

Arizona Department of Transportation
2020 Work Zone Safety and Mobility
Process Review Report

2020 Work Zone Safety and Mobility Process Review Report

This Work Zone Safety and Mobility Process Review Report was prepared by the Arizona Department of Transportation (ADOT) and is evidence of Arizona's Conformance with 23 CFR 630.1008(e) Subpart J & K.

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Dallas Hammit
Approved By: _____ Date: 4/14/2021
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2020 Work Zone Safety and Mobility Process Review Report

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Executive Summary

Title 23 of the Code of Federal Regulation (23 CFR) 630.1008 (e) or sometimes referred to as “The Rule” requires ADOT to conduct a biennial Process Review (PR) of work zones, and states that the ultimate objective of a PR is to enhance efforts to address safety and mobility on current and future projects.

The majority of the content in this PR reviews and highlights the improvements to ADOT’s Work Zone Safety and Mobility (WZSM) program due to the accomplishments of the Work Zone Safety and Mobility Committee (WZSMC) within the past two years. The WZSMC acknowledges that while an evaluation like the Capability Maturity Framework (CMF) was not completed, an assessment of what needed improvement within the ADOT WZSM program was completed.

ADOT has a successful WZSM program. Previous PRs have repeatedly identified that ADOT meets the requirements set forth by the Federal Highway Administration (FHWA) in 23 CFR. The 2019-2020 WZSMC evaluated ADOT’s WZSM program and assessed that focusing on Transportation Management Plans (TMPs) would help strengthen the program. During the work on TMP, the WZSMC found that the ADOT documents “Implementation Guidelines for Work Zone Safety and Mobility” and “Work Zone Safety and Mobility Policy ENG 07-3” needed to be updated in order to achieve the desired results of improving TMP development.

The specific purpose of this PR is to evaluate ADOT’s Policy, Implementation Guidelines, and TMP process. A detailed summary of work the WZSMC has completed on updates to the Implementation Guidelines and Policy is provided in Appendix G and H. The WZSMC also created a TMP Template to aid the improvements on TMPs which can be found in Appendix A.

ADOT continues to improve upon their healthy work zone safety and mobility program and should continue with work in-progress while implementing the recommendations found within this report as appropriate.

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List of Abbreviations

ACT	ADOT Communications Team
ADE	Assistant District Engineer
ADOT	Arizona Department of Transportation
CAT	Construction Advisory Team
CFR	Code of Federal Regulations
CMF	Capability Maturity Framework
DE	District Engineer
DOT	Department of Transportation
DPS	Department of Public Safety (Uniformed Officers)
ECD	Enforcement and Compliance Division
ERT	Emergency Response Team
EVAP	Emergency Vehicle Access Plan
FHWA	Federal Highway Administration
IDO	Infrastructure Delivery & Operations Division
IGWZSM	Implementation Guidelines for Work Zone Safety & Mobility
PIO	Public Information Officer
PM	Project Manager
PR	Process Review
RACI	Responsibility, Accountability, Consultation, and Informed
RE	Resident Engineer
RTE	Regional Traffic Engineer
TIM	Traffic Incident Management
TIS	Traveler Information System (AZ511)
TMP	Transportation Management Plan
TOC	Traffic Operations Center
TSMO	Transportation Systems Management and Operations Division
WZSM	Work Zone Safety and Mobility
WZSMC	Work Zone Safety and Mobility Committee

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Chapter 1

1.1 Background

PRs are a Federal requirement but are State-led and are not to be confused with FHWA Work Zone Self Assessment or Conformance Reviews. The Work Zone Self Assessment is a survey that the Department fills out with FHWA's guidance. The Self Assessment is ideally completed by a multidisciplinary team from within the Department (Construction, Traffic Operations, Communications, Design, etc.) and can be facilitated by someone from the FHWA Division office. The Conformance Reviews are to determine if all applicable standards (national, state, or local) have been met. Conformance reviews are tied to our stewardship agreement with FHWA; the language addressing it comes from 23 CFR 630.1014:

Each State shall work in partnership with the FHWA in the implementation of its policies and procedures to improve work zone safety and mobility. At a minimum, this shall involve an FHWA review of conformance of the State's policies and procedures with this regulation and reassessment of the State's implementation of its procedures at appropriate intervals. Each State is encouraged to address implementation of this regulation in its stewardship agreement with the FHWA.

