air/vacuum extraction methods to expose utilities. The zone of soil removal shall remain essentially within a vertical plane extending below the edges of the core hole.

The Contractor shall remove all materials excavated by keyhole excavation off site at their expense.

### **355.3 BACKFILL AND COMPACTION**

**355.3.1 Backfill Using Mechanical Compaction:** Agency-approved backfill below repair shall be **ABC per Section 702 or native soil per Sections 601.4.3**, placed in maximum 10-inch loose lifts.

Backfill compaction quality shall be determined by use of a compression wave amplitude monitoring device manufactured specifically for the purpose of measuring soil compaction. This device shall measure the compression wave amplitude as compaction progresses using below-

grade disposable piezoelectric transducer wave sensors and an above-grade electronic monitor. The device shall signal the operator of successful compaction when the compaction wave amplitude becomes asymptotic to continued compaction effort for each lift.

Backfill soil shall be compacted to within 3 percent of optimum moisture content. Moisture content shall be determined in accordance with AASHTO T-217.

Place a disposable compaction sensor at the bottom of the first loose lift. A new sensor shall be placed for every 48 inches of compacted fill depth. Remove backfill soil and sensor if the disposable sensor fails during compaction and repeat repairs with a new sensor.

**Pneumatic compaction equipment (pneumatic rammers or equivalent) shall be used for compaction of the backfill material. The size of the compactor shall not exceed half the diameter of the cored keyhole.**

Mechanical compaction on each lift shall be continued until the electronic monitor signals that compaction is complete. A new lift shall not be placed until a positive signal has been received. Remove backfill soil and sensor if the monitor does not give a positive compaction signal after repeated compaction work.

**355.3.2 Slurry Backfill:** If mechanical compaction is not successful, the Contractor shall use ½-sack CLSM in accordance with MAG Section 728.

**355.3.3 Leveling Course:** A 1-1/2-inch to 2-inch thick leveling course of compacted crushed gravel meeting the requirements of ASTM C33, No. 8 coarse aggregate shall be placed above the backfill and directly below the asphalt concrete pavement section.

#### **355.4 PAVEMENT RESTORATION**

The surface cut by keyhole coring shall be restored to its original condition with the reinstated core flush with and in the original orientation as the existing surface, matching existing asphalt concrete surface appearance.

Bonding agent meeting the requirements of MAG 708 shall be used for keyhole core reinstatement. Excess bonding material shall be removed from the restored surface. A "patched" appearance shall be avoided in surface restoration wherever possible.

Unless otherwise approved, the contractor shall reinstate the bonded keyhole core within 24 hours of cutting the pavement. Keyhole openings allowed to be left open greater than 24 hours of cutting shall be covered with an approved steel road plate capable of supporting traffic loads. The steel plate must be rounded with a fitted collar that, when inserted into the keyhole, will prevent the hole cover from tipping, tilting, bouncing or spinning out of the hole under traffic conditions. An asphalt mix shall be used to ramp pavement up to the steel plate along all edges.

### **355.5 SURFACE TOLERANCES**

The reinstated core shall be flush and level with the adjacent pavement. Gaps attributable to the positioning of the core shall be less than 1/16-inch between the bottom of a minimum 3-foot long straightedge and the surface of the pavement in any direction on the surface of the keyhole core, except across the crown or drainage gutters.

### **355.6 DEFICIENCIES**

Where the keyhole core is found to be fractured or defective upon removal, or becomes damaged after removal and prior to reinstating the keyhole cuts, the defective or damaged core shall not be used to reinstate the pavement. Pavement at damaged keyhole core locations shall be cut and patch repaired in accordance with MAG Detail 211, Type A.

A keyhole core is considered unacceptable when one of the following conditions exist:

- a) The keyhole core contains any vertical cracks wider than 1/8-inch extending full depth or partial depth through the core; or
- b) Any deteriorated piece of the keyhole core is larger than 10 percent of the overall area of the keyhole core.
- c) Two or more successive layers of asphalt concrete in the keyhole core become horizontally delaminated and cannot be rebounded to each other with the bonding compound.

All keyhole cores that are damaged or do not meet the surface tolerances shall be removed from the job site at the Contractor's expense. All repair work shall be at the Contractor's expense.

### **355.7 MEASUREMENT**

Measurement will be made for each reinstated keyhole core up to 24 inches in diameter.

### **355.8 PAYMENT**

Payment at the contract price for the above item shall be full compensation for all labor, equipment and material required to do the work including traffic control, coring, sawcutting, vacuum excavation, backfill material, bonding material and asphalt concrete.

**SECTION 708  
KEYHOLE BONDING MATERIALS**

**708.1 GENERAL:**

This specification covers the materials required to bond undamaged keyhole cores to the asphalt concrete pavement from which it was originally removed as shown in MAG Detail 211, Type B.

**708.2 MATERIALS:**

Bonding material shall be a single component cementitious, rapid hardening, high strength, waterproof bonding agent conforming to the physical properties shown in Table 708-1.

<b>Table 708-1</b>		
<b>Bond Material Properties</b>		
<b>Property</b>	<b>ASTM Test Method</b>	<b>Requirements</b>
Bond Strength, psi	C882	20 min.
Compressive Strength, psi, (70 degrees F., 30 minute cure)	C109	200 min.

Bonding material shall be impervious to water penetration at the joint after application. The bonding material is required to securely bond the undamaged keyhole core to the pavement or sidewalk and to fill the annular space at the joint.

**708.3 FIELD TESTING OF BONDING MATERIAL**

Bonding material shall, within 30 minutes at minimum ambient temperature of 70 degrees F., allow the core to support an equivalent traffic load condition of at least three (3) times the AASHTO H-25 standard.

**708.4 TEST REPORT AND CERTIFICATION**

Specifications for the bonding material shall be submitted to the Agency for review and approval before use.



**SECTION 336**

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**PAVEMENT MATCHING AND SURFACING REPLACEMENT**

**336.1 DESCRIPTION:**

Street and alley pavement and surfacing within the Contracting Agency's rights-of-way, removed by construction activities or to be widened or matched in connection with the improvement of Public Works, shall be placed as shown on the plans and applicable standard details, in accordance with this specification and/or the special provisions.

