

**US-60/Grand Avenue  
Traffic Management Plan  
Loop 303 to Willetta Street**

**Traffic Management Plan**

Prepared for:



Prepared By:

Burgess & Niple, Inc.

March 2017

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## **Overview**

The Maricopa Association of Governments (MAG) United States Route 60 (US-60)/Grand Avenue Corridor Optimization, Access Management Plan, and System Study (COMPASS), completed in 2015, was conducted to identify a long-term solution for accommodating travel demand and adjacent property access as well as establish operating principles to improve the effectiveness of traffic operations. The premise of the study is that ownership and maintenance responsibilities of the US-60/Grand Avenue corridor will remain with ADOT.

The completion of the US-60/Grand Avenue Traffic Management Plan (TMP) is a recommended action item of the US-60/Grand Avenue COMPASS project. This TMP was conducted by MAG in partnership with the Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), City of Surprise (Surprise), City of El Mirage (El Mirage), Town of Youngtown (Youngtown), City of Peoria (Peoria), City of Glendale (Glendale), and City of Phoenix (Phoenix). The purpose is to develop a plan that identifies:

- Infrastructure improvements necessary to create the Intelligent Transportation Systems (ITS) traffic management infrastructure across multiple jurisdictions within the corridor; and
- An overall Concept of Operations which describes how this corridor is/will be managed and operated utilizing ITS infrastructure and the roles and responsibilities of jurisdictions within the corridor.

The US-60/Grand Avenue study corridor begins at the Traffic Interchange (TI) with State Route 303 Loop (SR-303L) in Surprise at reference marker 138.051 (expressed in miles) and ends at the Willetta Street intersection in Phoenix at US-60X reference marker 161.880 (expressed in miles). The 24-mile corridor is oriented northwest-southeast, and passes through portions of Surprise, El Mirage, Youngtown, Peoria, Glendale, Phoenix, and unincorporated Maricopa County.

Three US-60/Grand Avenue TMP documents were prepared and are listed below. A brief summary of the findings follows.

- Inventory of Existing Traffic Management Infrastructure (Appendix TMP-1).
- Concept of Operations (Appendix TMP-2).
- Infrastructure Improvements and Cost Estimate (Appendix TMP-3).

## ***Inventory of Existing Traffic Management Infrastructure***

At the outset of the US-60/Grand Avenue TMP, an inventory of existing traffic management infrastructure was prepared that identified vehicle detection, Emergency Vehicle Preemption (EVP), Closed Circuit Television (CCTV) cameras, and other devices. Twenty-seven of the thirty-seven signalized intersection use video detection systems; the remaining use loop detectors. During the field review, a total of four intersections equipped with EVP devices were identified, although no agency has assumed responsibility of the devices. One CCTV camera is located at Myrtle Avenue and a CCTV camera at Northern Avenue was installed, but later removed. According to ADOT, bandwidth limitations prevented communication with the ADOT TOC for both CCTV cameras. Phoenix has four cameras located at 35th Avenue/Indian School Road, Osborn Road, Encanto Boulevard, and McDowell Road. The cameras are connected to the Phoenix TMC via radio. There are no Dynamic Message Sign (DMS) devices within the corridor. The findings of this review indicate that ITS infrastructure is present, but limited.

## **Concept of Operations**

The Concept of Operations establishes operational processes for managing the study corridor and addresses lines of communication between ADOT's and other agencies' traffic management facilities and law enforcement. Although ADOT is the lead agency along US-60/Grand Avenue, interagency cooperation and collaboration will be necessary for an Integrated Corridor Management (ICM) approach.

US-60/Grand Avenue TMP stakeholder engagement identified a variety of issues and needs along the study area including:

- Data Collection;
- ITS Infrastructure Improvements;
- Signal Timing Progression;
- EVP and Traffic Signal Preemption at Railroad Crossings;
- Adaptive Signal Control;
- Bicycle, Pedestrian, and Transit Accommodations;
- Transit Signal Priority;
- Planned Construction Coordination;
- Connected Vehicle Infrastructure; and
- Intergovernmental Agreements.

The following lists the recommendations for corridor management along US-60/Grand Avenue:

- ADOT and Phoenix will maintain ownership of their ITS infrastructure in their respective corridor segments in the short-term. In the future, as the MAG US-60/Grand Avenue COMPASS recommendations are implemented, ADOT will assume ownership and maintenance of all ITS infrastructure along the corridor.
- US-60/Grand Avenue will be given traffic signal priority at all times in both ADOT and Phoenix segments; traffic signals will be coordinated throughout the corridor.
- ITS infrastructure will be installed along the corridor including CCTV cameras, DMS, communications systems, vehicle detection devices, and EVP devices. It is intended that this infrastructure will help ADOT and Phoenix more efficiently manage the corridor.
- Other potential improvements include bicycle and pedestrian facilities, adaptive signal control, connected vehicle infrastructure, and integration with transit.

The following lists the recommended plan for incident management along US-60/Grand Avenue.

- ADOT ALERT will maintain responsibility for traffic incident management along the corridor.
- Pre-established traffic signal plans and predetermined diversion routes should be developed and distributed.
- Incident management operations during and after business hours will remain the same as they are today.
- Local police departments will continue serving as first responders given their proximity to the corridor.
- Consider implementing other recommendations, such as truck mounted DMS and computer systems in trucks, to improve ADOT ALERT capabilities.

## ***Infrastructure Improvements and Cost Estimate***

Recommended infrastructure improvements include the installation of communications systems (wireless and fiber), CCTV cameras that provide video detection and data collection capabilities, DMS, and EVP devices. Traffic signals maintained by Phoenix will need to conform to ADOT standards before ADOT can assume maintenance responsibilities. It is anticipated that this traffic signal maintenance responsibility transition will occur after projects from the US-60/Grand Avenue COMPASS are implemented. A cost estimate was prepared to determine how much funding will be needed to implement the system. The items included in the cost estimate are wireless to fiber tie-in connections, CCTV cameras and vehicle detection at major intersections, CCTV cameras and radio units for midblock locations, DMS, radio units/antennas for signalized intersections, and EVP devices. It is estimated that the system will cost approximately \$8.8 million.

The infrastructure recommendations in this study are conceptual in nature; the formal ADOT Scoping Phase will need to be completed, including required typical local, state, and federal agencies approvals. Additional design concept alternatives may be developed through ADOT's process; alternative concepts should be consistent with the fundamental objectives of this study.



# **US-60/Grand Avenue TMP**

**Loop 303 to Willetta Street**  
**Infrastructure Improvements and Cost Estimate**

## ***APPENDIX TMP-1***

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### **Inventory of Existing Traffic Management Infrastructure**

**US-60/Grand Avenue**  
Traffic Management Plan  
Loop 303 to Willetta Street

**Inventory of Existing  
Traffic Management Infrastructure**

Prepared for:



Prepared By:  
Burgess & Niple, Inc.

December 2015

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### 1.0 Introduction and Background

The United States Route 60 (US-60)/Grand Avenue Traffic Management Plan is being conducted by the Maricopa Association of Governments (MAG) in partnership with the Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), City of Surprise, City of El Mirage, Town of Youngtown, City of Peoria, City of Glendale, and City of Phoenix. The corridor begins at the Traffic Interchange (TI) with State Route 303 Loop (SR-303L) in the City of Surprise and ends at the Willetta Street intersection in the City of Phoenix. **Figure 1** shows the study area.



**Figure 1 – Study Area**

MAG’s Intelligent Transportation System (ITS) Strategic Plan identified US-60/Grand Avenue as a Systematically Managed Arterial (SMART) corridor. SMART Corridors provide an arterial link through an urban area passing through multiple jurisdictions and include a range of traffic management devices, such as traffic signals, controllers, vehicle sensors, vehicle preemption, CCTV cameras, and dynamic message boards, all operated and managed by controlling agencies.

ADOT and Phoenix currently own and operate the traffic signals along the corridor, while the intersecting arterial street network is managed by the adjacent cities. ADOT owns and operates signals between SR-303L and 51<sup>st</sup> Avenue/Bethany Home Road, inclusive, while Phoenix owns and maintains the remainder portion of the study corridor.

In 2012 new traffic signal coordination timing plans were implemented to improve the flow of traffic along US-60/Grand Avenue between 163rd Avenue and McDowell Road. The AM peak, PM peak, and off peak (midday) periods were analyzed favoring southeast (inbound) progression during the AM peak, northwest (outbound) progression in PM peak, and balanced progression in both directions during the midday periods. Changes to traffic signal cycle lengths, green times, offset values, and split lengths were made and resulted in increased average speed, reduced travel time, and reduced number of stops facilitating an increase in average speed as well as a reduction in total delay, fuel consumption, and emissions.

## **2.0 Existing Traffic Management Devices**

The US-60/Grand Avenue study area includes 37 operating signalized intersections, summarized in **Table 1**. Within the corridor, ADOT and Phoenix have a functioning Traffic Operation Center (TOC) and Traffic Management Center (TMC), respectively.

### **2.1. Vehicle Detection**

Twenty-seven of the signalized intersections use video detection systems. These include all intersections west of Cotton Crossing, inclusive, and the intersection at Myrtle Avenue. MCDOT (Sun City West), Surprise, El Mirage, Youngtown, Sun City, and Peoria have adopted the video detection systems. Loop detectors are widely used for Glendale and Phoenix intersections in the study area. In addition to loops, ITS Plus 3<sup>rd</sup> generation camera by ITS Plus Inc. is utilized at the Osborn Avenue/31<sup>st</sup> Avenue intersection in Phoenix due to difficulties of loop installation with the presence of the BNSF Railway railroad tracks.

During the field review, it was identified that US-60/Grand Avenue intersection at Surprise Pavilions is un-signalized; therefore, the installed video detection system was not in use. Surprise verified that the signal was removed over six years ago and currently there are no plans to reinstall the signal.

Video detection cameras were identified on all approaches at the US-60/Grand Avenue intersection at 51st Avenue/Bethany Home Road, which was inconsistent with data obtained from ADOT that indicated loops were used at this location.

For current maintenance practices, ADOT is replacing failing loop and video vehicle detectors with thermal cameras.

### **2.2. Emergency Vehicle Preemption (EVP)**

According to ADOT and Phoenix, the existing signalized intersections within the US-60/Grand Avenue study corridor are not currently using Emergency Vehicle Preemption (EVP) devices. During field review, a total of four intersections equipped with EVP devices were identified: Mountain View Boulevard, Litchfield Road, Belle Grand Drive and 132nd Avenue. All of these intersections are located within Surprise. There was also an EVP device at Towne Center Drive, which is within unincorporated Maricopa County. According to Surprise, any EVP equipment in place may have been installed by ADOT and is maintained by ADOT.

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### 2.3. Closed Circuit Television (CCTV) Cameras

One CCTV cameras is located at Myrtle Avenue and a CCTV camera at Northern Avenue was installed, but later removed. According to ADOT, bandwidth limitations prevented communication with the ADOT TOC for both CCTV cameras.

Phoenix has four cameras (pictured) located at 35<sup>th</sup> Avenue/Indian School Road, Osborn Road, Encanto Boulevard, and McDowell Road. The cameras are connected to the Phoenix TMC via radio.



### 2.4. Traffic Cabinets and Controllers

ADOT and Phoenix use NEMA TS2 type traffic control cabinets within the study corridor.

Traffic signal controllers used within the corridor are listed in Table 1. All existing ASC/2 controllers owned by ADOT are being upgraded to the Cobalt type controllers as Econolite no longer manufactures ASC/2 controllers.

Econolite’s traffic signal controllers are used within the corridor. Phoenix uses ASC 2 controllers operating under version 1.12 software. TransSuite by TransCore is being used by ADOT TOC and Phoenix TMC to communicate with the signals remotely.

**Table 1 – Inventory of Existing Traffic Management Devices**

Intersection with US-60/Grand Avenue	Operating Agency	Jurisdictional Boundary	Detection	Controller Platform	CCTV
SR-303L	ADOT	Maricopa Cnty	Video	Cobalt	-
Sunrise Boulevard/RH Johnson Blvd	ADOT	Surprise	Video	Cobalt	-
Reems Road/Meecker Blvd	ADOT	Maricopa Cnty	Video	ASC/2	-
Parkview Place	ADOT	Surprise	Video	ASC/2	-
Surprise Pavilions (Signal removed)	ADOT	Surprise	Video	Not in use	-
Mountain View Blvd	ADOT	Surprise	Video	ASC/2	-
Litchfield Road	ADOT	Surprise	Video	ASC/2	-
Towne Center Drive	ADOT	Maricopa Cnty	Video	Cobalt	-
Bell Road	ADOT	Surprise	Video	ASC/2	-
Belle Grande Drive	ADOT	Surprise	Video	ASC/2	-
132nd Avenue (Not in use)	ADOT	Surprise	Not In Use	-	-
Dysart Road	ADOT	Surprise	Video	Cobalt	-
Greenway St	ADOT	El Mirage	Video	ASC/2	-
Primrose St	ADOT	El Mirage	Video	ASC/2	-
Thompson Ranch Road	ADOT	El Mirage	Video	ASC/2	-
113th Avenue	ADOT	Youngtown	Video	ASC/2	-
111th Avenue	ADOT	Maricopa Cnty	Video	ASC/2	-

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Intersection with US-60/Grand Avenue	Operating Agency	Jurisdictional Boundary	Detection	Controller Platform	CCTV
107th Avenue/Del Webb Blvd	ADOT	Maricopa Cnty	Video	ASC/2	-
103rd Avenue	ADOT	Maricopa Cnty	Video	ASC/2	-
99th Avenue	ADOT	Maricopa Cnty	Video	ASC/2	-
SR-101L South On-Ramp	ADOT	Maricopa Cnty	Video	Cobalt	-
SR-101L North Off-Ramp	ADOT	Maricopa Cnty	Video	Cobalt	-
91st Avenue	ADOT	Peoria	Video	ASC/2	-
85th Avenue	ADOT	Peoria	Video	ASC/2	-
Peoria Avenue	ADOT	Peoria	Video	ASC/2	-
83rd Avenue	ADOT	Peoria	Video	ASC/2	-
Cotton Crossing	ADOT	Peoria	Video	ASC/2	-
75th Avenue/Olive Avenue	ADOT	Maricopa Cnty	Loop	ASC/2	-
Royal Palm	ADOT	Glendale	Loop	ASC/2	-
67 <sup>th</sup> Avenue/Northern Avenue	ADOT	Glendale	Loop	ASC/2	Yes
Myrtle Avenue	ADOT	Glendale	Video	ASC/3	Yes
57th Drive	ADOT	Glendale	Loops	ASC/2	-
51 <sup>st</sup> Avenue/Bethany Home Road	ADOT	Glendale	Video	ASC/2	-
35th Avenue/Indian School Road	Phoenix	Phoenix	Loops	ASC/2	Yes
33rd Avenue	Phoenix	Phoenix	Loops	ASC/2	-
Osborn Road/31st Avenue	Phoenix	Phoenix	Loops	ASC/2	-
Osborn Road	Phoenix	Phoenix	Loops/Camera ITS	ASC/2	Yes
Encanto Blvd	Phoenix	Phoenix	Loops	ASC/2	Yes
19 <sup>th</sup> Avenue/McDowell Road	Phoenix	Phoenix	Loops	ASC/2	Yes

### 2.5. Interconnect

Phoenix uses *Tropos Radios* (pictured) for traffic signal interconnect. This equipment is approximately five years old. According to Phoenix, their signal equipment is communicating to Phoenix TMC; however, none of the signals operated by Phoenix are in communication with ADOT TOC.

ADOT uses wireless *Ethernet radios* (pictured) for their traffic signal interconnect. According to ADOT, the only fiber optic cable installed within the study corridor is at the intersection with SR-101L. This location is also the gateway from radio to fiber.

### 2.6. Dynamic Message Sign (DMS)

There are no Dynamic Message Sign (DMS) devices within the corridor.

### 2.7. Other Devices

A Redflex speed camera was identified at Primrose Street. The camera is operated by El Mirage; it is currently in use with no plans to remove it.





# **US-60/Grand Avenue TMP**

**Loop 303 to Willetta Street**  
**Infrastructure Improvements and Cost Estimate**

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## ***APPENDIX TMP-2***

### **Concept of Operations**

# **US-60/Grand Avenue Traffic Management Plan**

**Loop 303 to Willetta Street**

## **Concept of Operations**

Prepared for:



Prepared By:

Burgess & Niple, Inc.