The WZSMC found the implementation and content of the TMP specification is inconsistent, as it was found in previous years. The subject of a standard stored specification for TMPs was brought before the ADOT Standards Committee where a consensus could not be reached due to differing opinions on whether or not this was the ultimate responsibility of the designer or contractor. The Standards Committee asked that this be brought before the Sub-program Project Initiation Review Board (SuPIRB) for further discussion. SuPIRB recommended the TMP be a responsibility of the contractor and sent it back to the Standards Committee. The Standards Committee then recommended that the WZSMC develop a TMP standard specification for review and implementation.

1.2 Committee Members

The standing WZSMC that conducted the 2020 WZSM PR included Todd Emery, Deputy Division Director for IDO, as the committee sponsor and representative from the SEO, along with ADOT representatives from MPD, TSMO, and IDO. The WZSMC chairman, historically, is a rotating position that is assigned by the State Engineer every two years. Recently, the chairman has been a District Engineer. The WZSMC co-chairman is a representative of the TSMO Operational Traffic & Safety Group, assigned by WZSMC. There were two representatives from MPD. There were a total of six representatives from TSMO, which included the Regional Traffic, Operations, Traffic Safety, Systems Technology, and Traffic Management Groups. There were two representatives from Communications. Ten members were from IDO which included representatives from Construction, Project Management, Resident Engineers, District Engineers, Traffic Design, and Materials Groups. Finally, two FHWA representatives were included. Although there are a few more groups defined and represented than as prescribed by the Implementation Guidelines, the intent of the guidelines was met.

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Table 2.1a - Committee Members

Voting Members = "X"

	Todd Emery (Sponsor)	TEmyer@azdot.gov	ADOT State Engineer's Office
X	Kurt Harris (2020 Chair)	RKHarris@azdot.gov	ADOT IDO SouthEast District
X	Adam Carreon (2020 Co-Chair)	ACarreon@azdot.gov	ADOT TSMO Operations
X	James Gomes	JGomes@azdot.gov	ADOT TSMO Regional Traffic
X	Kerry Wilcoxon	KWilcoxon@azdot.gov	ADOT TSMO Traffic Safety
X	Susan Anderson	SEAnderson@azdot.gov	ADOT TSMO Systems Technology
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	Mark Brown	mbrown4@azdot.gov	ADOT TSMO Traffic Management
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	Daniel Gabiou	dgabiou@azdot.gov	ADOT MPD
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Chapter 2

Purpose and Objectives

2.1 Purpose and Objectives

The purpose of this biennial PR is to evaluate the agency's WZSM policy, processes and procedures, data and information resources, and training programs to assess the effectiveness of a work zone program. Managing traffic in work zones is necessary to minimize traffic delays, maintain motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses, institutions, and residents. WZSM PRs help assess the effectiveness of the work zone program policies, guidelines, and procedures. The review is to enable ADOT and the FHWA to confirm where a problem does or does not exist, or to identify systemic problems, and make recommendations to improve situations where shortcomings are found. It is also used to identify Best Practices. The specific purpose of the 2020 PR was to evaluate the Policy, Implementation Guidelines, and the TMP process.

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Chapter 3

Observations and Recommendations

3.1 Initial Observations

The WZSMC found the implementation and content of the TMP and specification is inconsistent, as it was found in previous years. The WZSMC decided the contractor should not bear the sole responsibility of the TMP, and that on most projects (that are design-bid-build) the opportunity to outline many parts of the TMP prior to construction would be overlooked. Development is also the ideal time to start stakeholder engagement. The consensus of the WZSMC was that the creation of the TMP should be during the development process, and become a living document that gets handed off from designer to contractor.

Although not part of the initial observations of the WZSMC, updates were also made to the Implementation Guidelines. These updates are included here within, as they guide the overall program and improve WZSM processes.