Asphalt concrete roadway pavement replacement shall be constructed in accordance with Type A, B, ~~D or E~~ or T-Top of ~~standard details~~ Standard Detail 200 and, as indicated in the Contracting Agency Special Provisions or on the plans, ~~and as required by Sections 321 and 710.~~

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Portland cement concrete pavement replacement shall be in accordance with Type C of the Standard Details, ~~200~~ and as required by Sections ~~324-505 and 725.~~

~~ABC or decomposed granite~~ All other surface replacement in the right-of-way but not in paved roadways shall be constructed in accordance with Type ~~F-D~~ of ~~standard details~~ Standard Detail 200 and as indicated in the Contracting Agency Special Provisions or on the plans ~~and in Section 702.~~

Temporary pavement replacement shall be constructed as required ~~below~~ herein.

Pavements to be matched by construction of new pavements adjacent to or at the ends of a project shall be saw cut in accordance with these specifications and where shown on the plans.

Pavement and surfacing replacement within ADOT rights-of-way shall be constructed in accordance with their permits and/or specification requirements.

**336.2 MATERIALS AND CONSTRUCTION METHODS:**

Materials and construction methods used in the replacement of pavement and surfacing shall conform to the requirements of all applicable standard details and specifications, latest revisions.

**336.2.1 Pavement Widening or Extensions:** Existing pavements which are to be matched by pavement widening or pavement extension shall be trimmed to a neat true line with straight vertical edges free from irregularities with a saw specifically designed for this purpose. The minimum depth of cut shall be 1 ½ inches or D/4, whichever is greater.

The existing pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall be painted with a light coating of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt concrete pavements. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the widening or pavement extension.

The exact point of matching, termination, and overlay may be adjusted in the field, if necessary, by the Engineer or designated representative.

**336.2.2 Pavement to be Removed:** Existing asphalt pavement to be removed for trenches or for other underground construction or repairs shall be cut by a device capable of making a neat, straight and smooth cut without damaging

adjacent pavement that is not to be removed. The Engineer's decision as to the acceptability of the cutting device and manner of operation shall be final. If saw cutting, only, is to be utilized, it will be so specified in the plans or special provisions.

In lieu of cutting trenches across driveways, curbs and gutters, sidewalks, alley entrances, and other types of pavements, the Contractor may, when approved by the Engineer, elect to tunnel or bore under such structures and pavements.

When installations are within the street pavement and essentially parallel to the center line of the street, the Contractor, with approval of the Engineer, may elect to bore or tunnel all or a portion of the installation. In such installations, the seal coat requirements, as discussed in Section 336.2.4, will be modified as follows:

(A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat may not be required.

(B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.

**336.2.3 Temporary Pavement Replacement:** Temporary pavement replacement, as required in Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with Section 710. Permanent pavement replacement shall replace temporary repairs within 5 working days after completion of temporary work.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Engineer, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Engineer. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

(A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.

(B) On small areas or where equipment specified above is not available or is impractical, the Engineer will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished off flush with the adjacent pavement.

#### **336.2.4 Permanent Pavement Replacement and Adjustments:**

**336.2.4.1 Permanent Pavement Replacement:** Pavement replacement for longitudinal trenches (essentially parallel to traffic) greater than 50 feet in length and transverse cuts of any length shall be at least a two-course pavement replacement. Pavement replacement for longitudinal trenches less than 50 feet in length, bell holes and similar small areas may be a single course provided the layer thickness complies with the requirements of Section 321.5.4. All pavement replacement shall match gradation and thickness of the existing pavement. Pavement replacement shall be compacted to the same density specified for asphalt concrete pavements in Section 321.

Unless otherwise noted, pavement replacement shall comply with the following:

(A) Single course pavement replacement shall consist of a 1/2" or 3/4" mix in accordance with Section 710.

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(B) The base course(s) of a multi-course pavement replacement shall consist of a 3/4" mix in accordance with Section 710.

(C) The surface course of a multi-course pavement replacement shall consist of a 3/8" or 1/2" mix in accordance with Section 710 to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be a single course as specified above.

(D) Where the base course is to be placed with non-compactive equipment, it shall be not less than 2 inches in thickness and the material shall be immediately rolled with a pneumatic-tired roller. The surface course shall be of sufficient depth to provide the total required compaction thickness of the two courses, but not more than 1 inch.

(E) Where the trench is 6 feet or more in width, all courses shall be placed with self-propelled spreading and compacting equipment. When the trench is from 6 to 8 feet in width, self-propelled spreading and compacting equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1 1/2 inches.

(F) Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Engineer and flush with the existing pavement.

The pavement replacement surface shall not vary more than 1/4 inch from the lower edge of a straightedge placed across the replacement pavement surface between edges of the existing matched surfaces. When the pavement replacement includes replacement of the roadway crown, the surface smoothness shall comply with requirements of Section 321.

Laying a single course or the base course(s) of the asphalt concrete pavement replacement shall never be more than 600 feet behind the ABC placement for the pavement replacement.

The trench must be compacted to its required density, and required ABC must be in place and compacted prior to the placement of the asphalt concrete.

~~Pavement replacement for cuts essentially parallel to the street centerline and greater than 50 feet in length shall be two course pavement replacement as hereinafter specified. For cuts greater than 600 feet in length the entire area shall then be slurry seal coated in accordance with Section 330-332 (coated chips) or as otherwise specified. This seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb or where the pavement patch straddles the centerline, the entire width of street shall be seal coated.~~

In lieu of placing the seal coat as required previously, and with approval of the Contracting Agency, the Contractor may deposit with the Contracting Agency for credit to the Street Maintenance Department, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.