March 2017

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## **List of Acronyms**

ADOT – Arizona Department of Transportation

ALERT – Arizona Local Emergency Response Teams

ATIS – Advanced Traveler Information System

AZDPS – Arizona Department of Public Safety

CAD – Computer Aided Dispatch

CCTV – Closed Circuit Television

COMPASS – Corridor Optimization, Access Management, and System Study

DMS – Dynamic Messaging Sign

El Mirage – City of El Mirage

EVP – Emergency Vehicle Preemption

FHWA – Federal Highway Administration

Glendale – City of Glendale

HCRS – Highway Condition Reporting System

HSM – Highway Safety Manual

I – Interstate

ICM – Integrated Corridor Management

IGA – Intergovernmental Agreement

MAG – Maricopa Association of Governments

MCDOT – Maricopa County Department of Transportation

MCSO – Maricopa County Sheriff's Office

NHS – National Highway System

PD – Police Department

PTZ – Pan-Tilt-Zoom

Peoria – City of Peoria

Phoenix – City of Phoenix

Q/LOS – Quality/Level of Service

RADS – Regional Archived Data Systems

REACT- Regional Emergency Action Coordinating Team

RCN – Regional Community Network

RTP – Regional Transportation Plan

SPF – Safety Performance Function

SR – State Route

Surprise – City of Surprise

TI – Traffic Interchange

TMC – Traffic Management Center

TMP – Traffic Management Plan

TOC – Traffic Operations Center

TSMO - Transportation Systems Management and Operations

US – United States Route

V2I – Vehicle to Infrastructure

V2V – Vehicle to Vehicle

Wickenburg – Town of Wickenburg

Youngtown – Town of Youngtown

## 1.0 Introduction and Purpose

The United States Route 60 (US-60)/Grand Avenue Traffic Management Plan (TMP) is being conducted by the Maricopa Association of Governments (MAG) in partnership with the Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), City of Surprise (Surprise), City of El Mirage (El Mirage), Town of Youngtown (Youngtown), City of Peoria (Peoria), City of Glendale (Glendale), and City of Phoenix (Phoenix). The purpose of the project is to develop a Traffic Management and Operations Plan that will identify:

- Infrastructure improvements necessary to create the Intelligent Transportation Systems (ITS) traffic management infrastructure across multiple jurisdictions within the corridor; and
- An overall Concept of Operations which describes in detail how this corridor is/will be managed and operated utilizing ITS infrastructure and the roles and responsibilities of jurisdictions within the corridor.

### 1.1. Purpose of This Paper

This paper is the second in a series of four US-60/Grand Avenue TMP documents; it was prepared to identify current traffic management functions, services and responsibilities, and establish desired priorities for short, medium and long-term goals in coordination with ADOT and other agencies along the corridor. The first US-60/Grand Avenue TMP document provides an inventory of existing traffic management infrastructure.

This Concept of Operations establishes operational processes for managing the study corridor and addresses lines of communication between ADOT's and other agencies' traffic management facilities and law enforcement. Although ADOT is the lead agency along US-60/Grand Avenue, interagency cooperation and collaboration will be necessary for an Integrated Corridor Management (ICM) approach.

### 1.2. Study Area

The US-60/Grand Avenue study corridor, shown in **Figure 1**, begins at the Traffic Interchange (TI) with State Route 303 Loop (SR-303L) in Surprise at reference marker 138.051 (expressed in miles) and ends at the Willetta Street intersection in Phoenix at US-60X reference marker 161.880 (expressed in miles). The 24-mile corridor is oriented northwest-southeast, and passes through portions of Surprise, El Mirage, Youngtown, Peoria, Glendale, Phoenix, and unincorporated Maricopa County.

US-60/Grand Avenue is a regionally significant six-lane roadway that is part of the National Highway System (NHS). It serves as a vital link connecting four important regional freeways: I-10, I-17, SR-101L, and SR-303L. US-60/Grand Avenue extends north to the Town of Wickenburg, where it turns west to western Arizona and California. In Wickenburg, US-60/Grand Avenue connects with US-93, which is the primary link to northwestern Arizona and Nevada from the Phoenix metropolitan area.

**Figure 1 – Study Area Map**



**1.3. Key Agencies, Stakeholders**

This Concept of Operation was developed with involvement and input from the following stakeholders:

- MAG – Regional Coordination;
- ADOT – Transportation Systems Management and Operations (TSMO) Division, Traffic Operations Center (TOC), Arizona Local Emergency Response Teams (ALERT), Traffic Signals and Maintenance;
- Arizona Department of Public Safety (AZDPS) – Highway Patrol Incident Management;
- MCDOT – Transportation Systems Management Division, Regional Emergency Action Coordinating Team (REACT) Incident Management; and
- Municipalities – Surprise, El Mirage, Youngtown, Peoria, Glendale, and Phoenix.

## 2.0 Study Area Issues

Three primary sources of information served as the basis to identify issues that will be addressed by this study:

- Field research;
- MAG US-60/Grand Avenue Corridor Optimization, Access Management Plan, and System Study (COMPASS) – Loop 303 to Interstate 10, completed in 2015; and
- US-60/Grand Avenue TMP stakeholders.

### 2.1. Field Research

At the outset of this US-60/Grand Avenue TMP, an inventory of existing traffic management infrastructure was prepared at the end of 2015 that details the following:

- Vehicle detection;
- Emergency vehicle preemption (EVP);
- Closed Circuit Television (CCTV) cameras;
- Traffic cabinets and controllers;
- Interconnects; and
- Other devices.

The findings of this review indicate that ITS infrastructure is present, but limited, and the system is unreliable.

### 2.2. US-60/Grand Avenue COMPASS (2015)

The MAG US-60/Grand Avenue COMPASS, completed in 2015 was conducted to identify a long-term solution for accommodating travel demand and adjacent property access, establish operating principles to improve the effectiveness of traffic operations, and prepare an Access Management Plan that provides a detailed milepost-by-milepost description of adjacent property access along the US-60/Grand Avenue corridor. The underlying premise of the study is that ownership and maintenance responsibilities of the US-60/Grand Avenue corridor will remain with ADOT. A brief summary of relevant elements is provided below.

#### 2.2.1. Traffic Operations

**Roadway Segment Traffic Operations** – Based on the 2008 MAG conformity run travel demand model, the entire Study Area operates at a Quality/Level of Service (Q/LOS) of C or better in the existing condition, except for the following segments:

- Thunderbird Road to 111th Avenue – Operates at a Q/LOS F; and
- 99th Avenue to SR-101L – Operates at a Q/LOS F.

Based on two 2035 MAG travel demand models evaluated (projected population using the 2026 RTP network and adjusted 8 million population using the 2026 RTP network), multiple segments within the corridor are projected to operate at Q/LOS F. Key segments include:

- SR-303L to Bell Road;
- Thunderbird Road to SR-101L; and
- Northern Avenue to Indian School Road.

**Intersection Traffic Operations** – Based on the 2012 modeling results prepared and provided by MAG for the AM and PM peak periods, half of the intersections (twelve out of twenty-four) within the Study Area operate at LOS D or better during both AM and PM peak periods.

However, as forecast volumes increase throughout the corridor for both 2035 AM and PM peak period scenarios, all intersections operate at LOS E or F, except the following:

- Reems Road (City of Surprise/Sun City West) - Operates at LOS C during AM and LOS D during PM;
- Greenway Blvd (City of El Mirage/City of Surprise) - Operates at LOS C during AM and PM;
- Acoma Drive (City of El Mirage) - Operates at LOS D during AM and PM;
- Santa Fe Drive (City of El Mirage) - Operates at LOS C during AM and LOS B PM; and
- Primrose Street (City of El Mirage) - Operates at LOS D during AM and PM.

### 2.2.2. Crash History

The crash evaluation was conducted based on 2009 to 2011 data. During this period, the Study Area as a whole had 2,319 crashes. The yearly totals were steady from year to year, with 773 crashes in 2009, 774 in 2010, and 772 in 2011. Over 80% of the crashes in the study area occurred at intersections, with the majority of those at regular four-leg intersections. A downward trend was identified of non-intersection related crashes along the corridor and an upward trend of three, five, and six-leg intersection related crashes. No adverse lighting or weather patterns were identified, as 74% of the crashes in the study area occurred during daylight conditions, and 89% occurred under clear skies.

Crash severity was also consistent across the three year period, with only 4% involving incapacitating or fatal injuries, which is lower than the statewide average of 10%. A summary is provided below in **Table 1**.

**Table 1 – Crash Severity Summary**

Crash Severity	2009	2010	2011	Total %
Fatal	5	4	4	1
Incapacitating Injury	23	19	17	3
Non-Incapacitating Injury	84	86	87	11
Possible Injury	130	137	132	17
Property Damage Only	531	528	532	69
<b>Total</b>	<b>773</b>	<b>773</b>	<b>774</b>	

There were a total of 20 rail-related crashes along the US-60/Grand Avenue corridor, with no associated fatalities and 24 pedestrian and bicycle related crashes, two of which resulted in fatalities.

Six high crash locations were identified. Each of these intersections had a total of 80 or more crashes in the three year period.

- Bell Road;
- Thompson Ranch Road;
- 111th Avenue;
- 91st Avenue;
- 75th Avenue; and
- Bethany Home Road.

The primary crash type at these six intersections was rear-end crashes, accounting for almost 60% of the total intersection crashes. Many of these rear-end crashes were vehicles stopped in traffic approaching the intersections, which can signify congestion along the corridor. The second leading crash type at these intersections is same direction sideswipe crashes, just under 18%. Most of these crashes occurred when drivers were attempting to change lanes near an intersection.

The five roadway segments with the highest number of crashes were identified. These sections each had a total of 30 or more crashes in the three year period.

- Mile 141 (MP 141 to MP 142) – Reems Road to Litchfield Road;
- Mile 146 (MP 146 to MP 147) – Olive Street to 107th Avenue;
- Mile 147 (MP 147 to MP 148) – 107th Avenue to 101st Avenue;
- Mile 148 (MP 148 to MP 149) – 101st Avenue to SR-101L; and
- Mile 158 (MP 158 to MP 159) – 41st Avenue to 35th Avenue/Indian School Road.

The primary crash type throughout these sections was rear-end crashes, accounting for almost 64% of the total crashes. This typically signifies either congestion or access management issues along the corridor.

### **2.2.3. Study Recommendations**

A wide variety of needs were identified; the following recommendations were made:

- Revised intersection geometry and new grade separated traffic interchanges;
- Developed signing guidelines and the need for ITS improvements;

- Continued support for commuter rail; and
- Created an access management approach and plan.

### 2.3. Stakeholder Identified Needs

US-60/Grand Avenue TMP stakeholder engagement identified a variety of issues and needs along the Study Area. These are outlined in the sections below.

#### 2.3.1. Data Collection

Currently, ADOT and Phoenix lack data collection methods that provide real-time information about the corridor. Data collection is important in allowing the agencies to efficiently plan for high traffic volumes and unexpected events such as crashes and inclement weather.

#### 2.3.2. ITS Infrastructure Improvements

The ITS infrastructure along the corridor is owned by ADOT and Phoenix. Of the infrastructure available, much is unreliable and inconsistent. For example, CCTV cameras lack the sufficient bandwidth to connect to the ADOT TOC and there are no Dynamic Message Signs (DMS) to facilitate communication to the public.

#### 2.3.3. Signal Timing Progression

In 2012, coordination timing plans were developed and implemented to improve the flow of traffic along US-60/Grand Avenue between 163rd Avenue and McDowell Road. The AM peak, PM peak, and off peak (midday) periods were analyzed favoring eastbound (inbound) progression during the AM peak, westbound (outbound) progression in PM peak, and balanced progression in both directions during the midday periods. Changes to traffic signal cycle lengths, green times, offset values, and split lengths were made and resulted in increased average speed and reduced travel time, fuel consumption, and emissions. There is a MAG Traffic Signal Optimization Program project along US-60/Grand Avenue, from SR-101L to 51st Avenue, planned for 2017 to review the timing plans.

#### 2.3.4. EVP and Traffic Signal Preemption at Railroad Crossings

There are five intersections along US-60/Grand Avenue equipped with EVP devices. There are four intersections with EVP devices within Surprise, including Mountain View Boulevard, Litchfield Road, Belle Grand Drive, and 132nd Avenue. Neither ADOT nor Surprise assume ownership of these EVP devices. The last EVP device is located at Towne Center Drive within unincorporated Maricopa County. MAG noted that incident response times through the corridor are above the national average which is likely caused by a lack of preemption. Surprise currently has an Intergovernmental Agreement (IGA) with ADOT to enter ADOT right-of-way and install additional EVP devices.

ADOT does not currently maintain preemption equipment. In addition, there is uncertainty between ADOT and the local agencies as to whom the responsible party is when preemption equipment fails.

### 2.3.5. Adaptive Signal Control

While the corridor is equipped with vehicle detection devices, it lacks an adaptive signal control system. Adaptive signal control would allow the signal timing of the corridor to adapt to real-time events such as crashes, special events, and weather.

### 2.3.6. Bicycle, Pedestrian, and Transit Accommodations

Bicycle, pedestrian, and transit facilities along US-60/Grand Avenue are limited; however, the corridor is planned to be redeveloped with continuous sidewalks and increased transit, ultimately including commuter rail.

### 2.3.7. Transit Signal Priority

The 2010 MAG *Grand Avenue Commuter Rail Corridor Development Plan* identified commuter rail as the preferred long-term transit option along US-60/Grand Avenue and was carried forward in the US-60/Grand Avenue COMPASS project. These plans identify the current planning conditions for transit along US-60/Grand Avenue.

Valley Metro is conducting the *Grand Avenue Transit Feasibility Study* to make recommendations for the express and high capacity transit along the corridor for the short (2020) and mid-term (2026) horizons. These recommendations were developed to increase the number of transit users and to be able to support the long-term (2035) recommendation for commuter rail along US-60/Grand Avenue. The *Grand Avenue Transit Feasibility Study* identified transit signal priority as part of the mid-term recommendations to prepare for the implementation of commuter rail.

### 2.3.8. Planned Construction Coordination

There are on-going and planned improvements along US-60/Grand Avenue that affect the operations of the corridor. The construction on US-60/Grand Avenue at Bell Road is an example of efficient coordination between ADOT and MCDOT, minimizing delays on both corridors and identifying detours routes.

### 2.3.9. Connected Vehicle Infrastructure

Connected vehicle technology is emerging with an increase in test beds throughout the nation. Although it is not expected that improvements be made now, a consideration must be made for inclusion of connected vehicle infrastructure in future plans. Current applications by MCDOT, for example, include the SMARTDrive Program, National Signal Phase and Timing (SPaT) Challenge, and Anthem Test Bed Multi-Modal Intelligent Traffic Signal System (MMITSS).

### 2.3.10. Intergovernmental Agreements

Currently, IGAs are in place between ADOT, Phoenix, and MCDOT for traffic management and operations. The IGAs, which are included in **Appendix TM2-1**, allow the partners to mutually develop ICM projects and share ITS infrastructure. Surprise has developed an IGA with ADOT for EVP devices within the US-60/Grand Avenue corridor.

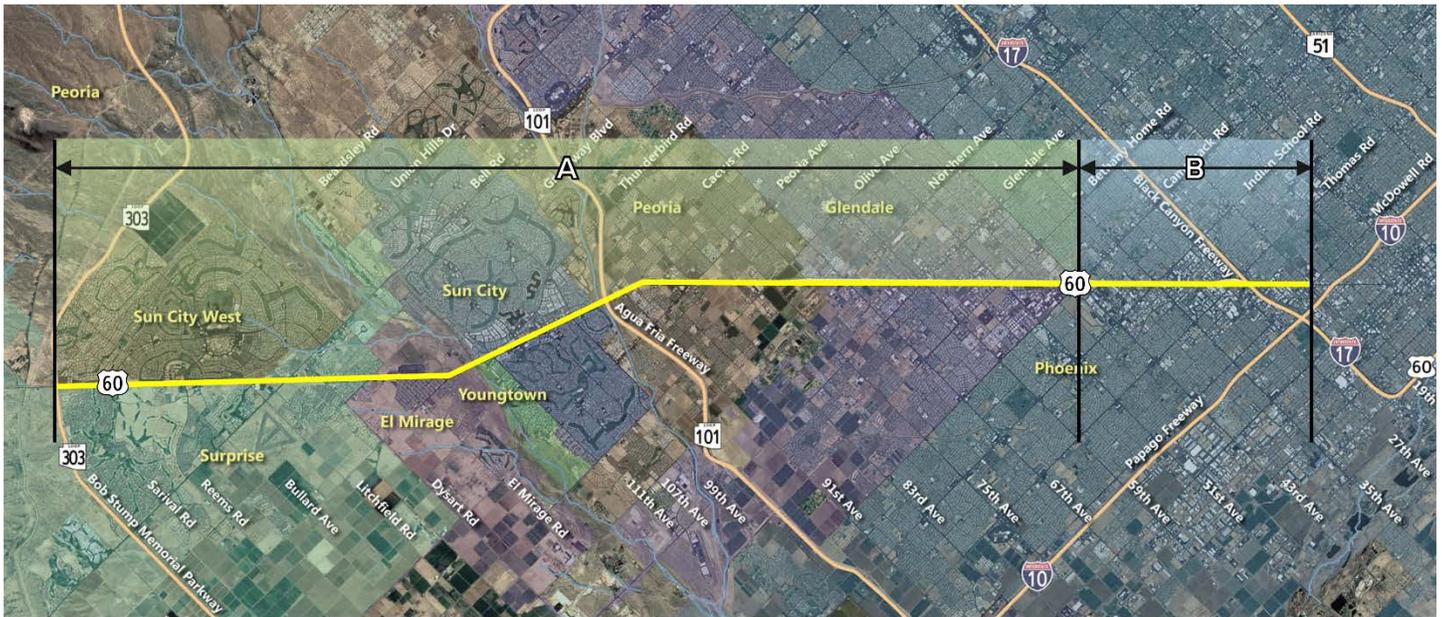
## 3.0 Existing Corridor Management

The inventory of existing traffic management infrastructure was documented in the first paper completed at the end of 2015 for this study. Information, such as devices within the study area, type of hardware (if known), and jurisdictional ownership was documented. Generally, with the exception of the recently completed ADOT project (888 MA 000 H8343 01C) and recently installed Phoenix surveillance devices, the traffic control infrastructure is inconsistent and incomplete. The following sections outline the current operating procedures for the corridor.