3.2 Update to WZSM Policy

The SEO engaged the WZSMC in the update process of the WZSM Policy (ADOT Policy ENG 07-3). Having a WZSM Policy is a requirement of The Rule. The update came into effect on September 16, 2020 and can be found in Appendix B, with a detailed list of the changes in Appendix H.

The policy is a central guiding document for the WZSM processes. Some notable changes, and the reason behind them, the WZSMC made to improve work zone safety and mobility include:

1. Add the definition of 'Incident'
2. Inclusion of ADOT Traffic Operations Center (TOC) was also previously excluded.
3. Addition of Traffic Incident Management (TIM)
4. The definition of Work Zone Safety was expanded. This clarification adds a measurement for safety. Effective safety measurement empowers you with quantifiable evidence of what is or isn't working. Furthermore, if you use effective data and indicators, safety measurement can even enable you to determine why something isn't working.
5. Updated language about what to do with the data that is collected. This follows the same logic of previous changes to the policy about the importance of measuring performance.
6. Changes to allow for flexibility in process review, which also allows for focusing on Significant projects, without excluding projects that are not (subsection D).
7. The important change to subsection E was to more clearly define that a project was to be identified as Significant before scoping. This was an important clarification to the WZSM process and the WZSMC. The previous language of "Early in development" could mean a multitude of points within a project life. Adding scope requires additional funds, a contract modification, pricing, and time consuming negotiations. The remainder of the definition

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was removed, because this is already clarified in the federal requirements, and the WZSMC was not aware of a single project where it has been used.

8. Finally an entirely new section 'J' was added for incident management. Incident management is an important strategy to be considered in the transportation operations component of the TMP. The goals, objectives, and reasons for incident management as well as the issues and concerns that incident responders and TOC employees need to consider are critical to a successful work zone.

3.3 Update to Implementation Guidelines for Work Zone Safety & Mobility

The WZSMC was also engaged to update the Implementation Guidelines for Work Zone Safety and Mobility. As with the policy, the Implementation Guidelines steer much of the processes involved in our work zone program. The WZSMC used this as another opportunity to help prove the overall program.

Another change was to remove the signatory section of the Implementation Guidelines. The original Implementation Guidelines was signed by the ADOT Director, State Engineer, Multimodal Planning Division Director, and Director of Communication and Community Partnerships. The need or requirement of the signatures was brought up during the revision process. The WZSMC researched practices of other DOTs and did not find a single signature of approval on any other states implementation guidelines. It is important to note that ADOT has adopted a Lean Business Model that is reflected in many of the changes to the Implementation Guidelines. "Lean" is considered a philosophy of continuous improvement. A lean organization focuses on increasing customer value, the elimination of waste, and optimizing operations. Removing the signatures allows the flexibility to change specific elements in a more efficient manner and eliminate any "muda", or waste, associated with collecting signatures of unaffected parties. This allows the WZSMC to make changes and updates to the Implementation Guidelines in the most efficient manner possible.

All of the other changes to Implementation Guidelines are not described within this document as this not the appropriate vehicle to do so. Only items critical to improving the agency's work zone policy, processes and procedures, data and information resources, and training programs to assess the effectiveness of a work zone program are noted. These changes are outlined in the following paragraphs.

The introduction clarifies the new definition of significance for projects, eliminating the previous "Major and Minor" levels and replacing them as shown in Figure 3.3a below.