~~Pavement replacement for cuts parallel to the street centerline less than 50 feet in length, transverse cuts, bell holes and similar small areas shall match gradation and thickness of the existing pavement. These one course pavement patches shall be compacted with a vibratory roller to the same density specified for asphalt concrete pavements.~~

~~Laying of single course or the base course of the asphalt concrete pavement replacement where a two course replacement is applicable shall never be more than 600 feet behind the ABC placed for the pavement replacement.~~

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~~The trench must be compacted to its required density, and required ABC must be in place prior to the placement of the asphalt concrete.~~

~~Single course replacement shall consist of a 1/2 inch or 3/4 inch mix placed and finished as directed by the Engineer.~~

~~The base course of two course pavement replacement shall consist of a 3/4 inch mix in accordance with Section 710.~~

~~Where the base course is to be placed with non compactive equipment, it shall be not less than 2 inches in thickness and the material shall be immediately rolled with a pneumatic tired roller. The surface course shall be of sufficient depth to provide the total required compacted thickness of the two courses, but not more than 1 inch.~~

~~Where the trench is 6 feet or more in width, all courses, single or both courses of the two course pavement replacement, shall be laid with a self-propelled compacting, spreading equipment. When the trench is from 6 to 8 feet in width, the self-propelled compacting, spreading equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1 1/2 inches.~~

~~The surface course shall consist of a 3/8 inch mix in accordance with Section 710 as specified by the Engineer to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be single course as specified above.~~

~~Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Engineer, and flush with the existing pavement.~~

~~Where deep lift asphalt concrete (asphalt concrete base and asphalt concrete wearing course) exists, the base course replacement shall be made in lifts not exceeding 6 inches in compacted thickness to within 1/2 inch of the finish grade.~~

**336.2.4.2 Adjustments:** When new or existing manholes, valves, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface or as directed by the Engineer. This will include but not be limited to slurry and chip seals.

The Contractor will coordinate with the Engineer and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, details, etc. of the Utility Company regarding the adjustments. When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these Specifications and Details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry. The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Engineer and/or the Utility Representative.

### **336.3 TYPES AND LOCATIONS OF PAVEMENT AND SURFACING REPLACEMENT:**

Normally, the type of pavement replacement and backfill required will be noted on the plans or specified in other portions of the contract documents and construction will be in accordance with Detail 200-1 and 200-2. ~~This detail requires that a 12 inches "T" Top be utilized when normal traffic flow is perpendicular to any one of the four sides of the trench excavation. Therefore, Type A pavement replacement will require a "T" Top whenever the trench crosses a street or goes through an intersection and at the end(s) if they terminate in the street. Type B pavement replacement will require the "T" Top on the sides that are perpendicular to normal traffic flow.~~

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If a type is not noted on the plans or specified in the special provisions, the following criteria will govern:

Type A ~~pavement replacement, including the "T" Top trench repair~~ will be utilized on all streets where the excavation is ~~parallel to the centerline of the street essentially longitudinal or parallel to traffic.~~

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~~Type B pavement replacement, including the "T" T-Top trench repair~~ will be utilized on all streets where the excavation is ~~essentially transverse to the centerline of the street or not parallel to traffic, including trenches that go through an intersection.~~ Type B trench repair may be used to repair transverse trenches if specified by the Agency.

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Type C ~~pavement replacement trench repair~~ will be used to match existing portland cement concrete pavement.

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Type D ~~pavement replacement may trench repair~~ will be utilized to repair ~~asphalt concrete, portland cement and concrete aggregate surfaces in the right-of-way, but not in paved roadways. It may also be used when the condition of the existing pavement does not justify construction of Type A, or Type B or T-Top trench repair.~~ Prior written approval of the Engineer is required ~~for this condition.~~

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~~Type F pavement replacement will be utilized to match existing ABC or decomposed granite roadways.~~

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Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the outside edge of the existing pavement, on a straight line, as indicated on the plans. Measurements for payment shall be from the inner limit of pay width allowed below, to the outside edge of the existing pavement as defined herein.

Where no part of a trench is in pavement, surfacing replacement will only be specified where existing surfacing materials have been removed.

When a trench cut is in aggregate surfaced area, the surfacing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601.

### 336.4 MEASUREMENT:

Measurement for payment and surfacing replacement shall be by the square yard, based upon actual field measurement of the area covered except as noted below.

(A) In computing pay quantities for replacement Types ~~A, B, and FE,~~ pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than ½ the distance, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

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(B) In computing pay quantities for replacement Types ~~T-Top, A, C, and D, E, and F,~~ pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than ½ the distance plus 12 inches, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.

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(C) Where a longitudinal trench is partly in pavement, computations of pay quantities shall be based on the limitations specified above.

(D) The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the above pay widths shall be considered and included in the bid item for such structure.

(E) Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.

(F) When special provisions allow deviations from the trench widths specified in Section 601, the above allowed pay widths for pavement replacement may be altered where so specified.

(G) Measurement of pavement and surfacing replacement shall be made along the finished surface of the ground to the nearest foot, and shall be computed to the nearest square yard.

**336.5 PAYMENT:**

Direct payment for pavement or surfacing replacement will be made for replacement over all pipe trench cuts except as otherwise allowed in the special provisions. Payment for replacements over other work shall be included in the cost of constructing that work, in accordance with the applicable standard details and specifications.

Payment for temporary pavement replacement shall be included in the cost of the pipe.

When a Contractor has the option of either jacking and/or boring or open cut construction, and elects to construct a pipeline by the jacking and/or boring method, he will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for open cut construction.



**MARICOPA COUNTY**  
*Department of Transportation*

MEMORANDUM

**Date:** March 3, 2010

**To:** MAG Specifications and Details Committee

**From:** Robert Herz, MCDOT Representative

**Subject:** Obsolete quotations of Arizona Revised Statutes in Section **Case 10-04**  
109.8 PAYMENT FOR DELAY

**PURPOSE:** Remove quotations of Arizona Revised Statutes from text located in Section 109.8 PAYMENT FOR DELAY.

**REVISION:** Revise wording in section 109.8 as indicated below:

**109.8 PAYMENT FOR DELAY:**

The procedures contained in this Section shall not be construed to void any provision of the contract which require notice of delays, provides for negotiation of other procedures for settlement or provide for liquidated damages.

**109.8.1 Failure to Locate or Incorrect Location of Utilities:** Arizona Revised Statutes 40-360.28 ~~states "indicates~~ that if ~~a person~~~~the~~ (owner, ~~or~~ operator, ~~or agent~~) fails to locate or incorrectly ~~marks the location of~~~~locates~~ the underground facility ~~in a timely manner, pursuant to this article~~, the ~~person~~ (owner, ~~or~~ operator, ~~or agent~~) becomes liable for resulting damages, costs and expense to the injured party." The Contracting Agency will deny any claims for damages or delays if another owner or operator is at fault.

**109.8.2 Contracting Agency Delays:** Arizona Revised Statutes 34-221 states "A contract for the procurement of construction shall include a provision which provides for negotiations between the Agent and the Contractor for the recovery of damages related to expenses incurred by the Contractor for a delay for which the Agent is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties to the contract." In this case, if the Contractor sustains damages which could not have been avoided by the judicious handling of forces, equipment and plant or by reasonable revision in the Contractor's schedule of operation, the compensation for such damages will be negotiated. The Contractor shall notify the Engineer of the condition in writing by the next work day. Failure to notify the Engineer within this time may be just cause to reject any claims for such damages.