### 3.1. Corridor Operations

ADOT owns, maintains, and operates US-60/Grand Avenue throughout the study corridor, with one exception of traffic management infrastructure. ADOT owns, maintains, and operates traffic management infrastructure between SR-303L and Camelback Road/43rd Avenue, which is illustrated in **Figure 2** as Segment A. Phoenix owns, maintains, and operates the traffic management infrastructure between Camelback Road/43rd Avenue and Willetta Street, which is illustrated on **Figure 2** as Segment B. The US-60/Grand Avenue intersection at Camelback Road/43rd Avenue is a grade-separated TI and does not have a traffic signal on US-60/Grand Avenue.

**Figure 2 – Existing Corridor Operations**



Adjacent agencies along US-60/Grand Avenue include MCDOT, Surprise, El Mirage, Youngtown, Peoria, and Glendale. These agencies do not own any infrastructure along the corridor but have ownership or jurisdictional control of the intersecting roads.

### 3.2. Services, Roles and Responsibilities

Although US-60/Grand Avenue crosses multiple jurisdictions, only ADOT and Phoenix have assumed responsibility for operation and maintenance. **Table 2** identifies primary agency roles and responsibilities by jurisdiction and facility along the US-60/Grand Avenue corridor.

**Table 2 – Primary Agency Roles and Responsibilities**

Jurisdiction/Agency	Facility	Roles and Responsibilities
<b>ADOT</b>	Traffic Operations Center	Traffic device management
	Traffic and Electrical Operations	Traffic signal equipment maintenance Traffic device management TransSuite traffic signal control
<b>Phoenix</b>	Traffic Management Center	Traffic signal plans TransSuite traffic signal control
	Maintenance	Maintenance

**Table 3** identifies the roles and responsibilities of the jurisdictions adjacent to the US-60/Grand Avenue corridor for informational purposes.

**Table 3 – Adjacent Agency Roles and Responsibilities**

Jurisdiction/Agency	Facility	Roles and Responsibilities
<b>Maricopa County (MCDOT)</b>	Traffic Management Center	Traffic management, coordination with regional TOC/TMCs, device and system managements, system integration support, traveler information, REACT, Regional Archived Data System (RADS), Advanced Traffic Performance Measures
<b>Surprise</b>	Traffic Management Center	Coordination with neighboring jurisdictions TMCs
<b>El Mirage</b>	No Traffic Management Center	
<b>Youngtown</b>	No Traffic Management Center	
<b>Peoria</b>	Traffic Management Center	Device Management, coordination with neighboring jurisdictions TMCs
<b>Glendale</b>	Traffic Management Center	Operations

Six out of eight jurisdictions have their own TOC/Traffic Management Center (TMC), provide incident management services, and operate on different systems and schedules. **Table 4** identifies the primary agency operating hours and locations of the facilities used to operate and maintain US-60/Grand Avenue by jurisdiction.

**Table 4 – Primary Agency Facility Operating Hours and Location**

Jurisdiction	Facility	Hours/Days	Location
ADOT	Traffic Operations Center	24/7/365	2302 W Durango St Phoenix, AZ 85009
	Traffic and Electrical Operations		2302 W Durango St Phoenix, AZ 85009
Phoenix	Traffic Management Center	6:00AM – 6:00PM Monday-Friday	200 W Washington St Phoenix, AZ 85003
	Maintenance	24/7/365	200 W Washington St Phoenix, AZ 85003

**Table 5** identifies the facility operating hours and locations of the jurisdictions adjacent to the US-60/Grand Avenue corridor for informational purposes.

**Table 5 – Adjacent Jurisdictions Facility Operating Hours and Locations**

Jurisdiction	Facility	Hours/Days	Location
Maricopa County (MCDOT)	Traffic Management Center	6:00AM – 6:00PM Monday-Friday	2919 W Durango St Phoenix, AZ 85007
Surprise	Traffic Management Center	8:00AM – 5:00PM Monday-Friday	14250 W. Statler Plz Ste 101 Surprise, AZ 85374
El Mirage	No Traffic Management Center		
Youngtown	No Traffic Management Center		
Peoria	Traffic Management Center	6:00AM – 6:00PM Monday-Friday	9875 N. 85th Ave Peoria, AZ 85345
Glendale	Traffic Management Center	6:00AM – 6:00PM Monday-Friday	9658 N. 59th Ave Glendale, AZ 85301

### 3.3. Corridor Systems

#### 3.3.1. Traffic Control Infrastructure

US-60/Grand Avenue is operated from the individual agency central traffic control locations, the ADOT TOC and Phoenix TMC. *Econolite* traffic signal controllers are used within the corridor. ADOT maintained traffic signals are interconnected using wireless Ethernet radios. ADOT indicated communication issues occur due to the distance the information has to travel to the TOC. Bandwidth limitations hinder communication between the CCTV camera at Myrtle Avenue and the ADOT TOC; although the CCTV camera at Myrtle is functioning, improvements to the bandwidth would improve the functionality and reliability of the CCTV camera. Phoenix maintained traffic signals are interconnected using *Tropos Radios*.

*TransSuite* by *TransCore* is being used by the ADOT TOC and Phoenix TMC to manage the traffic signals remotely. The four Phoenix CCTV cameras are connected to the TMC via wireless technology and allow for surveillance of the corridor within Phoenix jurisdiction during business hours. While ADOT has access to the Phoenix CCTV video feed through the MAG Regional Community Network (RCN) for surveillance after business hours, ADOT is not able to control the Pan-Tilt-Zoom (PTZ) functionality of the cameras. **Table 6** summarizes the current operating scenario during and after business hours as identified in **Table 4**.

**Table 6 – Current Operating Scenario**

	Phoenix TMC	ADOT TOC
Business Hours	<ul style="list-style-type: none"> <li>• Corridor surveillance</li> <li>• PTZ control (Phoenix cameras)</li> <li>• Own traffic signals within jurisdiction</li> <li>• No pre-established traffic signal plans for incident management</li> </ul>	<ul style="list-style-type: none"> <li>• No corridor surveillance</li> <li>• No PTZ control (Phoenix cameras)</li> <li>• Own remaining traffic signals on US-60/Grand Avenue</li> <li>• No pre-established traffic signal plans for incident management</li> </ul>
After Hours	<ul style="list-style-type: none"> <li>• Closed</li> </ul>	<ul style="list-style-type: none"> <li>• Corridor surveillance</li> <li>• No PTZ control (Phoenix cameras)</li> <li>• Own remaining traffic signals on US-60/Grand Avenue</li> <li>• No pre-established traffic signal plans for incident management (including inability to change Phoenix signal plans)</li> </ul>

Twenty-seven of the thirty-seven signalized intersections in the US-60/Grand Avenue corridor use video detection systems; MCDOT, Surprise, El Mirage, Youngtown, and Peoria have adopted video detection systems. Loop detectors are widely used for Glendale and Phoenix intersections adjacent to the study area. In addition to loop detectors, an ITS Plus 3rd generation camera by ITS Plus Inc. is deployed at the Osborn Avenue/31st Avenue intersection in Phoenix due to the difficulties of loop installation at the BNSF Railway railroad tracks.

All agencies along US-60/Grand Avenue are part of the MAG RCN, which provides high-speed optical fiber based communications to exchange video and data within the region; however, it is limited within the corridor. The data exchanged, where available, includes video footage from CCTV cameras and traffic signal timing information. **Table 7** lists the existing devices along the corridor by owner.

**Table 7 – Infrastructure Ownership**

Jurisdiction	Device Type	Device Location
ADOT	Traffic Signals	31 locations (Loop 303 to 51st Ave/Bethany Home Rd)
	CCTV	Myrtle 67th Ave/Northern Ave (removed)
	Vehicle Detection	Video, Loops
	Fiber	91st Avenue Bell Rd (under construction)
Phoenix	Traffic Signals	6 locations (35th Ave/Indian School Rd to 19th Ave/McDowell Rd)
	CCTV	35th Ave/Indian School Rd Osborn Rd Encanto Blvd 19th Ave/McDowell Rd
	Vehicle Detection	Video, Loops
	Fiber	None

### 3.4. Contacts

**Table 8** lists the contact information for the various facilities of the primary agencies.

**Table 8 – Primary Agency Contacts**

Jurisdiction	Facility	Contact Person	Phone/Email
ADOT	TOC	Steve Ramsey Traffic Management	(602) 712-8878 <a href="mailto:sramsey@azdot.gov">sramsey@azdot.gov</a>
	Traffic Signals	Mark Poppe Systems Maintenance	(602) 359-2277 <a href="mailto:mpoppe@azdot.gov">mpoppe@azdot.gov</a>
	ALERT	Craig Cornwell Operations Roadway Superintendent	(602) 712-7980 <a href="mailto:ccornwell@azdot.gov">ccornwell@azdot.gov</a>
Phoenix	TMC	Bruce Littleton Traffic Engineer Manager	(602) 262-4690 <a href="mailto:bruce.littleton@phoenix.gov">bruce.littleton@phoenix.gov</a>

**Table 9** lists the contact information for the various facilities of jurisdictions adjacent to the US-60/Grand Avenue corridor for informational purposes.

**Table 9 – Adjacent Agency Contacts**

Jurisdiction	Facility	Contact Person	Phone/Email
Maricopa County (MCDOT)	TMC	Faisal Saleem ITS Branch Manager	(602)506-1241 <a href="mailto:faisalsaleem@mail.maricopa.gov">faisalsaleem@mail.maricopa.gov</a>
	REACT	Barbara Hauser REACT Manager	(602) 506-6218 <a href="mailto:BarbaraHauser@mail.maricopa.gov">BarbaraHauser@mail.maricopa.gov</a>
Surprise	TMC/Signals	Albert Garcia ITS Operations	(623) 222-1733 <a href="mailto:albert.garcia@surpriseaz.gov">albert.garcia@surpriseaz.gov</a>
El Mirage	N/A	Bryce Christo Civil Engineer	(623) 876-2974 <a href="mailto:bchristo@cityofelmirage.org">bchristo@cityofelmirage.org</a>
Youngtown	N/A	Grant Anderson Town Engineer	(602) 319-6368 <a href="mailto:ganderson@willdan.com">ganderson@willdan.com</a>
Peoria	TMC/Signals	Steve McKenzie ITS Engineer	(623) 773-7994 <a href="mailto:Steve.McKenzie@peoriaaz.gov">Steve.McKenzie@peoriaaz.gov</a>
Glendale	TMC/Signals	Allan Galicia ITS Analyst	(623) 930-2940 <a href="mailto:agalicia@glendaleaz.com">agalicia@glendaleaz.com</a>

## 4.0 Planned Corridor Management

### 4.1. Services, Roles and Responsibilities

The premise of the MAG US-60/Grand Avenue COMPASS was that ADOT will continue ownership and maintenance of the US-60/Grand Avenue corridor. During the initial phases of the TMP, there was no benefit or interest identified by ADOT or Phoenix to turn control of the Phoenix owned and maintained traffic signals over to ADOT in the short-term. The long-term goal is for ADOT to assume ownership and maintenance responsibilities for all remaining non-ADOT traffic signals in the study area once the MAG US-60/Grand Avenue COMPASS recommendations are implemented. Future operations and maintenance of the traffic signals will be dependent on the nature of future improvements at each location. It is agreed local agency partners will maintain all traffic signals along the US-60/Grand Avenue corridor that are grade separated from the US-60/Grand Avenue mainline, e.g. the newly reconstructed Bell Road grade separation, Glendale Avenue/59th Avenue, and US-60/Grand Avenue ramp terminals at 27th Avenue.

### 4.2. Identification of Needs

Traffic operation and control needs were identified by the study stakeholders for short-, medium-, and long-term planning horizons based on the existing conditions presented in **Section 2.0**. Short-term needs include those within the next five years. Medium-terms needs were identified as longer term items for the corridor in its current geometric configuration. Long-term needs include those beyond a 20 year horizon required to accommodate the US-60/Grand Avenue COMPASS recommendations, such as new grade-separated TIs and commuter rail.

#### 4.2.1. Short-Term Needs

##### 4.2.1.1. Data Collection

There is a need to improve data collection to allow agencies to be better aware of the daily traffic patterns along the corridor and adjust traffic control measures as needed. Enhanced data collection, such as traffic volumes, speeds, travel times, and origins-destinations, will facilitate improved operations and performance measure reporting, including advanced traffic signal performance measures.

There is a need to identify and collect performance measures that are meaningful to the traveling public and the various agency stakeholders. ADOT will be tasked to manage US-60/Grand Avenue through several political jurisdictions. To perform effectively, ADOT must first have customer and stakeholder consensus on desired outcome performance measures related to safety, mobility, and access.

##### 4.2.1.2. Signal Timing Progression

There is a need to monitor and continue adjusting traffic signal timing to maintain progression along the US-60/Grand Avenue corridor and to enhance operational efficiency across the various jurisdictions. Timing plans should be updated every three to five years, adjusted for population growth and capacity needs, to maintain efficient corridor operations. Specific signal timing plans should be developed by ADOT and Phoenix for incident management. These should be coordinated with the adjacent agencies to provide an effective transportation system.

In addition, it is necessary to set a single time source to develop signal timing plans. ADOT and the Phoenix will need to coordinate signal timing progression plans to create a consistent corridor from SR-303L to Willetta Street. Coordinated signal timing progression will allow for a reduction in total delay and increased average speed.

#### **4.2.1.3. EVP and Traffic Signal Preemption at Railroad Crossings**

There is a need for additional EVP devices and traffic signal preemption along US-60/Grand Avenue. EVP devices would aid incident management allowing emergency services to arrive at the incident with reduced response times. The agencies adjacent to the study corridor have deployed different EVP technology. Future EVP deployment should provide an interoperable solution, such that all responders are capable of activating preemption regardless of agency boundaries. The ADOT *Traffic Engineering Guidelines and Processes* should be reviewed and considered with future EVP deployment.

There is also a need for railroad preemption along the corridor. The BNSF Railway has tracks that run adjacent to US-60/Grand Avenue and often creates delays for drivers. A coordinated system may allow the railroad to travel through the corridor with reduced stops and would help eliminate the congestion created when trains stop and block intersections.

#### **4.2.1.4. IGA Agreement Development**

There is a need to develop new IGAs or amendments to existing IGAs for EVP devices. IGAs will clarify agency roles and provide permission to local agencies to access and maintain EVP devices. The IGA between Surprise and ADOT was used to develop a template IGA, included as **Appendix TM2-2**, for other cities to use for new EVP devices.

Depending on the ultimate ITS configuration, a new IGA amendment(s) would need to be developed for traffic management and operations. The new IGA amendment(s) would include agreements for items such as full access and control of other agency CCTV cameras for the primary agency, implementation of traffic signal timing plans, maintenance and operation of preemption equipment, and a traffic incident management response strategy that supports the goals of all jurisdictions.

#### **4.2.1.5. Bicycle, Pedestrian, and Transit Accommodations**

There is a need to evaluate traffic signals to accommodate bicycle and pedestrian movements, including their access to transit along US-60/Grand Avenue. Data collection of bicycle and pedestrian traffic may be warranted to facilitate the multimodal redevelopment of the corridor. This information will facilitate planning for various modes of transportation.

#### **4.2.1.6. Planned Construction Coordination**

There is a need for planned construction coordination among the agencies to align construction schedules, avoid unnecessary costs, and maintain the operational efficiency of the corridor; it will be critical to coordinate planned construction to complete projects in a timely manner and provide cost saving opportunities. With the many improvements coming to US-60/Grand Avenue, including wireless communication, installation of traffic management devices, and roadway improvements, coordination of construction activities will be necessary to reduce impacts to the capacity of the roadway network.

## 4.2.1.7. Safety Considerations

There is a need to consider safety in identifying and implementing improvements along the corridor. Implementing the MAG US-60/Grand Avenue COMPASS recommendations, along with those listed herein, are anticipated to improve corridor safety.