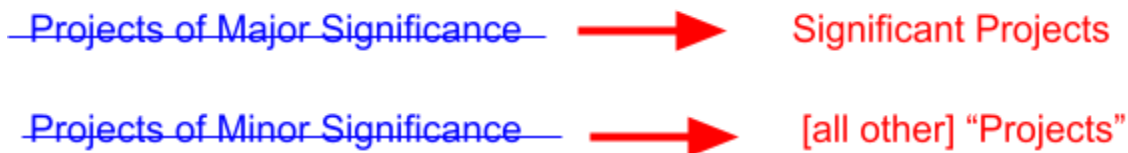


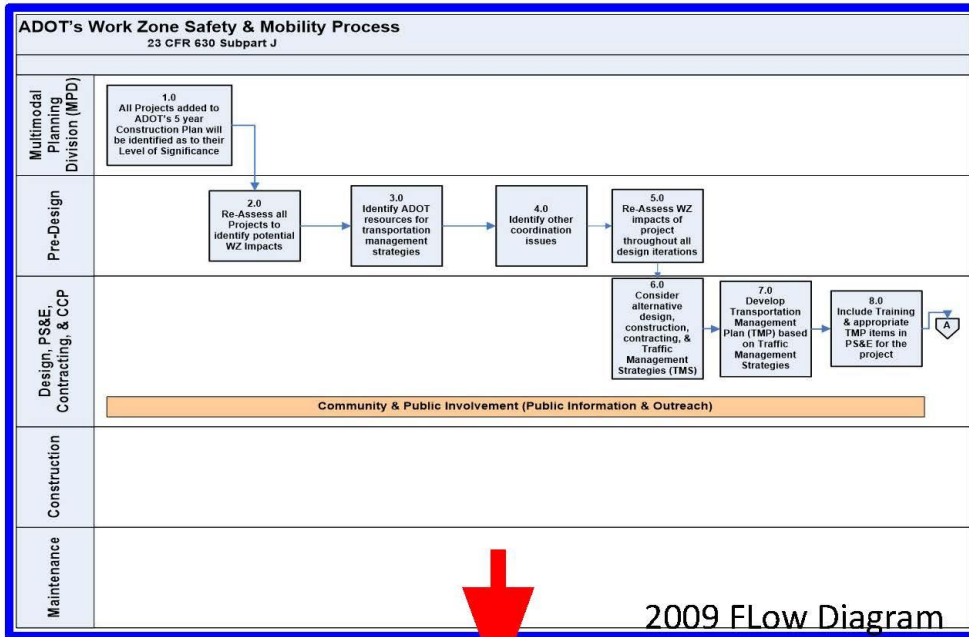
Figure 3.3a
Change in Definition of Significance

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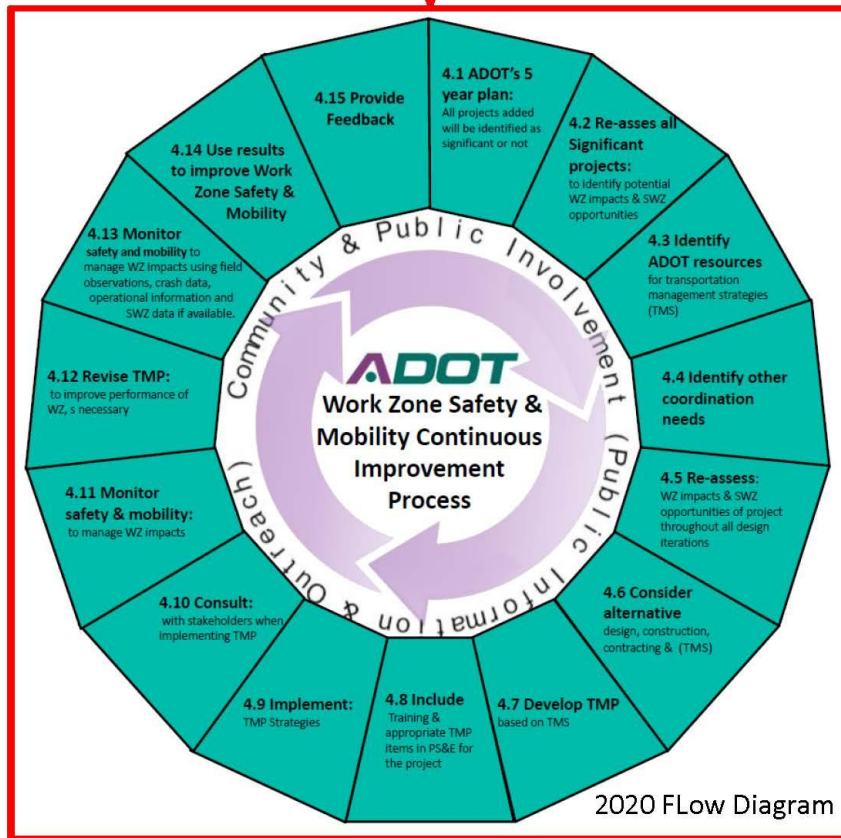
The WZSM Policy is now included as text, instead of as a picture as it was previously presented, which allows it to be a searchable part of the overall document. The previous policy format was included as a non-searchable picture. The biggest advantage of being searchable is it can save time. You can use a few tools like windows file search or command line to search for desired information. This also allows colleagues to open and copy data from the file, which enhances the overall value. This also allows the Implementation Guidelines to be easier to find online and in search results. This enhances the customer experience with increased accessibility. A scanned document is just an image of a text document and is therefore inaccessible for a disabled person, you can not extract the words or read the document using an assistive technology software. By adding the policy as searchable text it saves time, increases productivity, and improves the end-user experience.