Arizona Revised Statute:

40-360.28. [Civil penalty; liability](#)

A. Except as provided in section 40-360.22, subsection M, a person who violates any provision of this article is subject to a civil penalty in an amount not to exceed five thousand dollars to be imposed by the court in favor of the state. Any penalties received by the state shall be deposited in the state general fund.

B. If a violation of this article results in damage to an underground facility, the violator is liable to all affected underground facilities operators and excavators for all resulting damages proximately caused by the violations, including economic loss.

**C. If a person violates this article by failing to provide timely notice as required by this article, by failing to respond in the time and manner provided by this article or by failing to locate and mark an underground facility in the manner provided by this article, the person is liable to all affected underground facilities operators and excavators for all damages proximately caused by the violation, including economic loss.**

D. Notwithstanding any other law, a violation of section 40-360.22, subsection D or subsection I, paragraph 3 is a superseding event that breaks the chain of causation for any damages that could result from an underground facilities operator's failure to accurately locate or mark an underground facility.

E. If a landlord or an excavator complies with the duties set forth in sections 40-360.22, 40-360.30 and 40-360.32 for all facilities operated by a landlord as provided in section 40-360.22, subsection P, paragraph 1, the person is not liable for any death or injury to persons or property or for any economic loss to any person to the extent the conduct is regulated by this article. This section does not excuse any landlord or excavator from liability for any death or injury to persons or property or for any economic loss to any person to the extent the injury or loss does not arise from the conduct regulated by this article.

F. This section is not applicable to an excavation made:

1. During an emergency which involves danger to life, health or property if reasonable precautions are taken to protect underground facilities.
2. In agricultural operations or for the purpose of finding or extracting natural resources.
3. With hand tools on property owned or occupied by the person performing the excavation while gardening or tilling such property.

## § 40-360.28. Civil penalty; liability

A. Except as provided in § 40-360.22, subsection M, a person who violates any provision of this article is subject to a civil penalty in an amount not to exceed five thousand dollars to be imposed by the court in favor of the state. Any penalties received by the state shall be deposited in the state general fund.

B. If a violation of this article results in damage to an underground facility, the violator is liable to all affected underground facilities operators and excavators for all resulting damages proximately caused by the violations, including economic loss.

C. If a person violates this article by failing to provide timely notice as required by this article, by failing to respond in the time and manner provided by this article or by failing to locate and mark an underground facility in the manner provided by this article, the person is liable to all affected underground facilities operators and excavators for all damages proximately caused by the violation, including economic loss.

D. Notwithstanding any other law, a violation of § 40-360.22, subsection D or subsection L, paragraph 3 is a superseding event that breaks the chain of causation for any damages that could result from an underground facilities operator's failure to accurately locate or mark an underground facility.

E. If a landlord or an excavator complies with the duties set forth in §§ 40-360.22, 40-360.30 and 40-360.32 for all facilities operated by a landlord as provided in § 40-360.22, subsection P, paragraph 1, the person is not liable for any death or injury to persons or property or for any economic loss to any person to the extent the conduct is regulated by this article. This section does not excuse any landlord or excavator from liability for any death or injury to persons or property or for any economic loss to any person to the extent the injury or loss does not arise from the conduct regulated by this article.

F. This section is not applicable to an excavation made:

1. During an emergency which involves danger to life, health or property if reasonable precautions are taken to protect underground facilities.

2. In agricultural operations or for the purpose of finding or extracting natural resources.

3. With hand tools on property owned or occupied by the person performing the excavation while gardening or tilling such property.

Added by Laws 1981, Ch. 153, § 6. Amended by Laws 1985, Ch. 106, § 2; Laws 1999, Ch. 169, § 1; Laws 2005, Ch. 222, § 6; Laws 2006, Ch. 258, § 11, eff. Jan. 1, 2007.

## Historical and Statutory Notes

The 2005 amendment by Ch. 222 rewrote the section, which had read:

"A. A person who violates any provision of this article is subject to a civil penalty in an amount not to exceed five thousand dollars to be imposed by the court in favor of the state. Any penalties received by the state shall be deposited in the general fund.

"B. If a violation of this article results in physical contact with an underground facility, the violator is liable to the owner of the facility for all damages to the facilities and costs, expenses and damages to third parties incurred by the owner of the facility as a result of the contact.

"C. If the owner or operator fails to locate or incorrectly locates the underground facility, pursuant to this article, the owner or operator becomes liable for resulting damages, costs and expenses to the injured party.

"D. This section is not applicable to an excavation made:

"1. During an emergency which involves danger to life, health or property if reasonable precautions are taken to protect underground facilities.

"2. In agricultural operations or for the purpose of finding or extracting natural resources.

"3. With hand tools on property owned or occupied by the person performing the excavation while gardening or tilling such property."

The 2006 amendment by Ch. 258 rewrote the section, which had read:

"A. Except as provided in § 40-360.22, subsection J, a person who violates any provision of this article is subject to a civil penalty in an amount not to exceed five thousand dollars to be imposed by the court in favor of the state. Any penalties received by the state shall be deposited in the state general fund.

"B. If a violation of this article results in damage to an underground facility, the violator is liable to the owner of the facility for all damages to the facilities and all costs and expenses, including dam-



## FOREWORD

Publication of these Uniform Standard Specifications and Details for Public Works Construction [Within Public Rights of Way](#) fulfills the goal of a group of agencies who joined forces in 1966 to produce such a set of documents. Subsequently, in the interest of promoting county-wide acceptance and use of these standards and details, the Maricopa Association of Governments accepted their sponsorship and the responsibility of keeping them current and viable.