The state of practice for road safety management is changing with the increased use of methods found in the AASHTO Highway Safety Manual (HSM). The HSM provides more statistically robust methods for: (1) assessing existing safety performance, (2) estimating expected reduction in crashes associated with proposed safety countermeasures, and (3) evaluating the safety effect of implemented changes. US-60/Grand Avenue is somewhat unique with respect to facility type. Therefore, the various intersections and segments may not be amenable to the application of the "site type" Safety Performance Functions (SPF)s found in the HSM or elsewhere. As part of the overall management of US-60/Grand Avenue, it will be important to have a sound safety management component. This may require the development of US-60/Grand Avenue specific SPFs following the Federal Highway Administration (FHWA) guide: *A How-to Guidebook for States Developing Jurisdiction-Specific SPFs*.

A recommended incident management process is part of this plan and will help address the safety concerns along US-60/Grand Avenue.

## 4.2.2. Mid-Term Needs

### 4.2.2.1. ITS Infrastructure Improvements

ITS infrastructure is limited along the US-60/Grand Avenue corridor. Project stakeholders expressed the desire to expand existing communications and data collection along the corridor to aid with operations and management.

**Communications** – There is a need to install a new communication system to improve video and traffic control device management capabilities. The new system should improve existing radio communications, expand the use of fiber optic communication along the corridor, and connect to the RCN wherever possible.

**Devices** – There is a need to install new CCTV cameras to verify the traffic conditions and facilitate incident management. Camera spacing should be at about one-half to three-quarters of a mile to be able to view the entire roadway geometry and avoid obstructions. The cameras will need to have low light capabilities or lighting will have to be improved along the corridor for night conditions. The addition of CCTV cameras would allow ADOT and Phoenix to monitor the corridor more efficiently, identify incidents rapidly, and respond to incidents more effectively.

There is a need to install new DMS at strategic locations along the 24-mile long corridor as a means of communicating with the traveling public. The ADOT *Statewide Dynamic Message Sign Masterplan Guidelines for Location and Placement of Permanent DMS* identified locations for DMS along the corridor. DMS would provide the traveling public with traffic updates and estimated travel times along the corridor. In addition, DMS would aid with incident management to warn drivers of a crash ahead and inform them to select an alternate route if necessary.

## 4.2.2.2. Adaptive Signal Control

Adaptive traffic signal control should be explored for the corridor to respond to changing traffic demand throughout the weekday. In areas of the corridor where there is no predominate direction of traffic, an adaptive system might benefit operations in minimizing delay. Study of an adaptive system would need to consider local agency input for coordination.

## 4.2.3. Long-Term Needs

### 4.2.3.1. Transit Signal Priority

There is a need to implement transit signal priority when the commuter rail identified in the MAG *Grand Avenue Commuter Rail Corridor Development Plan* and Valley Metro *Grand Avenue Transit Feasibility Study* begins operation. Commuter rail operations would be conducted within the existing BNSF Railway right-of-way using their tracks and would require coordination with BNSF Railway freight schedules.

### 4.2.3.2. Connected Vehicle Infrastructure

There is a need to plan for connected vehicle infrastructure. Long-term ITS needs include improvements to the infrastructure along the corridor to prepare for emerging connected vehicle technology. Traffic signals will need to be improved with Vehicle to Infrastructure (V2I) technology. Connected vehicle infrastructure will improve traffic operations to support public safety and surface transportation mobility. IGAs would be necessary to allow private entities access to controller data.

## 4.3. Recommended Corridor Operations

The premise of the MAG US-60/Grand Avenue COMPASS is that ADOT will be the lead agency managing the entire study corridor. ADOT will be the lead agency operating the corridor and leading coordination efforts with other agencies adjacent to the corridor. ADOT will eventually operate and maintain all traffic signals and ITS devices on the US-60/Grand Avenue mainline. US-60/Grand Avenue would be given traffic signal priority along the corridor, as recommended in the MAG US-60/Grand Avenue COMPASS. In addition, it is anticipated that by 2035, major intersections would be grade separated. If US-60/Grand Avenue is grade-separated, the signalized ramp terminals on the arterial street system will be operated and maintained by the local agency responsible for the arterial.

**Table 10** summarizes the recommended corridor operations during and after business hours for the short-, mid-, and long-term horizons.

**Table 10 – Recommended Operating Scenarios per Horizon**

	Phoenix TMC	ADOT TOC
<b>Short-Term Operating Scenario</b>		
<b>Business Hours</b>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control (Phoenix cameras)</li> <li>Own traffic signals within jurisdiction</li> <li>No pre-established traffic signal plans for incident management</li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>No PTZ control (Phoenix cameras)</li> <li>Own remaining traffic signals on US-60/Grand Avenue mainline</li> <li>No pre-established traffic signal plans for incident management</li> </ul>
<b>After Hours</b>	<ul style="list-style-type: none"> <li>Closed</li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>No PTZ control (Phoenix cameras)</li> <li>Own remaining traffic signals on US-60/Grand Avenue mainline</li> <li>No pre-established traffic signal plans for incident management (including inability to change Phoenix signal plans)</li> </ul>
<b>Mid-Term Operating Scenario</b>		
<b>Business Hours</b>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control (Phoenix cameras)</li> <li><b>Own traffic signals within jurisdiction (phased switch)</b></li> <li><b>Pre-established traffic signal plans for incident management</b></li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li><b>PTZ control (all cameras)</b></li> <li>Own remaining traffic signals on US-60/Grand Avenue mainline</li> <li><b>Pre-established traffic signal plans for incident management</b></li> </ul>
<b>After Hours</b>	<ul style="list-style-type: none"> <li><b>Corridor surveillance</b></li> <li><b>PTZ control (Phoenix cameras)</b></li> <li><b>Own traffic signals within jurisdiction (phased switch)</b></li> <li><b>Pre-established traffic signal plans for incident management</b></li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li><b>PTZ control (all cameras)</b></li> <li>Own remaining traffic signals on US-60/Grand Avenue mainline</li> <li><b>Pre-established traffic signal plans for incident management</b></li> </ul>
<b>Long-Term Operating Scenario</b>		
<b>Business Hours</b>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control</li> <li><b>Own no traffic signals</b></li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control</li> <li><b>Own all traffic signals on US-60/Grand Avenue mainline</b></li> <li>Pre-established traffic signal plans for incident management</li> </ul>
<b>After Hours</b>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control</li> <li><b>Own no traffic signals</b></li> </ul>	<ul style="list-style-type: none"> <li>Corridor surveillance</li> <li>PTZ control</li> <li><b>Own all traffic signals on US-60/Grand Avenue mainline</b></li> <li>Pre-established traffic signal plans for incident management</li> </ul>

**Bold text** indicates changes from the prior planning horizon.

Based on the planned improvements and needs, US-60/Grand Avenue would experience many enhancements from now through 2040, including ITS infrastructure, roadway, and multi-modal facilities to aid in corridor operations.

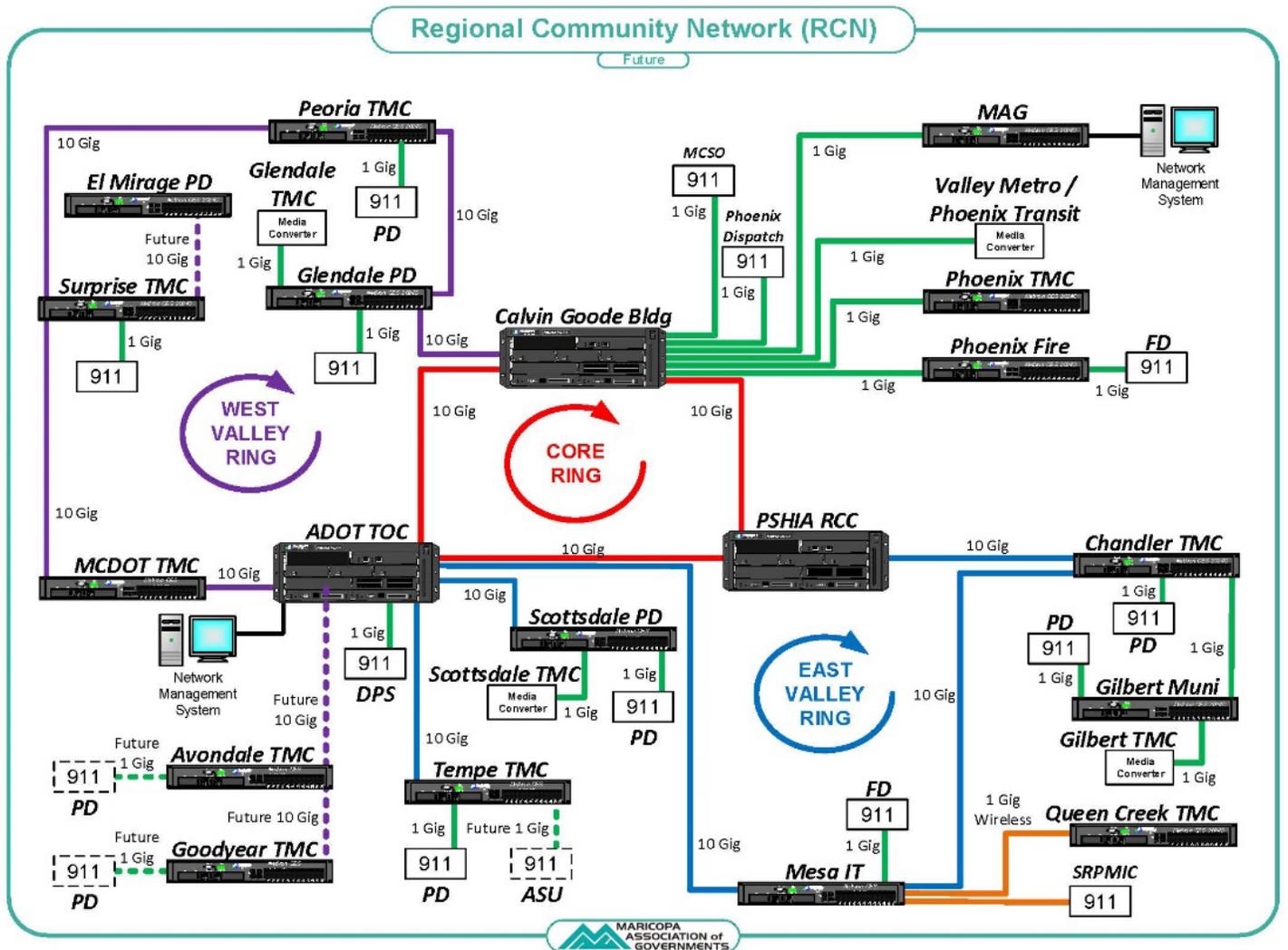
Within the next five years, improvements should be made to the current communications system to allow ADOT to more efficiently manage the corridor through real-time monitoring and work with ADOT ALERT to provide incident management services. The planned improvements may include better wireless communication for traffic signals connecting to the TOC and incorporating new connections with fiber optic cable at select locations along the corridor. There is existing conduit owned by agencies along US-60/Grand Avenue that could be used to house the new fiber optic cable via an IGA and the existing RCN. The wireless communication could be used to tie a number of traffic signals at one location to the fiber. Based on the multiple tie-in locations, communication between signals and ADOT TOC would be more reliable for real-time operations management.

The improved communication system would allow ADOT to make ITS improvements along the corridor including CCTV cameras and DMS. In the short-term, advanced CCTV cameras with capabilities such as vehicle detection, data collection for possible adaptive signal control, and video monitoring could be installed at signalized intersections as an approach to satisfy multiple identified needs. Once US-60/Grand Avenue is reconstructed with grade-separated intersections in the long-term, traditional CCTV cameras would be installed mid-block to supplement or replace the cameras at signalized intersections. It is intended that DMS would be installed at select locations to allow ADOT to post travel times, planned closures, and incident reports. The DMS locations will be guided by the ADOT *Statewide Dynamic Message Sign Masterplan Guidelines for Location and Placement of Permanent DMS*. Placement of CCTV cameras will also need to be coordinated with potential DMS locations to ensure the DMS can be monitored using the CCTV cameras and that the camera has PTZ capabilities to be able to verify the message contents. The need for DMS may be re-evaluated in the future, depending on the rate of change in advancing V2I and Vehicle to Vehicle (V2V) technology.

There are also planned improvements to the RCN to enhance communications between partner agencies.

**Figure 3** shows the future RCN.

**Figure 3 – Future Regional Community Network**



Planned traffic signal improvements through 2040 include retimed signal plans, signal timing plans specific to incident management, EVP devices and preemption, adaptive signal control, and connected vehicle infrastructure. These improvements will aid in reducing traffic congestion, improving incident response times, and minimizing safety concerns and give ADOT more control of the corridor to make improvements and adjustments during unique situations.

Planned multimodal enhancements include bicycle, pedestrian, and transit improvements, and transit signal priority. Within the next five years, the corridor should be improved to provide safer pedestrian and bicycle facilities. Within the next ten years, options for transit will improve with increased stops along the corridor. Short and mid-term improvements will be developed to prepare for the recommended commuter rail service adjacent to US-60/Grand Avenue using the existing BNSF Railway railroad tracks.

Improvements to the corridor operations will be developed to create a continuous corridor through the study area and allow ADOT to more efficiently monitor and maintain this regionally significant roadway.

## 5.0 Current Incident Management Plan

Incidents along US-60/Grand Avenue are primarily managed by first responders including AZDPS, local police, fire, and emergency services. The purpose of first responders is to help individuals involved in an incident and then identify the magnitude of an incident to determine support needs. Generally, first responders are the primary groups to be notified of an incident and therefore serve as the line of communication to traffic incident management teams, such as ADOT ALERT; TOC/TMCs; and towing companies. The primary purpose of the incident management teams is to address injuries, secure the crash site, and provide traffic control services to reduce the chance of secondary crashes and mitigate congestion.

**Table 11** identifies the roles and responsibilities of the jurisdictions along US-60/Grand Avenue for incident management. ADOT ALERT provides traffic incident management support services to first responders within ADOT right-of-way. Peoria and Glendale have IGAs with MCDOT to engage REACT for traffic incident management support along intersecting roads within their jurisdictions. MCDOT REACT may also provide traffic incident management support to ADOT ALERT and other local jurisdictions when requested and where signed agreements are in place.

**Table 11 – Agency Incident Management Roles and Responsibilities**

Jurisdiction/Agency	Group	Roles and Responsibilities
ADOT	ALERT	Incident management within ADOT right-of-way
AZDPS	N/A	Incident management
Phoenix	Police Department	Incident management
Maricopa County	Sheriff's Office	Incident management
Maricopa County (MCDOT)	REACT	Incident management along intersecting roads *generally limited to Peoria and Glendale
Surprise	Surprise Police Department	No Role
El Mirage	El Mirage Police Department	Incident Management
Youngtown	No Police Department, Maricopa County Sheriff's Department	
Peoria*	Peoria Police Department	Incident Management
Glendale*	Glendale Police Department	Incident Management

\*May request help from MCDOT REACT.

**Table 12** identifies the agency incident management facility operating hours and location.

**Table 12 – Incident Management Group Operating Hours and Locations**

Jurisdiction	Group	Hours/Days	Location
<b>ADOT</b>	ALERT	24/7/365	2140 W. Hilton Ave Phoenix, AZ 85009
<b>Phoenix</b>	Police Department	24/7/365	620 W Washington St Phoenix, AZ 85003
<b>AZDPS</b>	N/A	24/7/365	2102 W Encanto Blvd Phoenix, AZ 85009
<b>Maricopa County</b>	Sheriff's Office	24/7/365	550 W. Jackson St Phoenix, AZ 85003
<b>Maricopa County (MCDOT)</b>	REACT	24/7/365	2919 W Durango St Phoenix, AZ 85007
<b>Surprise</b>	Police Department	24/7/365	14250 W Statler Plaza, Ste 103 Surprise, AZ, 85374
<b>El Mirage</b>	Police Department	8:00AM – 5:00PM Monday-Friday	12401 W Cinnabar Ave El Mirage, AZ 85335
<b>Youngtown</b>	No Police Department, Maricopa County Sheriff's Office		
<b>Peoria</b>	Police Department	24/7/365	8351 W. Cinnabar Ave Peoria, AZ 85345

The AZDPS Computer-Aided Dispatch (CAD) feed is available to the ADOT TOC and MCDOT TMC. The Phoenix Fire Department CAD feed is available to the ADOT TOC, Phoenix TMC, and MCDOT TMC. The ADOT TOC and MCDOT TMC are able to obtain data on freeway incidents from the AZDPS CAD feed and arterial street incidents from the Phoenix Fire Department CAD system.