“ADOT’s process for the identification, assessment, implementation and re-assessment of WZSM”, was changed from a linear flow chart to a circular model to mimic our continuous improvement strategy, or the Lean Business Model [See Figure 3.3b Updated WZSM Process].

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2009 FLOW Diagram
(Entire diagram not shown)



2020 FLOW Diagram

Figure 3.3b

Updated ADOT Process for the Identification, Assessment, Implementation and Re-assessment of WZSM

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There were a number of updates to the WZSM Procedure table. For the first activity in the procedure, the tasks were almost completely revised. Most important to note is that projects are no longer designated as minor or major. Being that the designation as Significant relative to WZSM (and not environmentally) is critical to do as early as possible. The WZSMC met with ADOT MPD to discuss how to do this accurately. The team members agreed to the following revised task:

“Projects within a TMA and an access controlled divided highway will be marked as “Significant for WZSM” and will include the conception of a four part TMP during the scope of the project...The two additional parts of the TMP can be removed at a later stage if the project team deems that the project is not a Significant project.”

Tasks related to training were completely rewritten to focus on operations, new technologies, and data collection through SMZs. Two of these new tasks are:

- Training on new technologies should be a continued practice that is renewed as technology changes.
- Smart Work Zone (SWZ) items and specifications should always be included on Significant projects.

One improvement of note was the revision of the figure for Types of Work Zone Impacts as shown in Figure 3.3c, a revision made to match existing Federal documentation, The change was to add *“Environmental Impacts (noise, dust,etc.)”* as a type of Work Zone Impacts. This is a small but very substantial addition as environmental impacts can be the most significant and impactful to the project and the public.

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Figure 3.3c
Revision to FHWA Types of Work Zone Impacts

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Within Chapter 8, *Process Reviews*, the process flow chart was changed from a linear format to circular to match the Lean Process. One interesting finding was that in the original process the final task was to “Apply recommendations and lessons learned”, but this logic was not shown on the flow diagram to complete the loop back as with the revised format. These diagrams are shown in Figure 3.3d Change in Process Review Stages Flow Diagram below.