These specifications and details, representing the best professional thinking of representatives of several Public Works Departments, reviewed and refined by members of the construction industry, were written to fulfill the need for uniform rules governing public works construction performed for Maricopa County and the various cities and public agencies in the county. It further fulfills the need for adequate standards by the smaller communities and agencies [within Maricopa County](#) who could not afford to promulgate such standards for themselves. [Agencies in other regions or climes within the state of Arizona wishing to apply these specifications may need to make adjustments for local conditions.](#)

[These uniform specifications and details are intended to aid the private construction industry in providing modern materials and construction techniques, eliminate conflicts and confusion, lower construction costs and encourage more competitive bidding by private contractors for the benefit of public works construction in the right-of-way. Use of these standards for projects outside of the right-of-way should be reviewed by professional engineers and architects and applied with care to insure relevance to the planned work.](#)

[Specifications and details contained herein should be incorporated into project plans and specifications after careful review by the design engineer or architect of specific project needs. Not all specifications will apply to all projects as these standards are developed to meet a variety of public works needs. Prepared plans and specifications should clearly call out specific uniform specifications and details required for the project.](#)

[Uniform specifications and details are not a substitute for good engineering judgment. Unique conditions will arise that are outside the scope of these standards. When this happens, professional engineers and architects are required to use their judgment to amend these standards to best meet site-specific project needs in accordance with rules set forth by the State of Arizona and policy statements made by the Arizona State Board of Technical Registration.](#)

The Uniform Standard Specifications and Details for Public Works Construction will be revised periodically and reprinted to reflect advanced thinking and the changing technology of the construction industry. To this end a Specifications and Details Committee has been established as a permanent organization to continually study and recommend changes to the Specifications and Details. Interested parties may address suggested changes and questions to:

Standard Specifications & Details Committee  
c/o Maricopa Association of Governments  
302 North First Avenue, Suite 300  
Phoenix, Arizona, 85003.

These suggestions will be reviewed by the committee and appropriate segments of the industry and cumulative annual revisions will be published the first of each year. A copy of this publication is available for review on the internet at the website listed below.

Please follow the links to the publications page and look for *Uniform Standard Specifications for Public Works Construction and/or Uniform Standard Details for Public Works Construction Within Public Rights of Way*:

[www.mag.maricopa.gov](http://www.mag.maricopa.gov)

While in the interest of **regional** uniformity, it is hoped that all using agencies will adopt these standards with as few changes as possible, it is recognized that because of charter requirements and for other reasons, some agencies will find it necessary to modify or supplement certain requirements. **In the interest of reducing a proliferation of agency specific modifications it is strongly recommended that the agency representatives to MAG bring their modifications for consideration by the committee for inclusion into these standards.**

## Forward

### Public Works Construction ~~Not in~~ Outside the Right of Way

This document has been prepared as a supplement to the Uniform Standard Specifications for Public Works Construction as adopted by the Maricopa Association of Governments (MAG) and is to be used for onsite development that is not associated with public right of way construction. ~~While~~ ~~†The standards within this supplement~~ ~~hese standards~~ are intended to apply to all agency public works development projects within Maricopa County, ~~they are intended to be utilized in applicable agency developments~~ such as libraries, equipment yards, service centers, recreational facilities or other public agency building sites. They may also serve as a guide for non-agency private development should the design professional find they are useful.

~~We~~ With this supplement, the MAG Specifications and Details Committee attempts to achieve maximum uniformity of planning, engineering, and construction practices for agency work outside the public right of way ~~and as applicable as outlined above~~. These are minimum standards and are intended to assist, but not to substitute for competent work by engineering and design professionals. Special conditions or environmental constraints may require a more stringent design than would normally be required under ~~these Standards~~ this supplement. It is not the intent to ~~unreasonably~~ limit any innovative effort which could result in a superior project design or meet specific design objectives. A proposed design which ~~is different than~~ varies from these ~~Development Guidelines~~ standards will be evaluated on the basis that the proposed design will produce a comparable or superior result, ~~and that is~~ in every way adequate for the user, and the public.

SECTION 604 – Revision 3-29-10

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

**1/2 SACK:** ~~One half sack CLSM can be used as a g~~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.

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**1 SACK:** ~~One sack CLSM can be used as a g~~General trench backfill and backfill behind retaining walls where additional strength is required above that of 1/2 sack CLSM.

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**1-1/2 SACK:** ~~One and one half sack CLSM can be used as a s~~Structural backfill under foundations and as thermal fill and/or mechanical protection of duct banks and conduits.

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

604.2 MATERIALS:

~~Controlled low strength material CLSM~~ shall conform to the requirements of Section 728. Ready-mixed concrete not meeting the requirements of table 728-1 shall not be used in lieu of 1/2 sack or 1 sack CLSM.

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.

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## SECTION 604 – Revision 3-29-10

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 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. ~~Further testing may be required prior to placing the material in a freeze-thaw condition.~~

### 604.4 ~~PROTECTION:~~ PERFORMANCE TESTING:

~~When~~ CLSM ~~is~~ 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.

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## SECTION 604 – Revision 3-29-10

~~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). the material shall achieve a penetration resistance of 3 inches (indentation diameter) or less with 5 drops at a drop distance of 5 inches prior to covering and opening to traffic or the installation of the surface be delayed for 12 hours, whichever occurs first. Penetration resistance shall be as measured by ASTM Test Method D-6024, "Standard Test Method for Ball Drop on Controlled Low Strength Material to Determine Suitability for Load Application."~~

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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.

~~Where the Engineer has identified soils as being moisture sensitive, a drainage notch or drain wick shall be placed longitudinally along the centerline of the trench or CLSM placement. The notch or wick shall be constructed within the first hour following placement. Drainage water shall be collected and removed at the end of notch or wick.~~

### 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

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(B) The aggregate gradation is outside the limits specified in Section 701.3.5.

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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 ~~bid~~ for the specific work function (laying pipe, placing structure foundation, construction retaining wall, etc.).

## SECTION 701 - Revision 3-29-10

**701.3.2 Sand for Mortar and Plaster:** It shall be thoroughly and uniformly washed and shall be entirely free from oil and deleterious substances.

The average value of sand equivalent determined on 3 successive samples shall not be less than 70. No individual sample shall have a sand equivalent less than 65.

The size and grading of sand to be used in mortar, and plaster shall be such as to conform with the requirements specified as follows:

Mortar:                 ASTM C-144

Plaster:                 ASTM C-35

**701.3.3 Aggregate for Portland Cement Concrete:** Coarse and fine aggregate shall conform to the applicable requirements of ASTM C-33.

Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate Table. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section.

The average value of 3 successive sand equivalent samples shall not be less than 70 when tested in accordance with AASHTO T-176. No individual sample shall have a sand equivalent less than 65.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

**701.3.4 Aggregate for Masonry Grout:** The size and grading of the fine or coarse aggregate to be used in masonry grout shall conform to ASTM C-404.