ADOT provides traffic information updates to the public via DMS, social media, and the Freeway Management System website at az511.gov. This website provides access to freeway cameras, and information on closures, delays, and travel times. This information is provided through the internet and by the 511 phone system. Currently, the MCDOT TMC provides traveler information in the form of emails, tweets, texts, and data into the Advanced Traveler Information System (ATIS) for arterial street incidents. This information is also added to the statewide 511 traveler information system. Traffic information is provided to the public via radio, television and social media.

Local police and fire departments communicate well, as do the TOC/TMCs. Stakeholder input indicated there are communication challenges between local police and agency TOCs/TMCs for incidents along the study area. Currently, AZDPS personnel are stationed at the ADOT TOC to aid with corridor monitoring and incident management as part of a three year Co-location Pilot Project. The project aimed to allow AZDPS troopers to be able to quickly identify an incident and dispatch a team to the location of the incident. During an evaluation period between January 2015 and September 2015, the project proved to be effective with an overall decrease in roadway clearance time, incident clearance time, and incident duration. However, the ADOT TOC and co-located AZDPS has minimal surveillance capabilities of the corridor.

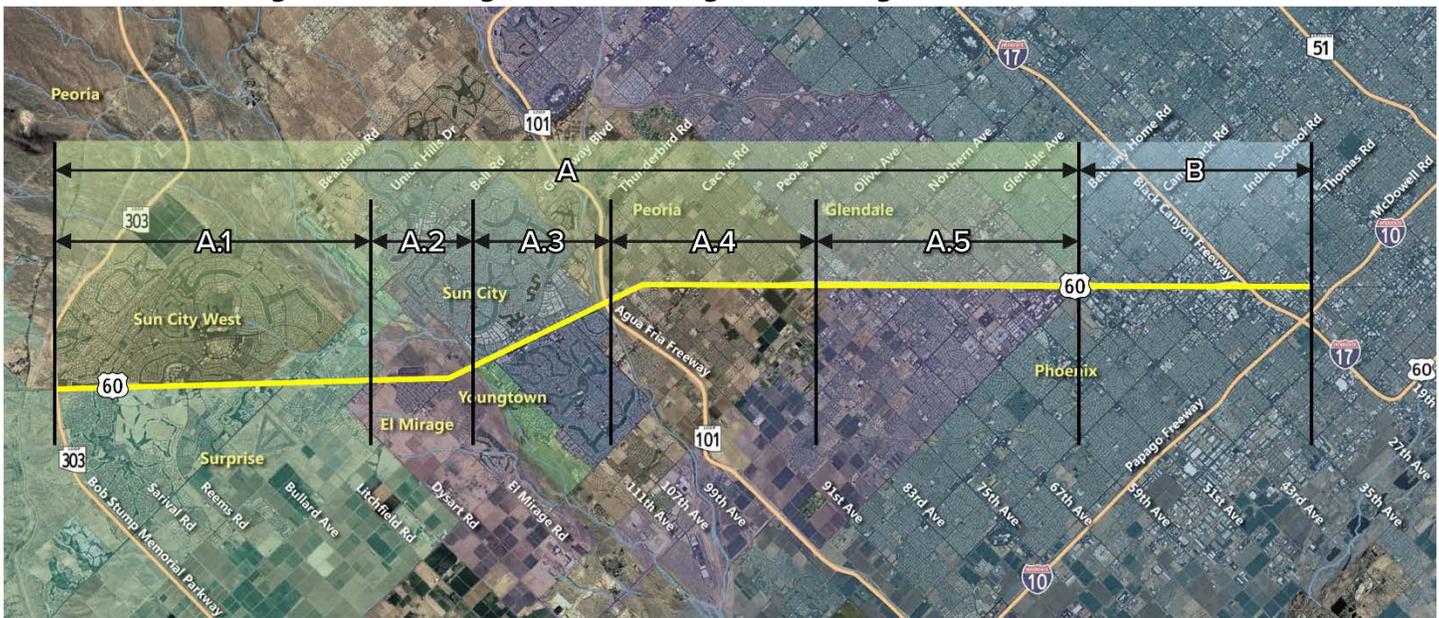
### **5.1. Operating Scenario**

Incidents that occur along US-60/Grand Avenue are managed through the Unified Command system. The primary groups responsible for US-60/Grand Avenue are AZDPS and local Police Departments from El Mirage, Peoria, Glendale, and Phoenix within their respective jurisdictions. The following describes the agencies responsible by mile post (MP) as shown in **Figure 4**:

- MP 137.8 – MP 144.2: AZDPS (Segment A.1)
- MP 144.2 – MP 146.2: El Mirage Police Department (Segment A.2)
- MP 146.2 – MP 148.9: AZDPS (Segment A.3)
- MP 148.9 – MP 152.6: Peoria Police Department (Segment A.4)
- MP 152.6 – MP 157.5: Glendale Police Department (Segment A.5)
- MP 157.5 – MP 162.2: Phoenix Police Department (Segment B)

ADOT ALERT provides traffic incident management services along US-60/Grand Avenue within ADOT right-of-way when requested by local police departments. MCDOT REACT has IGAs with Glendale and Peoria to provide incident management services within their jurisdiction. MCDOT REACT also provides support traffic incident management services to ADOT ALERT and the other jurisdictions when requested and have signed agreements.

**Figure 4 – Existing Incident Management along US-60/Grand Avenue**



**5.1.1. Process for During Business Hours**

**Table 4, Table 5, and Table 12** show the operating hours of the TOC/TMC and police department of each agency, respectively. For day-to-day operations, each agency monitors their cameras from their TOC/TMC, manages traffic signals, and coordinates with neighboring jurisdictions. During normal operations consisting of expected travel patterns and congestion, traffic signal timing plans will run on pre-set time of day schedules and agencies respond to input from the public or neighboring agencies.

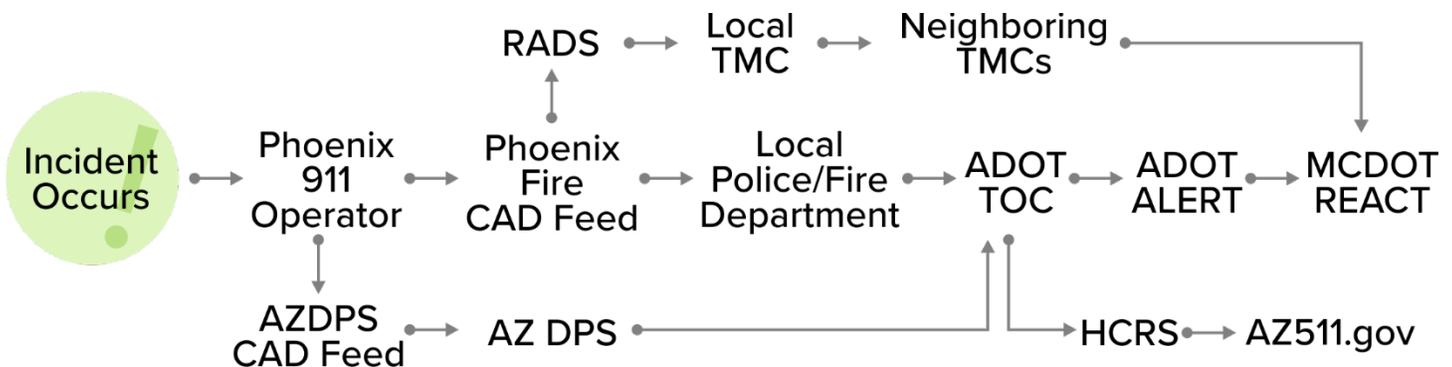
When an incident occurs, the following events occur in order to clear the incident safely and quickly. This process is depicted in **Figure 5**.

- The Phoenix 911 operator is first alerted of the incident from a witness call. At this time, the Phoenix 911 operator notifies the local fire department based on the jurisdiction and current operating scenario. The local fire department then dispatches the local police department who arrives at the scene of the incident. Other agencies receive a notification or learn about the incident from the Phoenix Fire feed. AZDPS is notified of the incident through their own CAD feed and alert the AZDPS officers stationed at the ADOT TOC.
- Once an incident is identified, the local police department or AZDPS on site evaluates the situation and proceeds to request assistance from ADOT ALERT, if necessary, to aid with incident response. The local police department, AZDPS, or ADOT ALERT may also request assistance from others for traffic diversion. Through the Unified Command system, agencies on site communicate to notify each other of the incident and coordinate to return to normal operating conditions in a timely manner.
- A diversion route is identified through a local TMC, by ADOT ALERT, or by MCDOT REACT (for agencies with an agreement with MCDOT) driving alternate routes. During this time, first responders secure the individuals of a crash while police divert traffic with help from ADOT ALERT. This allows first responders

to safely exit the scene and transport injured individuals to a nearby medical center. During this time, the local police department contacts a tow agency to help clear the wreckage.

- During normal operating hours, the local agency TMC is alerted of the incident through first responders or the RADS incident feed. The local agency TMC notifies neighboring jurisdiction TMCs based on potential impacts to their roadway network. During the process of identifying the best diversion route, the local TMCs will also seek assistance from other TOC/TMCs to verify traffic conditions. The TOCs will communicate with one another to attempt to minimize congestion and can adjust traffic signal timing based on individual capabilities.
- MCDOT REACT is notified of an incident from a page from the ADOT TOC to assist ADOT ALERT. Currently, MCDOT REACT only has agreements with the Peoria and Glendale.
- Once the ADOT TOC is notified of the incident, it enters the incident information to the Highway Closure and Restriction System (HCRS) to make sure it is available to the public through the AZ511 system.
- Depending on the severity of the crash, number and types of vehicles involved, the extent of the damages, and the time of day and the day of the week, a roadway closure may be necessary. ADOT ALERT, AZDPS, MCDOT REACT, and neighboring agency police departments coordinate to block traffic and provide a detour to mitigate congestion.
- Once the crash is cleared, the local police department and incident management teams will open the roadway and notify all necessary personnel to be able to return the corridor to normal operating conditions.

**Figure 5 – Existing US-60/Grand Avenue Incident Management Process (Within ADOT Right-of-Way)**



### 5.1.2. Process for After-Hours

In general, incidents that occur after hours (as listed in **Table 4, Table 5 and Table 12**) are dealt with in the same manner as those during business hours. Local police departments operate 24 hours a day, 7 days a week and respond to incidents using the same process. The ADOT TOC, ADOT ALERT, and MCDOT REACT operate 24 hours a day, 7 days a week, and aid with incident management. MCDOT has agreements with Glendale and Peoria to access their TMCs and use their traffic management equipment.

## **6.0 Recommended Incident Management Plan**

### **6.1. Operating Scenario**

In general, the primary issue with the current operating scenario for incident management along US-60/Grand Avenue is the absence of a comprehensive plan that defines the roles and responsibilities of each agency. This document is intended to document agency roles and responsibilities.

Based on the information gathered during this study and input from stakeholders and agencies, it is in the best interest of the corridor and therefore recommended that ADOT ALERT continue as the primary agency responsible for incident management response along the entirety of US-60/Grand Avenue, segments A and B in **Figure 4**. Clarifying ADOT ALERT as the primary agency will improve communication between agencies and allow for a traffic incident management process to be developed and implemented. The ADOT TOC currently has access to Phoenix CCTV cameras, and with the recommended infrastructure improvements in the future, ADOT will have full surveillance of the corridor. This will provide ADOT ALERT a better understanding of incidents and traffic concerns with real time updates from the ADOT TOC. ADOT ALERT is part of the Unified Command system, which facilitates seamless communication between agencies.

Another primary incident management issue is the absence of pre-established traffic signal plans with predetermined diversion routes for times that a detour is necessary. It is recommended that these plans are developed and provided to all agencies involved with incident management responsibilities along US-60/Grand Avenue for integrated corridor management.

#### **6.1.1. Process for During Business Hours**

The process for incident management during business hours is recommended to remain the same as the current operating scenario shown in **Figure 5**. The addition of CCTV cameras, DMS, and EVP will allow for better monitoring and reduced response times. These ITS devices will aid with incident management and allow ADOT ALERT to quickly identify a scenario and alert drivers of corridor roadway conditions.

#### **6.1.2. Process for After Hours**

The incident management process for after hours is recommended to remain the same as the current operating scenario. Similarly, ITS technology will allow incident management teams to more effectively and efficiently monitor the corridor, adjust signal timing plans and establish detour routes, and notify the public.

#### **6.1.3. Other Recommendations**

Other recommendations or needs for incident management that have been identified by stakeholders include:

- Truck mounted DMS to aid with rerouting traffic;
- Computer systems in trucks to show alternative routes; and
- Cameras on the trucks to allow the ADOT TOC to monitor the status of an incident.

In addition, stakeholders have identified a lack of resources and funding as an issue.

## 7.0 Summary

This study investigated the corridor operations and incident management for US-60/Grand Avenue and provided recommendations based on planned improvements and input from agencies that cross the corridor.

The following lists the plans for corridor management along US-60/Grand Avenue:

- ADOT and Phoenix will maintain ownership of their ITS infrastructure in their respective corridor segments in the short-term. In the future, as the MAG US-60/Grand Avenue COMPASS recommendations are implemented, ADOT will assume ownership and maintenance of all ITS infrastructure along the corridor.
- US-60/Grand Avenue will be given traffic signal priority at all times in both ADOT and Phoenix segments; traffic signals will be coordinated throughout the corridor.
- ITS infrastructure will be installed along the corridor including CCTV cameras, DMS, communications systems, vehicle detection devices, and EVP devices. It is intended that this infrastructure will help ADOT and Phoenix more efficiently manage the corridor.
- Other potential improvements include bicycle and pedestrian facilities, adaptive signal control, connected vehicle infrastructure, and integration with transit.

The following lists the recommended plan for incident management along US-60/Grand Avenue.

- ADOT ALERT will maintain responsibility for incident management along the corridor to clarify agency roles and responsibilities and improve communication between agencies during an incident.
- Pre-established traffic signal plans and predetermined diversion routes should be developed and distributed.
- Incident management operations during and after business hours will remain the same as the current scenario.
- Local police departments will continue serving as first responders given their proximity to the corridor.
- Consider implementing other recommendations, such as truck mounted DMS and computer systems in trucks, to improve ADOT ALERT capabilities.



# US-60/Grand Avenue TMP

Loop 303 to Willetta Street

Concept of Operations

## ***APPENDIX TM2-1***

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**Intergovernmental Agreements**

ADOT File No.: IGA/JPA 14-0004509-I  
AG Contract No.: P0012015000752  
Project: Traffic Management &  
Operations  
Section: Various Locations  
**Budget Source Item No.: N/A**

**140625-0**

**MASTER INTERGOVERNMENTAL AGREEMENT  
FOR TRAFFIC MANAGEMENT AND OPERATIONS**

BETWEEN  
THE STATE OF ARIZONA  
AND  
THE CITY OF PHOENIX

(C-91-09- -2-00)

**THIS AGREEMENT** is entered into this date June 16, 2015, pursuant to the Arizona Revised Statutes §§ 11-951 through 11-954, as amended, between the STATE OF ARIZONA, acting by and through its DEPARTMENT OF TRANSPORTATION (the "State") and the CITY OF PHOENIX, acting by and through its MAYOR, and CITY COUNCIL ("the City". The State and City are collectively referred to as "Partners or Parties".

**I. RECITALS**

1. The State is empowered by Arizona Revised Statutes § 28-401 to enter into this Agreement and has delegated to the undersigned the authority to execute this Agreement on behalf of the State.
2. The City is empowered by Arizona Revised Statutes § 48-5722 to enter into this Agreement and has by resolution, a copy of which is attached hereto and made a part hereof, resolved to enter into this Agreement and has authorized the undersigned to execute this Agreement on behalf of the City.
3. The State and the City desire to set forth the general terms and conditions whereby the State, City will collaborate to share infrastructure and execute Integrated Corridor Management (ICM) projects (with respect to each engagement "the Project"), with the specifics of each engagement to be set forth in an executed Addendum to this Agreement.

**II. BACKGROUND**

1. The Partners currently each own and operate separate Intelligent Transportation Systems.
2. The Partners recognize the extensive infrastructure and systems foundation that has been established by the Partners and agree to advance collaboration with each other to leverage infrastructure and systems for regionally integrated operations.
3. The Partners recognize that collaborating on ITS initiatives provides a mutual benefit and cost savings by expanding their respective systems and contributing to the regional communications effort.
4. The Partners are committed to continuing efforts associated with regional initiatives that leverage existing infrastructure and resources and implementing new initiatives to support coordinated traffic management, traveler information dissemination, and ongoing operations and maintenance.
5. The Partners are committed to continuing their participation in the AZTech™ regional transportation operations partnership. In addition to the standard terms and conditions, the Partners agree to:

### **III. TERMS OF THE AGREEMENT**

#### **5.1 General**

- i. Mutually develop ITS Projects and initiatives. Such Projects under this Agreement may be proposed by either of the Parties, and shall become effective upon mutual approval of the Phoenix Street Transportation Department Director and ADOT Division Director, ITD. Projects under this Agreement will detail specific processes for coordination, communication, freeway and arterial system operations when a freeway closure necessitates diverting freeway traffic onto City and County arterial streets. The projects can also be used to share infrastructure such as conduit or fiber. If shared, the project will specify in detail what is being shared, who has primary responsibility, and how it will be maintained.
- ii. Limit the geographical area of the ITS Projects and initiatives through this Agreement to all freeways and arterial roads within the common jurisdictions of the Partners.
- iii. Give Prompt written notice to the partner whenever the State or the City observes or otherwise becomes aware of any development that affects the scope, timing, or payment of partner's services.
- iv. Designate in writing a person to act as the agency's representative with respect to the services to be rendered under this Agreement. Such person shall have complete authority to transmit instructions, receive information, and make or interpret the agency's decisions regarding project execution.
- v. Provide all criteria and full information as to the agency's requirements, objectives, and expectations for the Project, including all numerical criteria that are to be met and all standards of development, design, or construction.
- vi. Assist Partner by providing information pertinent to the Project including previous reports and any other data relative to studies, design, or construction or operation of the Project.
- vii. Arrange for access to and make all provisions for the Partner to enter upon public property as required for the Partner to perform services under this Agreement.