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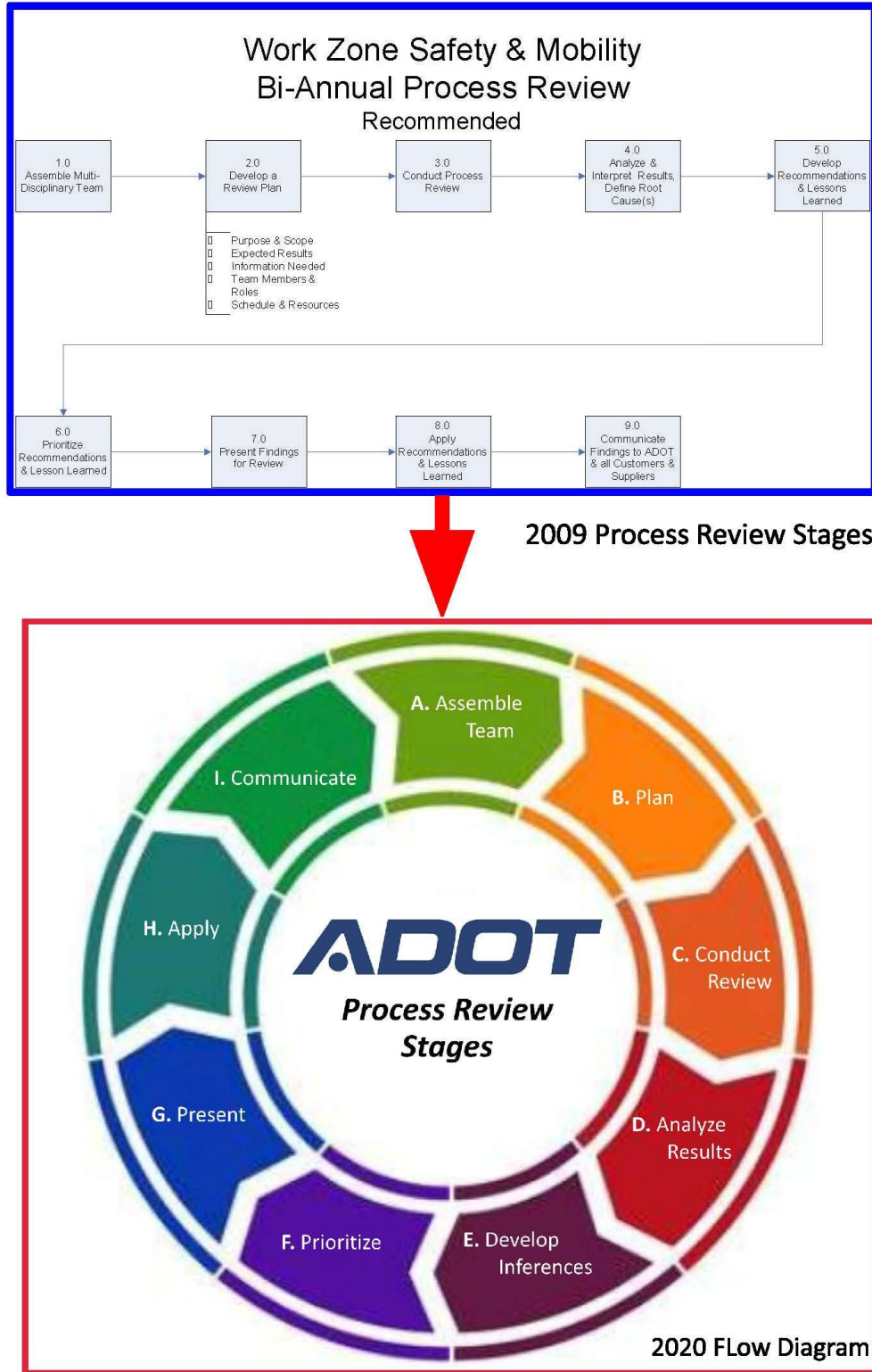


Figure 3.3d
Change in Process Review Stages Flow Diagram

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3.4 TMP Template

Development of a standard template for TMPs was chosen by the WZSMC as a priority before creating a specification since it would require the WZSMC to take a closer look at what goes into a TMP and therefore help it write a better specification. Once the roles and responsibilities were defined within the TMP Template, a specification could be more easily written. The latest version of the TMP Template is located in Appendix A.

One item that is worth elaborating on within the TMP is the Responsibility, Accountability, Consultation, and Informed (RACI) Tables. The RACI table is the appropriate method for communicating this critical information within a project. The 'R' stands for Responsible and defines who does the work. The 'A' stands for Accountable and defines who is to review or ensure the work is getting done. The 'C' stands for Consulted and defines who is needed for input. Finally, the 'I' stands for Informed as needed and defines who is kept in the loop on progress. This exercise in creating the RACI table redefined the Transportation Management Measures and Roles that were used. Two tables were created, one for the development process and one for during construction. The WZSMC sees these tables as another very helpful step in creating consistency with TMPs statewide.