**701.3.5 Aggregate for Controlled Low Strength Material:** Coarse and fine aggregate shall conform to the applicable requirements of ASTM C-33.

Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate Table. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section. aggregate shall conform to ASTM C-33 grading size No. 57. The size and gradation of fine aggregates (sand) shall conform to ASTM C-33.

### 701.4 QUARRY STONE:

**701.4.1 General:** Quarry stone shall be angular, sound, durable, hard, resistant to abrasion; free from laminations, weak cleavages, and undesirable weathering, leaching, exfoliation tendencies, and slaking; and of such character that it will not disintegrate

**SECTION 728 - Revision 3-29-10**

**CONTROLLED LOW STRENGTH MATERIAL**

**728.1 GENERAL:**

Controlled Low Strength Material (CLSM) is a mixture of portland cementitious materials, aggregates, admixtures/additives, and water that, as the cementitious materials hydrates, forms a soil replacement. CLSM is a self-compacting, flowable, cementitious based material that is primarily used as a backfill or structural fill 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:**

Portland 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. 45.

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

Proportioning of the mixture shall comply with Section 701.3.5, Section 725. 67 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>TABLE 728-1</b>			
<b>CONTROLLED LOW STRENGTH MATERIAL REQUIREMENTS</b>			
<b>Description of CLSM</b>	<b>Portland Cement Content, Sacks/cu yd</b>	<b>Flow, Slump, inches</b>	<b>Compressive Strength at 28 days, psi</b>
<u>1/2 Sack CLSM</u>	<u>1/2 Sack 47±5%</u>	<u>79±24</u>	<u>150 maximum70±30</u>
<u>1 Sack CLSM</u>	<u>1 Sack 94±5%</u>	<u>79±24</u>	<u>500 maximum450±50</u>
<u>1 1/2 Sack CLSM</u>	<u>1 1/2 Sack 141±5%</u>	<u>79±24</u>	<u>400 minimum425±75</u>

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**Notes for Table 728-1:**

1. CLSM mixes meeting the table requirements for Portland Cement Content generally will not 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

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## SECTION 728 - Revision 3-29-10

Cement Content may be used.

- ~~1. The values specified in the table are for both mix design requirements and field production. The deviations are for production, testing and sampling tolerances.~~
- ~~2. Slump shall be tested in accordance with ASTM C-143. Flow consistency test can be substituted for the slump test. When used, the CLSM shall have a flow consistency of 8 inches as tested in accordance with ASTM D-6103.~~
- ~~3. Compressive strength shall be tested in accordance with ASTM D-4832. The supplier shall provide laboratory and/or field test data to verify the design strength.~~
- ~~4. Sampling shall be in accordance with ASTM D-4832.~~
- ~~5. Unit weight shall be obtained by ASTM D-6023.~~
- ~~6. Temperature shall be taken in accordance with ASTM C-1064.~~
- ~~7. Cement content shall be tested in accordance with ASTM D-5982.~~

~~Where CLSM is to be used as backfill around gas pipelines (totally encapsulating the gas pipeline), the material shall meet a minimum permeability coefficient (k) of  $1 \times 10^{-5}$  cm/sec or more, based on ASTM D-5048.~~

### **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. The total elapsed time between the addition of the water and placement of the complete mix shall not exceed 90 minutes. The Engineer may waive this limitation if the slump is such that the material can be placed without addition of water.~~

~~Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Mixes shall be homogenous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability and other required properties appropriate for the intended usage. When the CLSM is mixed other than at the project site, the mixing shall comply with Section 725.8. When the CLSM is mixed at the job site, the Contractor will submit for the Engineer's approval, the methods, equipment and procedures for proportioning and mixing of the material.~~

## 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 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 not meeting the requirements of table 728-1 shall not be used in lieu of 1/2 sack or 1 sack CLSM.

### 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 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.

## SECTION 604 – Revision 3-29-10

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.

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 701 - Revision 3-29-10

### ROCK, GRAVEL, AND SAND

#### 701.1 GENERAL:

The following specifications set forth the requirements for crushed rock, gravel, sand, and quarry stone. Samplings and sieve analysis shall be performed in accordance with ASTM D-75 and ASTM C-136. Sand equivalents shall be determined in accordance with AASHTO T-176. The liquid limit and plasticity index shall be determined in accordance with AASHTO T-89 and T-90.

#### 701.2 CRUSHED ROCK AND GRAVEL:

Rock and gravel shall be clean, hard, sound, durable, uniform in quality, and free of any detrimental quantity of soft, friable, thin elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

**701.2.1 Crushed Rock:** Crushed rock shall consist of the product obtained by crushing rock, stone, or gravel so that at least 50 percent by weight of aggregate retained on the No. 4 sieve for 3/4 inch or larger maximum sizes, and 50 percent retained on the No. 8 sieve for maximum sizes less than 3/4 inch shall consist of particles which have at least one rough, angular surface produced by crushing. All material that will pass a grizzly with bars spaced 15 inches apart, clear opening, shall be crushed when producing from the Contracting Agency's source.

The gradation of crushed rock shall comply with ASTM D-448.

**701.2.2 Gravel:** Material designated herein as gravel shall be composed entirely of particles that are either fully or partially rounded and water-worn. Crushed rock obtained by crushing rock which exceeds ASTM D-448 maximum gradation sizes may be combined provided it is uniformly distributed throughout and blended with the gravel. The quality and gradation requirements shall be as stated in this specification.

#### 701.3 AGGREGATE:

Sand shall be fine granular material produced by the crushing of rock or gravel or naturally produced by disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay, and other deleterious substances to be thoroughly suitable for the purpose for which it is intended.

**701.3.1 Sand for Asphalt Concrete Pavement:** Sand for asphalt concrete pavement shall comply with AASHTO M-29 except that grading requirements shall be deleted and have a minimum sand equivalent of not less than 50 and shall be non-plastic when tested in accordance with AASHTO T-89 and T-90.

## **SECTION 701 - Revision 3-29-10**

**701.3.2 Sand for Mortar and Plaster:** It shall be thoroughly and uniformly washed and shall be entirely free from oil and deleterious substances.

The average value of sand equivalent determined on 3 successive samples shall not be less than 70. No individual sample shall have a sand equivalent less than 65.