#### **5.2 Infrastructure and Systems**

- i. Make available to the other Partners the infrastructure and system resources in order to collaborate on efforts associated with Intelligent Transportation Systems initiatives.
- ii. Define and implement the mutual sharing of existing fiber communications infrastructure within common jurisdiction boundaries.

- iii. Operate and maintain their existing systems in a manner that supports infrastructure sharing.
- iv. Make available to the other Partner primary and secondary contact information for approved agency staff to report problems with the shared infrastructure or systems.
- v. In the event either Partner experiences a shortage of available communications bandwidth to meet its needs at any location in its system, adjustments will be made to maintain communications to accommodate all Partners' needs.
- vi. No Partner will make payments to the other Partners for the use of the shared resources.
- vii. Notify the other Partner of planned or unplanned downtime that impacts shared infrastructure.
- viii. Maintain and provide continuous technical support of hardware or software physically in the other Partners facility as needed to support Intelligent Transportation Systems initiatives.

### **5.3 Incident Management**

- i. Provide traffic management support services for incident management purposes where agreed within specific Project.
- ii. Designate appropriate representatives of response teams to attend collaborative discussions related to incident debriefs, AZTech™ Working Groups or Committees, or ICM discussions according to their best effort.

### **5.4 AZTech Partnership**

- i. Continue commitment to their participation in the AZTech™ regional transportation management and operations partnership. Participate in developing AZTech Transportation System Management and operation initiatives to improve regional transportation management.

## **IV. MISCELLANEOUS PROVISIONS**

1. This Agreement shall be effective for a period of ten (10) years, unless extended by the Division Director, ITD, ADOT and City's Street Transportation Director; provided, however that this Agreement may be cancelled at any time upon thirty (30) days written notice to the other Party.

2. To the extent permitted by law, the Partners hereby agrees to save and hold harmless, defend and indemnify from loss the State, any of its departments, agencies, officers or employees from any and all liability, costs and/or damage incurred by any of the above arising or resulting from the Agreement; and from any other liability, damage to any person or property whatsoever, which is caused by any activity, negligence, condition, misrepresentation, directives, instruction or event arising out of the performance or non-performance of any provisions of this Agreement by (a) the State, any of its departments, agencies, officers and employees, or its independent contractors; or (b) the City, any of its agents, officers and employees, or its independent contractors. Costs incurred by the State, any of its departments, agencies, officers or employees shall include in the event of any action, court costs, and

expenses of litigation and attorneys' fees.

3. This Agreement shall become effective upon signing and dating of the Determination Letter by the State's Attorney General.

4. This Agreement may be cancelled in accordance with Arizona Revised Statutes § 38-511.

5. The provisions of Arizona Revised Statutes § 35-214 are applicable to this Agreement.

6. This Agreement is subject to all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable Federal regulations under the Act, including 28 CFR Parts 35 and 36. The parties to this Agreement shall comply with Executive Order Number 09-09 issued by the Governor of the State of Arizona and incorporated herein by reference regarding "Non-Discrimination".

7. Non-Availability of Funds: Every obligation of the Parties under this Agreement is conditioned upon the availability of funds appropriated or allocated for the fulfillment of such obligations. If funds are not allocated and available for the continuance of this Agreement, this Agreement may be terminated by the Parties at the end of the period for which the funds are available. No liability shall accrue to the Parties in the event this provision is exercised, and the Parties shall not be obligated or liable for any future payments as a result of termination under this paragraph.

8. In the event of any controversy which may arise out of this Agreement, the Parties hereto agree to abide by required arbitration as is set forth for public works contracts in Arizona Revised Statutes § 12-1518.

9. The Parties shall comply with the applicable requirements of Arizona Revised Statutes § 41-4401 and Title 34 of the Arizona Revised Statutes.

10. The Parties hereto shall comply with all applicable laws, rules, regulations and ordinances, as may be amended.

11. All notices or demands upon any party to this Agreement shall be in writing and shall be delivered in person or sent by mail, addressed as follows:

Arizona Department of Transportation  
Joint Project Administration  
205 S. 17<sup>th</sup> Avenue, Mail Drop 637E  
Phoenix, Arizona 85007  
(602) 712-7124  
(602) 712-3132 Fax

City of Phoenix  
Attn: Bruce Littleton  
200 West Washington Street,  
Phoenix, Arizona 85003-1611  
(602) XXX-XXXX  
(602) 495-2016 Fax

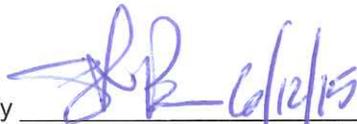
12. In accordance with Arizona Revised Statutes § 11-952 (D) attached hereto and incorporated herein is the written determination of each party's legal counsel and that the Parties are authorized under the laws of this State to enter into this Agreement and that the Agreement is in proper form.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

CITY OF PHOENIX,  
an Arizona Municipal Corporation  
Ed Zuercher, City Manager

STATE OF ARIZONA  
Department of Transportation

By   
RAY DOVALINA, Jr. P.E., Director  
Street Transportation Department

By   
STEVE BOSCHEN  
Senior Deputy State Engineer, Development

ATTEST:

By   
CRIS MEYERS  
City Clerk



Approved as to form  
  
ACTING City Attorney *mx*

CITY CLERK DEPT.  
2015 JUN -4 AM 9:48

IGA/JPA 14-0004509-I

ATTORNEY APPROVAL FORM FOR THE CITY OF PHOENIX

I have reviewed the above-referenced Intergovernmental Agreement between the State of Arizona, acting by and through its DEPARTMENT OF TRANSPORTATION, and the CITY OF PHOENIX, an agreement among public agencies which, has been reviewed pursuant to Arizona Revised Statutes §§ 11-951 through 11-954 and declare this Agreement to be in proper form and within the powers and authority granted to the City under the laws of the State of Arizona.

No opinion is expressed as to the authority of the State to enter into this Agreement.

DATED this 3rd day of June, 2015

  
ACTING City Attorney  
*amk*

**CITY OF PHOENIX  
REQUEST FOR COUNCIL ACTION**

Complete this form per A.R. 4.11.  
Refer to the City Council Agenda Process Reference Guide for Assistance

<b>ACTION REQUESTED</b>	Formal Action:	<b>OR</b>	Legal Document:
	Bid Award <input type="checkbox"/> License Application <input type="checkbox"/> Public Hearing <input type="checkbox"/> Other <input type="checkbox"/>		Ordinance <input checked="" type="checkbox"/> Amend City Code? <input type="checkbox"/> Resolution <input type="checkbox"/> Emergency Clause? <input type="checkbox"/> (for use only w/ord. or res. requests)
<b>IMPACTED DISTRICT(S)</b>	CITYWIDE	<b>ADDITIONAL BACKUP MATERIAL SENT UNDER SEPARATE COVER?</b> <input type="checkbox"/>	
<b>SUBJECT</b>	IGA WITH ADOT TO COLLABORATE TO SHARE INFRASTRUCTURE AND EXECUTE INTEGRATED CORRIDOR MANAGEMENT PROJECTS		
<b>REQUESTED AGENDA DATE</b>	5/27/2015	<b>PREPARED BY</b>	Name Myesha Harris (P15-412)
			Department Street Transportation
			Phone 262-6871
<b>APPROVALS</b>	Division Head:	Jenny L. Grote, PE, PTOE	If prepared for another department: Department Name:
	Department Head:	Ray Dovalina Jr., PE	Approval:
<b>BID AWARD INFORMATION</b>	Bid Surety Required? <input type="checkbox"/>	Performance Surety Required <input type="checkbox"/>	
	Submitted by Low Bidder? <input type="checkbox"/>	Amount? _____	
	Contract Required? <input type="checkbox"/>	Requisition No. _____	
<b>CONTRACT INFORMATION</b>	Contract Amendment? <input type="checkbox"/>	Sole Source Contract? <input type="checkbox"/>	
	If Yes, Current Contract No. _____		
	Approved by:	Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Formal Action <input type="checkbox"/>	on Date: _____
<b>BUDGET INFORMATION</b>	\$ _____	To Be Encumbered? <input type="checkbox"/>	
	Source of Funds: _____	Fiscal Year? _____	
	Fund Center(s) (SAP-FM): _____	Commitment Item(s) (SAP-FM): _____	
	Availability of Funds Approval	Rick Freas	
<b>CITY MANAGER'S OFFICE</b>	<b>Approved by</b> Rick Naimark 5/11/15 (Rita Marko)		CM Control No. <b>09</b>
<b>CITY CLERK DEPARTMENT</b>	Council Action Taken: Adopted		
	Ordinance Number: S-41775	RCA No.	74583
	Resolution Number:	Contract No.	
	Comments:	Meeting Date	5/27/2015
		Item No.	69

**ITEM**

**CITYWIDE**

**INTERGOVERNMENTAL  
AGREEMENT WITH ARIZONA  
DEPARTMENT OF  
TRANSPORTATION TO  
COLLABORATE TO SHARE  
INFRASTRUCTURE, AND  
EXECUTE INTEGRATED  
CORRIDOR MANAGEMENT  
PROJECTS**

---

Request authorization for the City Manager, or his designee, to enter into an Intergovernmental Agreement (IGA) with Arizona Department of Transportation (ADOT) to collaborate to share infrastructure, and execute Integrated Corridor Management (ICM) projects.

The shared infrastructure will be for the state highway systems within the City of Phoenix region. Projects under this agreement will detail specific processes for coordination, communication, freeway, and arterial system operations when a freeway closure necessitates diverting freeway traffic onto City arterial streets.

As part of the IGA, the City and ADOT agree to save and hold harmless, defend, and indemnify each other from claims resulting from either's negligent or wrongful acts or omissions. Per City Code 42-20(B), indemnification of another public entity requires approval from the City Council.

**Financial Impact**

There are no financial impacts.

**Citizen Notification**

There is no public notification required with the execution of this agreement.

This item is recommended by Mr. Naimark and the Street Transportation Department.



MARK BRNOVICH  
ATTORNEY GENERAL

OFFICE OF THE ARIZONA ATTORNEY GENERAL  
STATE GOVERNMENT DIVISION /  
TRANSPORTATION SECTION

DAWN NORTHUP  
DIVISION CHIEF COUNSEL  
SUSAN E. DAVIS  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8855  
E-MAIL: SUSAN.DAVIS@AZAG.GOV

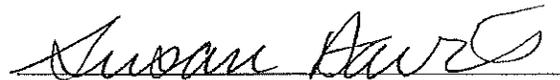
**INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012015000752 (ADOT IGA/JPA 14-0004509-I), an Agreement between public agencies, the State of Arizona and the City of Phoenix, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: June 16, 2015

MARK BRNOVICH  
Attorney General

  
SUSAN E. DAVIS  
Assistant Attorney General  
Transportation Section

SED:rt:#4510836  
Attachment

140625--1

ADOT File No.: 14-0004509-1  
Addendum No.: One, 150005522  
AG Contract No.: P0012015000752

**ADDENDUM TO MASTER INTERGOVERNMENTAL AGREEMENT  
FOR TRAFFIC MANAGEMENT AND OPERATIONS  
BETWEEN  
THE STATE OF ARIZONA  
AND  
CITY OF PHOENIX**

**PROJECT NAME:** MAG Regionwide FMS Rehabilitation  
Federal Aid No.: 888-A(220)T  
ADOT TRACS No.: H8674 01C

**PROJECT LOCATIONS:** 1) I-10 and 24 th Street south east corner  
2) I-10 and 32<sup>nd</sup> Street south west corner  
3) I-10 and 40 th Street north west corner

as illustrated in Exhibit A.

**PROJECT DESCRIPTION:**

- Assign and set aside four fiber strands from the ADOT I-10 fiber trunkline.
- Construct and install 12 count single mode fiber optic (SMFO) cables, conduit and number nine vaults in three locations as illustrated in Exhibit A.
- Splice the ADOT fiber trunkline for fiber strands to the associated 12 count single mode fiber optic (SMFO) cables.

The Master Intergovernmental Agreement ("Master IGA") between the State of Arizona (the "State") and the City of Phoenix (the "City") for Traffic Management and Operations was approved by the City Council on May 27, 2015 and was executed by the State on June 16, 2015.

The City and the State, acting through their respective Department of Transportation ("City" and "State" or "ADOT") elect to apply the terms of the Master IGA to the project identified above. The Master IGA allows the City and the State to collaborate and leverage infrastructure and systems for regional operations and mutually develop Intelligent Transportation Systems (ITS) projects. Under the terms of the Master IGA, such projects may be proposed by either entity, and shall become effective upon mutual approval of project-specific, addendums (Addendum). For the purpose of this Addendum, the City and the State will collectively be referred to as "Partners". The final design plans of the project will develop the requirements of the new and existing fiber assignments needed to complete this project.

**Partners- Responsibilities:**

- Partners agree to proceed in a manner consistent with the provisions as set forth in the Master IGA.
- Partners agree to make available the fiber optic cables and system resources, as identified in Exhibit A.
- Partners agree to operate and maintain the existing systems and make any future infrastructure improvements to the respective systems, as identified in Exhibit A.

**CITY Responsibilities:**

- The City will own and maintain the 12 count SMFO branch cables branch, conduit, and number 9 (nine) vaults adjacent to City right-of-way.

**STATE Responsibilities:**

- Assign and set aside four fiber strands from the ADOT I-10 fiber trunkline
- Construct and install 12 single mode fiber optic (SMFO) cables, conduit and number nine vaults in three locations as illustrated in Exhibit A.
- Splice the ADOT fiber trunkline four fiber strands to the associated 12 count single mode fiber optic (SMFO) cables.

CITY OF PHOENIX, a Municipal Corporation  
Ed Zuercher, City Manager

STATE OF ARIZONA  
Department of Transportation

By *Ray Dovalina, Jr.* 5/11/16  
 RAY DOVALINA, JR., P.E. Date  
 Street Transportation Director

DocuSigned by:  
*Steve Boschen*  
 2C8E28BDDC8C4A2  
 By STEVE BOSCHEN, P.E. Date  
 ITD Director

ATTEST:

By *Cris Meyer*  
 CRIS MEYER  
 City Clerk



CITY CLERK DEPT.  
 2016 MAY 20 PM 2:51

IGA/JPA 14-0004509-I

Addendum No.: One, 15-0005522 -I

**ATTORNEY APPROVAL FORM FOR THE CITY OF PHOENIX**

I have reviewed the above-referenced Intergovernmental Agreement between the State of Arizona, acting by and through its DEPARTMENT OF TRANSPORTATION, and the CITY OF PHOENIX, an agreement among public agencies which, has been reviewed pursuant to Arizona Revised Statutes §§ 11-951 through 11-954 and declare this Agreement to be in proper form and within the powers and authority granted to the City under the laws of the State of Arizona.

No opinion is expressed as to the authority of the State to enter into this Agreement.