TMP Responsibility, Accountability, Consultation, and Informed (RACI) Table									
Project Description (or Activity) - as applicable to project	Project Development Team								
	Law Enforcement**	Project Management Group	Contracts & Specifications	Districts	Traffic Operations Center	Regional Traffic Engineer	ADOT Communications Team	Traffic Designer	
* R = Responsible (does the work); A = Accountable (to review/ensure the work is getting done); C = Consulted (for input as needed); I = Informed (as needed, is kept in the loop on progress)									
** Law Enforcement could be DPS, ECD, or local (City or County) uniformed law enforcement officers									
Task									
Define as "Significant" for WZSM		A	i	R*	C	R*	I	C	
Traffic Control Plans	C	A	I	C	C	C	I	R	
Emergency Vehicle Access Plan	C	A	I	C	C	C	I	R	
TMP Template	I	A	I	C	C	C	I	R	
TMP Specification	I	A	R	C	C	C	I	C	
* Projects should be defined as Significant for Work Zone Safety & Mobility by ADOT Multimodal Planning Division during project scoping, however the District will be responsible at the start of design.									

Table 3.4a
TMP RACI Table (Development)

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TMP Responsibility, Accountability, Consultation, and Informed (RACI) Table						
Project Description (or Activity) - as applicable to project	Construction Advisory Team Roles*					
	Law Enforcement**	Contractor	RE	TOC	RTE	ACT
* R = Responsible (does the work); A = Accountable (to review/ensure the work is getting done); C = Consulted (for input as needed); I = Informed (as needed, is kept in the loop on progress)						
** Law Enforcement could be DPS, ECD, or local (City or County) uniformed law enforcement officers						
Motorist Information Strategies	Chapter 5					
Smart Work Zone		R	A	I	C	I
Changeable Message Board		R	A	I	C	
existing fixed overhead digital Dynamic Message Sign		C	A	R	C	I
Ground Mounted Signs	I	R	A		C	
AZ511 Traveler Information System	C	C	A	R	C	I
Sequential Flashing Lights		R	A	I	C	
Website	I	C	C	I	C	R
Freight Transportation Information	C	C	C	C	C	R
Mobile Device Application	C	C	C	I	C	R
Public Involvement Plan	C	C	C	I	C	R
Traffic Incident Management & Enforcement Strategies	Chapter 6					
Access of Emergency Services	C	R	A	I	C	
Traffic Incident Management	R	C	C	A	C	I
Law Enforcement	R	C	C	A	C	I
Emergency vehicle access management and planning	C	R	A	C	C	
Construction TMP Strategies	Chapter 7					
Lane Restrictions	I	R	A	I	C	C
Project Coordination		R	A	I	C	C
Stakeholder Coordination	Chapter 8					
Team Meeting	I	A	R	I	C	A
Corridor/Network Management Strategies	Chapter 9					
TMP Effectiveness Monitoring	I	A	R	I	C	C
Alternate Route Strategies	Chapter 10					
Detours	C	R	A	C	C	C
Public Information Campaign	Chapter 11					
Printed Communications Materials		A	C	I	I	R
Press Releases		A	C	I	I	R
Project Hotline and Public Feedback		A	C	I	I	R
Electronic Media		A	C	I	I	R
Emergency Contingency Plan	Chapter 12					
Contingency Plans	I	R	A	A	C	C
Emergency Communication Plan	I	C	C	A	C	R
TOC Response Protocol	I	A	A	R	C	I

Table 3.4b
TMP RACI Table (Construction)

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3.5 Findings & Recommendations