The size and grading of sand to be used in mortar, and plaster shall be such as to conform with the requirements specified as follows:

Mortar:                 ASTM C-144

Plaster:                 ASTM C-35

**701.3.3 Aggregate for Portland Cement Concrete:** Coarse and fine aggregate shall conform to the applicable requirements of ASTM C-33.

Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate Table. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section.

The average value of 3 successive sand equivalent samples shall not be less than 70 when tested in accordance with AASHTO T-176. No individual sample shall have a sand equivalent less than 65.

The loss by abrasion in the Los Angeles abrasion machine, determined as prescribed in ASTM C-131, Grading A, shall not exceed 10 percent, by weight, after 100 revolutions nor 40 percent after 500 revolutions.

**701.3.4 Aggregate for Masonry Grout:** The size and grading of the fine or coarse aggregate to be used in masonry grout shall conform to ASTM C-404.

**701.3.5 Aggregate for Controlled Low Strength Material:** Coarse and fine aggregate shall conform to the applicable requirements of ASTM C-33.

Coarse aggregate grading requirements shall conform to the appropriate rock size designation in the Grading Requirements for Coarse Aggregate Table. Fine aggregate grading requirements shall conform to the Fine Aggregate Grading section.

### **701.4 QUARRY STONE:**

**701.4.1 General:** Quarry stone shall be angular, sound, durable, hard, resistant to abrasion; free from laminations, weak cleavages, and undesirable weathering, leaching, exfoliation tendencies, and slaking; and of such character that it will not disintegrate from the action of air, water, or the conditions to be met in handling and placing. Stone shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse,

## SECTION 701 - Revision 3-29-10

and adherent coatings. Suitable tests and/or service records will be used to determine the acceptability of the stone. Tests to which the material may be subjected include petrographic analysis, X-ray diffraction, specific gravity, absorption, abrasion, rock drop, soundness, wetting and drying, and such other tests as may be considered necessary to demonstrate to the Engineer that the materials are acceptable for use in the work. In connection therewith, the Contractor shall notify the Engineer in writing at least 60 days prior to use of the intended sources of quarry stone.

**701.4.2 Test Requirements:** Quarry stone shall meet the following requirements except as may be otherwise provided on the plans and in the special provisions:

(A) Apparent specific gravity: 2.65 minimum.

(B) Breakdown:

Rock drop breakdown:	5 percent maximum
Abrasion breakdown at 1000 revolutions:	40 percent maximum
Breakdown after 10 cycles of wetting and drying:	5 percent maximum
Solubility in water, breakdown, or softening:	None

**701.4.3 Test Methods:** Unless otherwise specified in the special provisions or indicated on the plans, test methods for quarry stone shall be as follows:

Apparent specific gravity per ASTM C-127.

(B) Abrasion characteristics to be determined by either Rock Drop Test or Los Angeles Rattler, ASTM C-131, as required on the plans or the special provisions.

(1) Standard Rock Drop Test. Tests shall be made on groups of 5 accurately weighed sizes of rocks: No. 1, ranging from 75 to 100 lbs.; No. 2, 100 to 125 lbs.; No. 3, 125 to 150 lbs.; No. 4, 150 to 175 lbs.; No. 5, 175 to 225 lbs.

Each rock of the 5 sizes shall be dropped 3 times on the group of the other 4, in an enclosure, from successive heights of 10, 15, and 18 feet. The enclosure shall have a flexible medium weight galvanized iron floor or equivalent, set on a solid foundation. Order of dropping shall be Nos. 3, 2, 4, 1, 5. All rock passing a 3 inch square mesh screen after test shall be weighed and recorded as a percentage of the total initial weight of the 5 rocks.

(2) Los Angeles abrasion machine, per ASTM C-131, Grading B.

C) Wetting and drying. The stone shall be crushed, screened, and 1000 or 1500 grams of the 3/4 inch to 3/8 inch fraction taken for the test.

## SECTION 701 - Revision 3-29-10

The crushed and graded stone shall be submerged in water for 18 hours at room temperature, after which the sample shall be drained and oven-dried at 140°F. When dry, the sample shall be cooled to room temperature. This would complete one cycle.

The percent loss shall be determined by screening the tested sample on a No. 4 sieve and shall be computed as follows:

$$\frac{100 \times \text{Weight of Materials Passing No. 4 Sieve}}{\text{Total Weight of Sample}} = \% \text{ Loss}$$

(D) Accelerated water breakdown and solubility test. Air-dry samples of representative stone weighing approximately 1 lb. each shall be immersed for 8 hours at 140°F., in distilled water, local tap water, or 3.5 percent sodium chloride solution.

**SECTION 728 - Revision 3-29-10**

**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 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:

1. CLSM mixes meeting the table requirements for Portland Cement Content generally will not 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 3-29-10**

**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

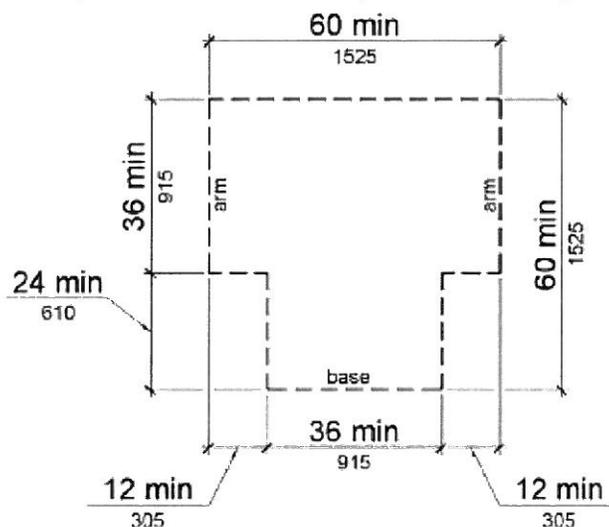
**PURPOSE:** Revise minimum sidewalk width to match the minimum ADA requirements for two (2) wheel chairs to pass and to match minimum ADA requirements for a wheel chair to u-turn.