DATED this 18<sup>th</sup> day of May, 2015

ACTING Julie Krueger  
City Attorney *JK*

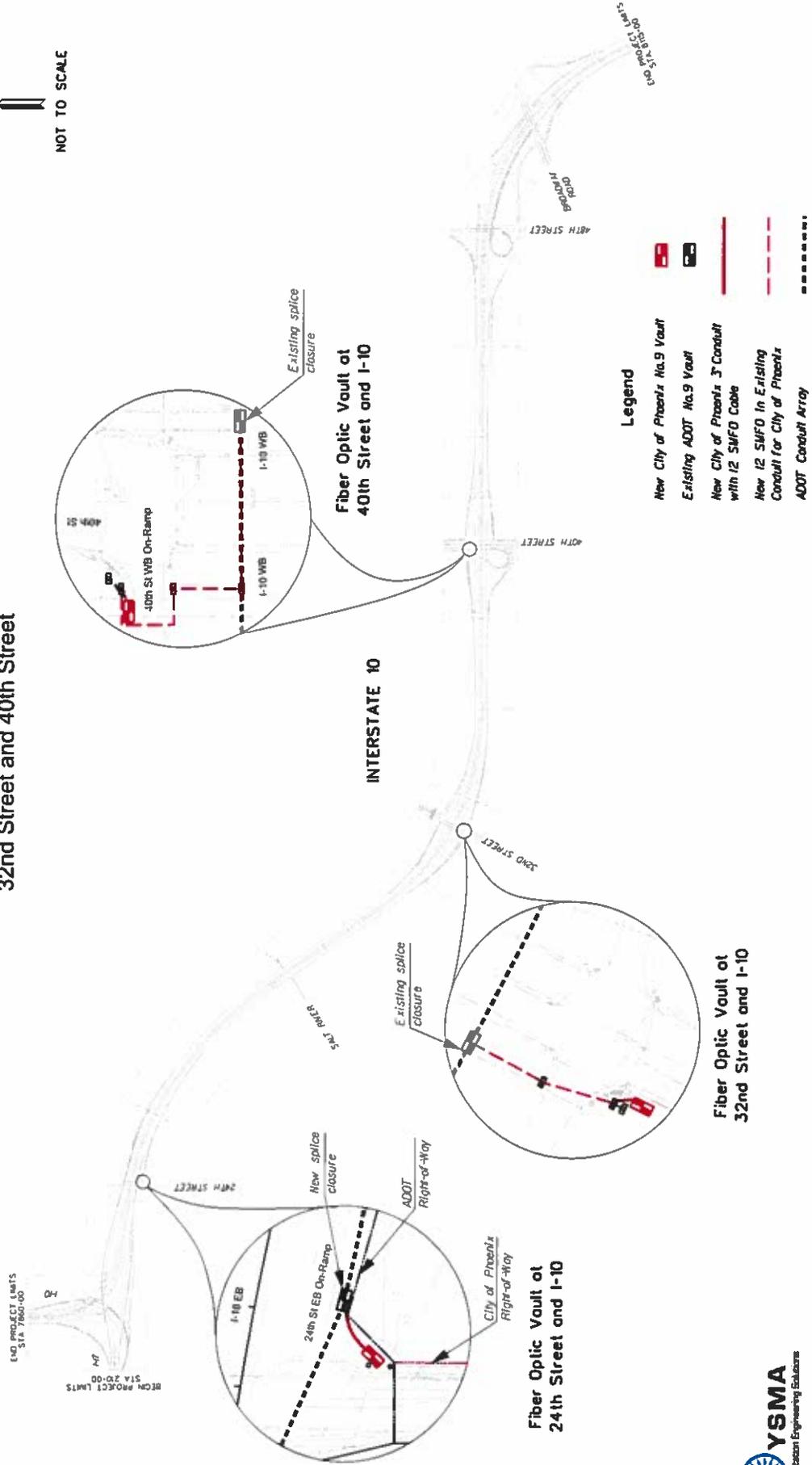
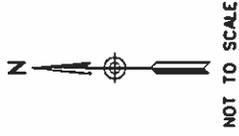
## **EXHIBIT A**

Location #1 I-10 and 24<sup>th</sup> Street south east corner  
Location #2 I-10 and 32<sup>nd</sup> Street south west corner  
Location #3 I-10 and 40<sup>th</sup> Street north west corner

**Exhibit A**

**ADOT - City of Phoenix Fiber Connectivity**

**Future Splice Points at 24th Street,  
32nd Street and 40th Street**





**City of Phoenix  
Contract Route Slip**

*Howland*

Administrative Regulation (A.R.) 4.21 provides the policy for processing and executing contracts. It is the responsibility of departments to ensure contracts are executed according to City policies and other governing statutes. For additional contract guidance contact the Law Department or visit the Contract Resource Center on the City's Intranet.

Recommended routing order for signatures: (1) Contracting party (There are cases where the Contracting party requires the City to sign first. This is permissible. If you have questions, consult the Law Department.) (2) City Manager or designee\* (A.R. 1.51 requires Delegation of Authority for designee.) (3) Law Department\* (Some departments require review and signature by legal counsel to "Approve As To Form" prior to the Department Director's signature, so check with your Department.) and (4) City Clerk. (\*Signature required prior to City Clerk attestation).

Only one contract original is required for processing which will be returned to the department. The official record of the contract will be maintained electronically by the City Clerk Department. The signature line for City Clerk attestation **MUST** be on the same page as the Department Director's signature. The Contract Route Slip **MUST** be filled out completely and printed on yellow paper. An incomplete Contract Route Slip may delay processing. Contracts are processed within 48 hours of receipt and are available via the Intranet Public Records Search Page within 72 hours. If special processing is required, please call for arrangements at 602-262-6811.

Recommended Routing for Signatures	(1) Contracting Party	(2) City Manager or Designee	(3) Law Department	(4) City Clerk
------------------------------------	-----------------------	------------------------------	--------------------	----------------

Contract No. (Issued by City Clerk):	<i>1401025</i>	Amendment No. (If Applicable)	<i>1</i>
Document Type (Contract, Lease, IGA, Deed, MOU, License, Permit, etc.)	IGA Amendment #1	All Original Signatures Required:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Name of Contracting Party/ Vendor(s):	Arizona Department of Transportation		
Contract Term:		City Council Approval?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Execution Date:		Council Action Date: mm/dd/year	
Expiration Date:		RCA No.:	
Does this document contain information classified as confidential or restricted?(A.R. 1.50)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Agenda Item No.:	
Does the contract require recording with the Maricopa County Recorder's Office?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Ordinance or Resolution No.:	
Special Instructions for City Clerk:	<i>RETURN FOR SIGNATURES</i>		
Primary Contact:	Marshall Riegel	Department:	Street Transportation
Phone:	534-5351	Email:	marshall.riegel@phoenix.gov

Cost Center or WBS for Legal Services (If Applicable)		
Law Department Use Only	ProLaw No.	Assigned Attorney
	<i>15-004055</i>	

22-20 Rev. 7/10

Law Department Time Stamp

**CITY ATTORNEY'S OFFICE**

**2016 MAY 17 PM 4: 25**

**CITY OF PHOENIX**

**RECEIVED**

City Clerk Time Stamp

**2016 MAY 20 PM 2: 51**

**CITY CLERK DEPT**



**MARK BRNOVICH**  
ATTORNEY GENERAL

OFFICE OF THE ARIZONA ATTORNEY GENERAL  
STATE GOVERNMENT DIVISION /  
TRANSPORTATION SECTION

**DAWN NORTHUP**  
DIVISION CHIEF COUNSEL  
**SUSAN E. DAVIS**  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8855  
E-MAIL: [SUSAN.DAVIS@AZAG.GOV](mailto:SUSAN.DAVIS@AZAG.GOV)

**INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012016001701 (ADOT IGA/JPA 15-0005686-I), an Agreement between public agencies, the State of Arizona and City of Phoenix, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: May 27, 2016

**MARK BRNOVICH**  
Attorney General

  
\_\_\_\_\_  
**SUSAN E. DAVIS**  
Assistant Attorney General  
Transportation Section

SED:rl:# 5114987  
Attachment

ADOT CAR No.: IGA /JPA 14-0004045-I  
AG Contract No.: 14-0004045-I  
Project: Traffic Management &  
Operations  
Section: Various Locations  
**Budget Source Item No.: N/A**

**MASTER INTERGOVERNMENTAL AGREEMENT  
FOR TRAFFIC MANAGEMENT AND OPERATIONS**

BETWEEN  
THE STATE OF ARIZONA  
AND  
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

(TE 023)  
(C-64-15-049-M-00)

**THIS MASTER INTERGOVERNMENTAL AGREEMENT (AGREEMENT)** is entered into this date December 22<sup>nd</sup>, 2014, pursuant to the Arizona Revised Statutes §§ 11-951 through 11-954, as amended, between the STATE OF ARIZONA, acting by and through its DEPARTMENT OF TRANSPORTATION (**State or ADOT**) and the COUNTY OF MARICOPA, a body politic (**County**). The County and State are collectively referred to as the **Partners** or individually as a **Partner**.

**I. RECITALS**

1. The State is empowered by Arizona Revised Statutes § 28-401 to enter into this Agreement and has delegated to the undersigned the authority to execute this Agreement on behalf of the State.
  2. The County is empowered by Arizona Revised Statutes § 11-251 to enter into this Agreement and has by resolution, a copy of which is attached hereto and made a part hereof, resolved to enter into this Agreement on behalf of the County.
  3. The State and the County desire to set forth the general terms and conditions whereby the State and County will collaborate to execute one or more projects (with respect to each engagement "the Project"), with the specifics of each engagement to be set forth in an executed Addendum referencing this Master Agreement.
-

## **II. BACKGROUND**

1. The Partners currently each own and operate separate Intelligent Transportation Systems (ITS). Systems are currently integrated to share information to support regional traffic operations. The integration of these systems has largely been established by the Partners.

2. The Partners recognize the extensive infrastructure and systems foundation that has been established by the Partners and agree to move forward with collaborating with each other to leverage infrastructure and systems for regional operations.

3. The Partners recognize that collaborating on ITS initiatives provides a mutual benefit and cost savings by expanding their respective systems and contributing to the regional communications effort.

4. The Partners are committed to continuing efforts associated with regional initiatives that leverage existing infrastructure and resources and implementing new initiatives to support coordinated traffic management, traveler information dissemination, and ongoing operations and maintenance.

5. The Partners are committed to continuing their leadership and participation in the AZTech™ Regional Transportation Operations Partnership (RTOP).

## **III. TERMS OF THE AGREEMENT**

1. The Partners agree to:

### **1.1 General**

- i. Mutually develop Intelligent Transportation Systems Projects. Such Projects under this Agreement may be proposed by either, and shall become effective, as an Addendum, upon mutual approval of ADOT Senior Deputy State Engineer and the County, acting through the Maricopa County Department of Transportation (MCDOT) Director or designee.
- ii. Designate in writing a person to act as the agency's representative with respect to the services to be rendered under this Agreement. Such person shall have complete authority to transmit instructions, receive information, and make or interpret the agency's decisions regarding project execution.
- iii. Provide all criteria and full information as to the agency's requirements, objectives, and expectations for the Project, including all numerical criteria that are to be met and all standards of development, design, or construction.
- iv. Assist Partner by providing information pertinent to the Project including previous reports and any other data relative to studies, design, or construction or operation of the Project.
- v. Arrange for access to and make all provisions for the Partner to enter upon public property as required for the Partner to perform services under this Agreement.
- vi. Give prompt written notice to the Partner whenever the State or the County observes or otherwise becomes aware of any development that affects the scope, timing, or payment of Partner's services.

## 1.2 Regional Systems Integration

- i. Through collaborative efforts between the State and County, jointly develop projects to establish and implement a regional integrated traveler information system for the multimodal traveler, and expand the transportation management system for the Phoenix metropolitan area.
- ii. Through collaborative efforts jointly develop plans of collecting, processing, analyzing and dissemination of regional freeway and arterial data through the Regional Archived Data System (RADS). The plans will expand the ongoing collaboration between State and County in administering and maintaining the RADS services.
- iii. Cooperate between Partners in the common goal of coordinating the traffic management systems and signals in direct consideration of a regional traffic transportation system. Allow timely access to State traffic system data bases to enhance integration into the system. Participate in the development and execution of multi-jurisdictional projects including the development and implementation of multi-jurisdictional Integrated Corridor Management (ICM) plans and the establishment of inter-operability between the State and other jurisdictions regarding traveler information, data collection/reporting efforts and compatibility of field equipment and corridor signal timing plans.
- iv. Share real-time CCTV camera images as described in the published AZTech™ Center-to-Center Video Feed & Camera Control Guidelines. Any changes in permissions shall be agreed to by specified designees on behalf of Partners.
- v. Provide access to post messages on other Partner-owned DMS after-hours including permissions and processes for posting messages based on permissions defined for each Partner and approved use described in the published AZTech™ Center-to-Center Dynamic Message Sign Guidelines. Any changes in permissions shall be agreed to by specified designees on behalf of Partners.

## 1.3 Infrastructure and Systems

- i. Make available to the other Partner the infrastructure and system resources in order to collaborate on efforts associated with Intelligent Transportation Systems initiatives.
- ii. Define and implement the mutual sharing of existing fiber communications infrastructure referencing this Agreement in the form of a detailed map (hereby known as "Infrastructure Maps") specifying, at a minimum, amount and type of item (i.e. two fiber strands, one server, or one pull box), identifying information for items (i.e. fiber #1, server A1, or pull box #32), text and geographical description of extents and location where that infrastructure exists in the Maricopa County area. Additional maps will be developed as additional resources are identified which are incorporated by reference to this Agreement. Copies of all Infrastructure Maps will be maintained by all Partners involved in infrastructure sharing or operational collaboration.
- iii. Operate and maintain their existing systems in a manner that supports infrastructure sharing identified in the maps described in Infrastructure Maps, unless unable to make reasonable modifications at the time of request.
- iv. Make available to the other Partner primary and secondary contact telephone numbers for approved agency staff to report problems with the shared infrastructure or systems.
- v. In the event either Partner experiences a shortage of available communications bandwidth

to meet its needs at any location in its system, adjustments will be made to maintain communications to accommodate both Partners' needs as mutually agreed.

- vi. Neither Partner will make payments to the other Partner for the use of the resources identified in Infrastructure Maps.
- vii. Notify the other Partner of planned or unplanned downtime that impacts infrastructure identified in Infrastructure Maps and thereby potentially impacting associated Intelligent Transportation Systems initiatives. Notification will include detail such as the date, time, expected duration of downtime, and impacts to the Partner.
- viii. Replace or upgrade hardware or software owned by Partners as needed to support Intelligent Transportation Systems initiatives.
- ix. Maintain and provide continuous technical support of hardware or software physically in the other Partners facility as needed to support Intelligent Transportation Systems initiatives.
- x. Ensure staff is identified to conduct basic training on systems, services, functions that apply to this Agreement when Partner requires basic training to utilize systems, services, or functions.
- xi. The use of infrastructure will be limited to the same level of priority as the owner utilizes the infrastructure.

#### **1.4 Incident and Congestion Management**

- i. Make available to the other Partner the infrastructure and system resources in order to collaborate on efforts associated with Intelligent Transportation Systems initiatives, such as Integrated Corridor Management (ICM) or incident response.
- ii. Provide traffic management support services for incident management purposes where agreed to by Addendum. This includes ADOT Arizona Local Emergency Response Team (ALERT) team response services on freeways and County Regional Emergency Action Coordination Team (REACT) team response services on arterials.
- iii. Coordinate ALERT and REACT team response services as deemed appropriate by on-scene incident commanders during incident response.
- iv. Designate appropriate representatives of response teams to attend collaborative discussions related to incident debriefs, AZTech™ Working Groups or Committees, or ICM discussions.
- v. Develop a collaborative Incident Management (IM) plan between ALERT and REACT.

#### **1.5 AZTech Initiatives**

- i. Continue commitment to their leadership and participation in the AZTech™ regional transportation operations partnership. Each Partner will provide one representative to serve as Chair of the AZTech Executive Committee and provide collaborative AZTech Program Management leadership. Provide human resources to support AZTech collaboration as needed.
- ii. Develop and implement Projects that promote Integrated Corridor Management and

enhanced Freeway-Arterial Operation to achieve efficient and seamless transportation in the region.

- iii. Develop and implement Projects that advance Connected Vehicle technologies in Maricopa County region.

#### **IV. MISCELLANEOUS PROVISIONS**

1. This Agreement shall be effective for a period of ten (10) years, unless amended by the Partners; provided, however that this Agreement may be cancelled at any time upon thirty (30) days written notice to the other Party.

2. The parties to this Agreement agree that the State of Arizona shall be indemnified and held harmless by the County for the vicarious liability of the State as a result of entering into this Agreement. Each party to this contract is responsible for its own negligence.

3. This Agreement shall become effective upon signing and dating of the Determination Letter by the State's Attorney General.

4. The cost of the project under this Agreement includes indirect costs approved by the FHWA, as applicable.

5. The Parties warrant compliance with the Federal Funding Accountability and Transparency Act of 2006 and associated 2008 Amendments (the "Act"). Additionally, in a timely manner, the County will provide information that is requested by the State to enable the State to comply with the requirements of the Act, as may be applicable.

6. This Agreement may be cancelled in accordance with Arizona Revised Statutes § 38-511.

7. The provisions of Arizona Revised Statutes § 35-214 are applicable to this Agreement.

8. This Agreement is subject to all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable Federal regulations under the Act, including 28 CFR Parts 35 and 36. The parties to this Agreement shall comply with Executive Order Number 09-09 issued by the Governor of the State of Arizona and incorporated herein by reference regarding "Non-Discrimination".