3.5.1 Findings

1. There is a need for a TMP Template, however development of the Template has not been finalized.
 - a. Consensus could not be reached on who should be responsible for the creation and implementation of a TMP .
 - b. Development of a standard specification for TMPs has not been completed.
 - c. A sample of Significant projects contained all four components of a TMP, however no standard format has been established.
 - d. From the 2016 PR; the team identified Business Practices, especially the implementation of TMPs as one of the areas that is being done in a systematic way, but the team found that there could be improvements. Some team members noted that there is often excess information in TMPs.
2. Updates were made in 2020 to the WZSM Policy and Implementation Guidelines.
3. The WZSMC is continuously making improvements to the WZSM program.
4. Finding from FHWA: It could be helpful to develop a spreadsheet of all findings and recommendations as a running log of potential action items or a 2-, 3-, 5-, 10-year action plan. ADOT could keep track of items addressed, not addressed, reason for not addressing, etc. Whenever it seems appropriate to address a finding from a process review or some other source, then it can be addressed and marked completed on the spreadsheet. The findings can be ranked by priority if it is reasonable to do so.
5. Finding from FHWA: Goals should be established for each Process Review so there is direction in completing the review, “the goal does not have to be complex. The goal can be simplified and focused. i.e., Evaluate ADOT’s use of TMPs from a random sample of projects or random sample of REs.”
6. Finding from FHWA: ADOT should consider “use of the ADOT on-call contract for technical editing and/or writing. This could help take the load off formatting/writing and focus on the intent of the document, which is evaluating effectiveness of the program. The contact for more information on the on-call contract is through ADOT MPD.”

3.5.2 Recommendations

1. The WZSMC should continue its work towards finalizing a TMP Template.
 - a. The contractor should not bear the sole responsibility of the TMP, projects (that are design-bid-build) have a missed opportunity to outline many parts of the TMP prior to construction if it is automatically relegated to the contractor. Development is also the ideal time to start stakeholder engagement. The consensus of the WZSMC was that the creation of the TMP should be during the development process, and become a living document that gets handed off from designer to contractor.
 - b. With the use of the documents as shown in Appendix A, B, & C by project teams, comments are to be expected. The WZSMC recommends to create a standard specification for TMPs with consideration of the comments received.

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- c. The Template will provide standardization of the format of the TMP components.
 - d. Reduce the length of TMPs by removing extraneous information, and develop standardized language for specifications.
2. No further action is required unless changes, updates, or additions are needed to the WZSM Policy and Implementation Guidelines.
 3. The WZSMC should continue its progress and the representative from the Operational Traffic and Safety Group should remain as co-chair of the PR to support the continuity of the WZSMCs efforts.
 4. Develop a spreadsheet as described in Finding No. 4 above. A potential example is shown in Table 4.2a below.
 5. In considering FHWA's recommendation, the 2022 PR goal is to evaluate ADOT's implementation of SMZs from a random sample of projects.
 6. Look into the use of a 3rd party for assistance in preparation of the next PR.

Finding or Recommendation	Goal Date of Completion	Priority	Notes/Reason for not addressing	Completed

Table 3.5.2a
Potential Action Items

3.5 Conclusion

The information provided within this PR documents continuous improvement toward the implementation of the work zone best practices. The practices at ADOT are consistent with the work zone management principles promoted by the Rule. ADOT continues to promote and improve upon their sound work zone management practices leading to reduced congestion and delay while improving safety in and around work zones.

Appendix A: Transportation Management Plan Template

Appendix B: 2020 Work Zone Safety and Mobility Policy ENG 07-3

Appendix C: Implementation Guidelines for Work Zone Safety and Mobility [2020]

Appendix D: 2014 Process Review

Appendix E: 2016 Process Review

Appendix F: 2018 Process Review

Appendix G: ADOT 2020 Update to the Implementation Guidelines for Work Zone Safety and Mobility

Appendix H: ADOT 2020 Update to the Work Zone Safety and Mobility Policy ENG 07-3

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Arizona Dept of Transportation
Security Level: Email, Account Authentication (None)

COPIED

Sent: 4/14/2021 1:46:30 PM

Electronic Record and Signature Disclosure:
Not Offered via DocuSign

Witness Events

Signature

Timestamp

Notary Events	Signature	Timestamp
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Envelope Summary Events	Status	Timestamps
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Envelope Sent	Hashed/Encrypted	4/6/2021 11:00:57 AM
Certified Delivered	Security Checked	4/14/2021 1:45:27 PM
Signing Complete	Security Checked	4/14/2021 1:46:28 PM
Completed	Security Checked	4/14/2021 1:46:30 PM

Payment Events	Status	Timestamps
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