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

**ADA Accessible Routes Requirement:**

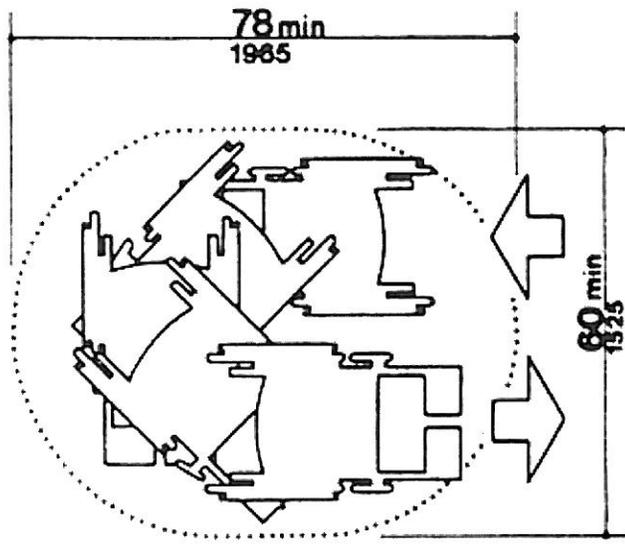
403.5.3 Passing Spaces. An accessible route with a clear width less than 60 inches shall provide passing spaces at intervals of 200 feet maximum. Passing spaces shall be either: a space 60 inches minimum by 60 inches minimum; or, an intersection of two walking surfaces providing a T-shaped space complying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

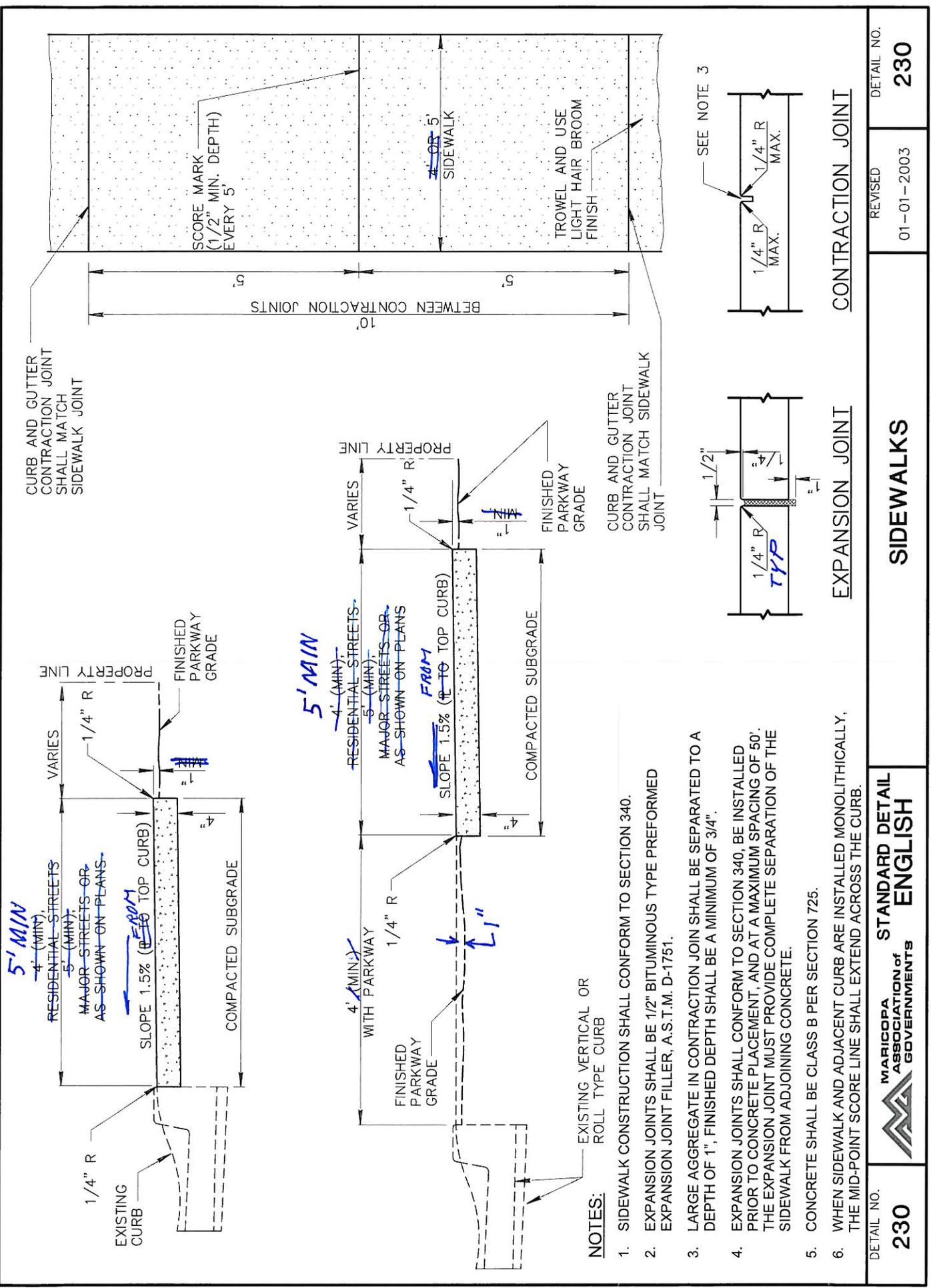


From Code of federal regulations 28 CFR Part 36:

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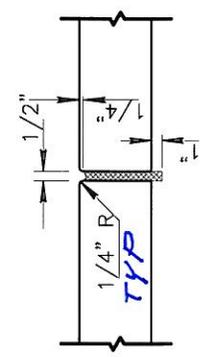
**Fig. A2**  
**Space Needed for Smooth U-Turn in a Wheelchair**



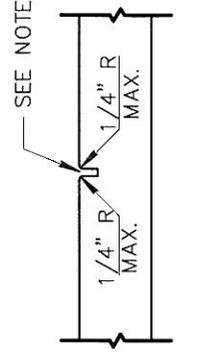
**NOTES:**

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 JOIN SHALL BE SEPARATED TO A DEPTH OF 1", FINISHED 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 SEPARATION 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.

SEE NOTE 3



EXPANSION JOINT



CONTRACTION JOINT

DETAIL NO. **230**

**MARICOPA ASSOCIATION of GOVERNMENTS**  
STANDARD DETAIL  
**ENGLISH**

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 $\mu\text{m}$ )	20 - 100
#50 (300 $\mu\text{m}$ )	0 - 45
#200 (75 $\mu\text{m}$ )	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 –