9. Non-Availability of Funds: Every obligation of the State under this Agreement is conditioned upon the availability of funds appropriated or allocated for the fulfillment of such obligations. If funds are not allocated and available for the continuance of this Agreement, this Agreement may be terminated by the State at the end of the period for which the funds are available. No liability shall accrue to the State in the event this provision is exercised, and the State shall not be obligated or liable for any future payments as a result of termination under this paragraph.

10. In the event of any controversy which may arise out of this Agreement, the Parties hereto agree to abide by required arbitration as is set forth for public works contracts in Arizona Revised Statutes § 12-1518.

11. The Parties shall comply with the applicable requirements of Arizona Revised Statutes § 41-4401 and Title 34 of the Arizona Revised Statutes.

12. The Parties hereto shall comply with all applicable laws, rules, regulations and ordinances, as may be amended.

13. All notices or demands upon any party to this Agreement shall be in writing and shall be delivered in person or sent by mail, addressed as follows:

Arizona Department of Transportation  
Joint Project Administration  
205 S. 17<sup>th</sup> Avenue, Mail Drop 637E  
Phoenix, Arizona 85007  
(602) 712-7124  
(602) 712-3132 Fax

Maricopa County Department of  
Transportation  
Intergovernmental Relations  
2901 West Durango Street  
Phoenix, Arizona 85009  
(602) 506-8672  
(602) 506-4882 Fax

14. In accordance with Arizona Revised Statutes § 11-952 (D) attached hereto and incorporated herein is the written determination of each Party's legal counsel and that the parties are authorized under the laws of this State to enter into this Agreement and that the Agreement is in proper form.

**IN WITNESS WHEREOF**, the Parties have executed this Agreement the day and year first above written.

**MARICOPA COUNTY**

**STATE OF ARIZONA**

Department of Transportation

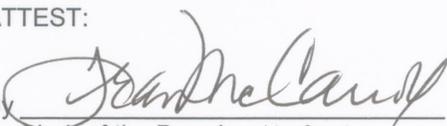
By   
\_\_\_\_\_  
**JENNIFER TOTH, P.E.**  
Transportation Director

By   
\_\_\_\_\_  
**DALLAS HAMMIT, P.E.**  
Senior Deputy State Engineer, Development

**Approved and Accepted by:**

By   
\_\_\_\_\_  
**DENNY BARNEY**, Chairman  
Board of Supervisors

**ATTEST:**

By   
\_\_\_\_\_  
Clerk of the Board 111914

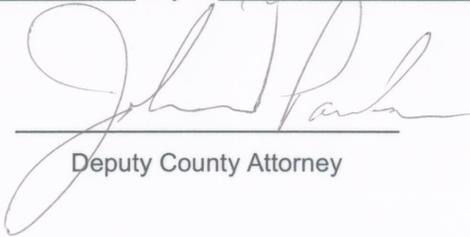
JPA 14-0004045-I

**ATTORNEY APPROVAL FORM FOR THE COUNTY OF MARICOPA**

I have reviewed the above referenced Intergovernmental Agreement between the State of Arizona, acting by and through its DEPARTMENT OF TRANSPORTATION, and the COUNTY OF MARICOPA, an Agreement among public agencies which, has been reviewed pursuant to Arizona Revised Statutes §§ 11-951 through 11-954 and declare this Agreement to be in proper form and within the powers and authority granted to the County under the laws of the State of Arizona.

No opinion is expressed as to the authority of the State to enter into this Agreement.

DATED this 19<sup>th</sup> day of November, 2014.

  
\_\_\_\_\_  
Deputy County Attorney



THOMAS C. HORNE  
ATTORNEY GENERAL

OFFICE OF THE ATTORNEY GENERAL  
TRANSPORTATION SECTION

JAMES R. REDPATH  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8837  
E-MAIL: [JIM.REDPATH@AZAG.GOV](mailto:JIM.REDPATH@AZAG.GOV)

**INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012014000457 (**ADOT IGA/JPA 14-0004045-I**), an Agreement between public agencies, the State of Arizona and Maricopa County Department of Transportation, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: December 22, 2014

THOMAS C. HORNE  
Attorney General

JAMES R. REDPATH  
Assistant Attorney General  
Transportation Section

JRR:rl:# 4266510  
Attachment

**ADDENDUM TO MASTER INTERGOVERNMENTAL AGREEMENT  
FOR TRAFFIC MANAGEMENT AND OPERATIONS  
BETWEEN  
THE STATE OF ARIZONA  
AND  
MARICOPA COUNTY  
(14-0004045-I)(C64-15-049-M-00)**

**PROJECT NAME:** ITS Last Mile Connections  
MCDOT Project No.: TT466  
Federal Aid No.: CM-MMA-0(255)D  
ADOT TRACS No.: 0000 MA MMA SZ167 01C

**PROJECT LOCATIONS:** 1) Indian School Road, SR 101L to 99<sup>th</sup> Avenue (0.57 mi)  
2) McDowell Road, SR101L to 92<sup>nd</sup> Street (0.54 mi)  
3) Daisy Mountain Drive, I-17 to Gavilan Peak Parkway (0.62 mi)

**PROJECT DESCRIPTION:** Install conduit, pull boxes and fiber optic cable to connect existing Maricopa County Department of Transportation (MCDOT) equipment to the Regional Community Network (RCN) via Arizona Department of Transportation (ADOT) existing optic cable at three project locations. The project will eliminate the need for T1-leased lines, reduce associated costs and enable future connectivity to other equipment along each corridor. The project is designed in accordance with MCDOT design standards. Construction is anticipated in fiscal year 2017.

The Master Intergovernmental Agreement (“Master IGA”) between the State of Arizona (the “State”) and the County of Maricopa County (the “County”) for Traffic Management and Operations was approved by the County Board of Supervisors on November 19, 2014 and was executed by the State on December 22, 2014.

The County and the State, acting through their respective Department of Transportation (“MCDOT” and “ADOT”) elect to apply the terms of the Master IGA to the project identified above. The Master IGA allows MCDOT and ADOT to collaborate and leverage infrastructure and systems for regional operations and mutually develop Intelligent Transportation Systems (ITS) projects. Under the terms of the Master IGA, such projects may be proposed by either entity and shall become effective upon mutual approval of project-specific addendums (Addendum). For the purpose of this Addendum, MCDOT and ADOT will collectively be referred to as “Partners”. The final design plans of the project will develop the requirements of the new and existing fiber assignments needed to complete this project.

**Partners’ Responsibilities:**

- Partners agree to proceed in a manner consistent with the provisions as set forth in the Master IGA.
- Partners agree to make available the fiber optic cables and system resources, as identified in Exhibit A.
- Partners agree to operate and maintain the existing systems and make any future infrastructure improvements to their respective systems, as identified in Exhibit A.

**MCDOT Responsibilities:**

- MCDOT is the lead agency and is responsible for the design, construction and cost of the Project.

**ADOT Responsibilities:**

- ADOT will provide an all-inclusive right-of-entry no-cost fee permit for Project work within the State's jurisdictional boundaries.
- ADOT will dedicate a new pair of fibers within the ADOT trunk line to provide MCDOT Traffic Management Center (TMC) connectivity to each of the 3 new MCDOT connection sites, as illustrated in Exhibit A. Segments within the communication pathways of these 3 new connection sites which currently have a pair of fibers dedicated for MCDOT use will be utilized, and new fiber will not be necessary in these segments.



Handwritten signature of Steve Boschen in blue ink, with the date 7/7/15 written to the right.

Steve Boschen, P.E.                      Date  
Director, Intermodal Transportation Division  
Arizona Department of Transportation



Handwritten signature of Jennifer Toth in blue ink, with the date 06/24/2015 written to the right.

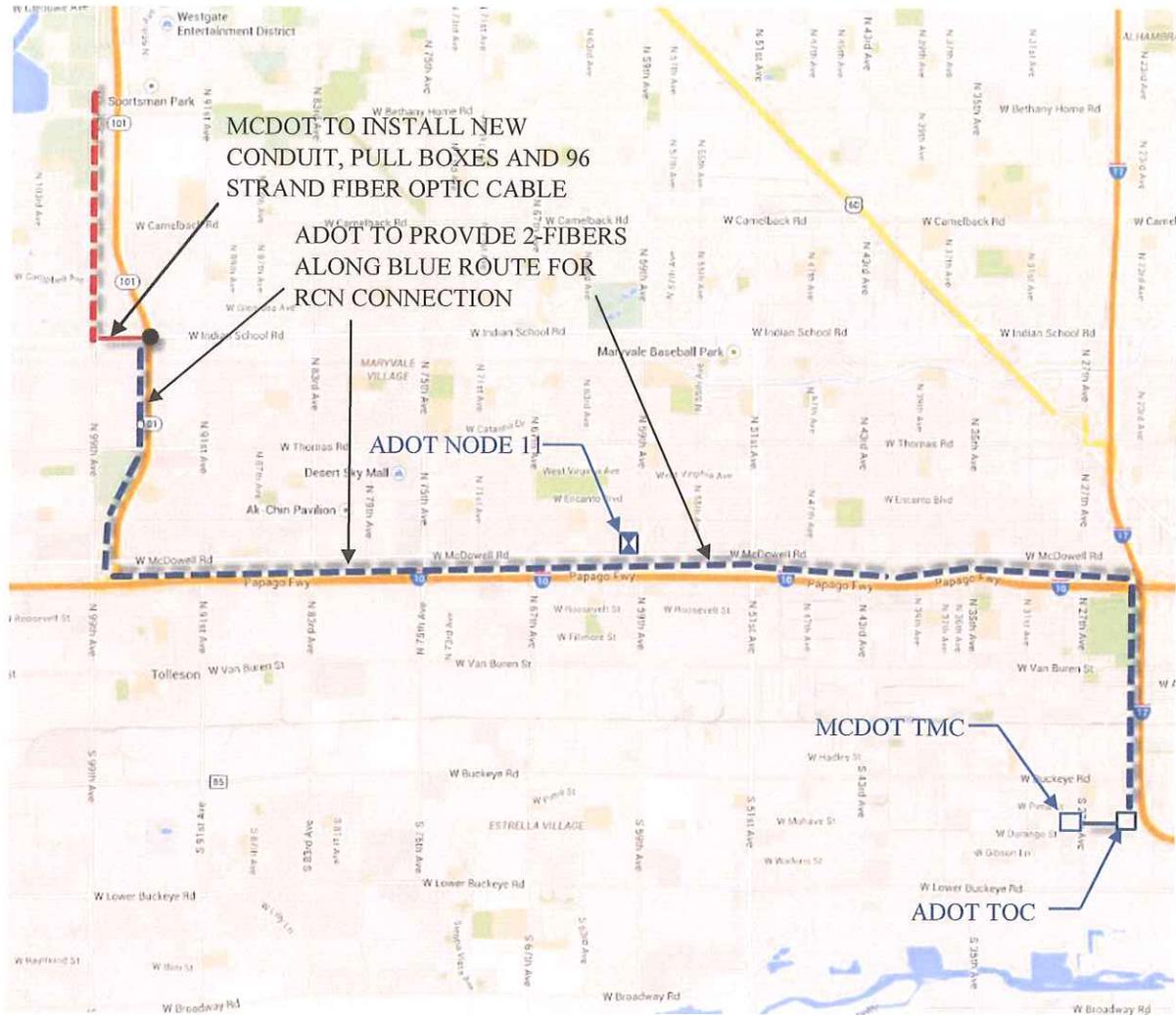
Jennifer Toth, P.E.                      Date  
Director  
Maricopa County Department of  
Transportation

## **EXHIBIT A**

Location #1: Indian School Road  
Location #2: McDowell Road  
Location #3: Daisy Mountain Drive

# Location #1: Indian School Road

New Construction Limits: 99<sup>th</sup> Ave to SR 101L



LEGEND:	
	EXISTING 96-FIBER MCDOT CABLE
	NEW 96-FIBER MCDOT CABLE
	EXISTING FIBER OPTIC CONNECTION BETWEEN MCDOT TMC AND ADOT TOC
	EXISTING 96 OR 144- FIBER ADOT CABLE
	MCDOT TO ADOT FIBER OPTIC CABLE SPLICE

## Location #2: McDowell Road

New Construction Limits: SR 101L to 92<sup>nd</sup> St

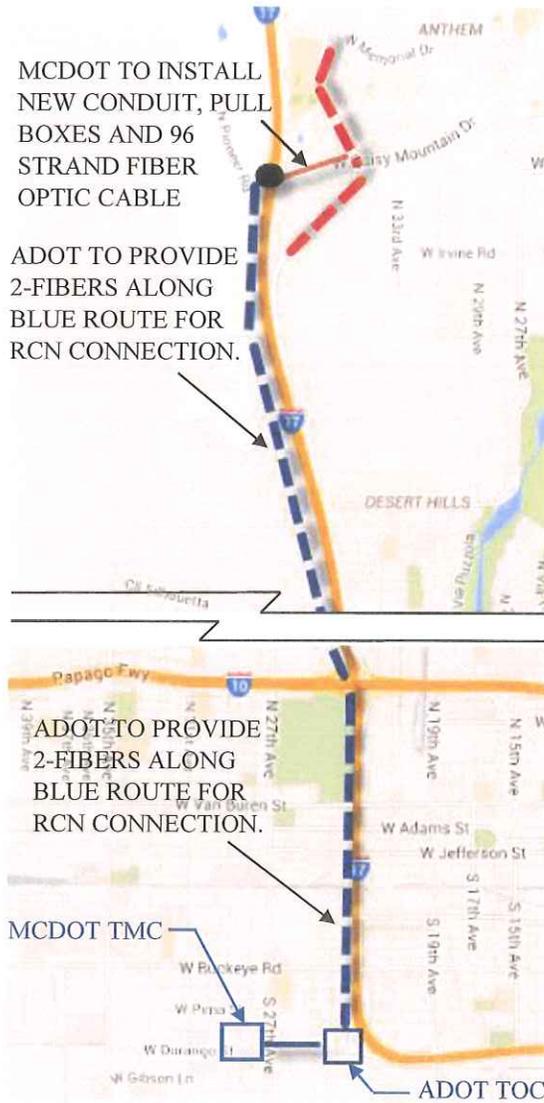


### LEGEND:

- ■ ■ ■ ■ EXISTING 96-FIBER MCDOT CABLE
- NEW 96-FIBER MCDOT CABLE
- EXISTING FIBER OPTIC CONNECTION BETWEEN MCDOT TMC AND ADOT TOC
- ■ ■ ■ ■ EXISTING 96 OR 144- FIBER ADOT CABLE
- MCDOT TO ADOT FIBER OPTIC CABLE SPLICE

### Location #3: Daisy Mountain Drive

New Construction Limits: I-17 to Gavilan Peak Parkway



**LEGEND:**

- ■ ■ ■ ■ EXISTING 96-FIBER MCDOT CABLE
- NEW 96-FIBER MCDOT CABLE
- EXISTING FIBER OPTIC CONNECTION BETWEEN MCDOT TMC AND ADOT TOC
- ■ ■ ■ ■ EXISTING 96 OR 144- FIBER ADOT CABLE
- MCDOT TO ADOT FIBER OPTIC CABLE SPLICE



MARK BRNOVICH  
ATTORNEY GENERAL

OFFICE OF THE ARIZONA ATTORNEY GENERAL  
STATE GOVERNMENT DIVISION /  
TRANSPORTATION SECTION

DAWN NORTHUP  
DIVISION CHIEF COUNSEL  
SUSAN E. DAVIS  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8855  
E-MAIL: SUSAN.DAVIS@AZAG.GOV

**MASTER INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012014000457 (ADOT IGA/JPA 14-0004045-I), Addendum No. One, an Agreement between public agencies, the State of Arizona and Maricopa County Department of Transportation, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: July 9, 2015

MARK BRNOVICH  
Attorney General

  
SUSAN E. DAVIS  
Assistant Attorney General  
Transportation Section

SED:rl:#4545609  
Attachment

**ADDENDUM TWO TO MASTER INTERGOVERNMENTAL AGREEMENT  
FOR TRAFFIC MANAGEMENT AND OPERATIONS  
BETWEEN  
THE STATE OF ARIZONA  
AND  
MARICOPA COUNTY  
(14-0004045-I)(C64-15-049-M-00)**

**PROJECT NAME:** Develop Scope for Acquiring Third Party Probe Data  
MCDOT Project No.: TE023  
ADOT Purchase Order No.: ADOT17-152468  
AG Contract No.: P0012014000457

**PROJECT DESCRIPTION:** Jointly develop a scope of work that ADOT will advertise to establish a statewide on-call procurement contract that will be utilized for procurement of third party probe data and analysis tools.

The Master Intergovernmental Agreement (“Master IGA”) between the State of Arizona (the “State”) and the County of Maricopa County (the “County”) for Traffic Management and Operations was approved by the County Board of Supervisors on November 19, 2014 and was executed by the State on December 22, 2014.

The County and the State, acting through their respective Department of Transportation (“MCDOT” and “ADOT”) elect to apply the terms of the Master IGA to the project identified above. The Master IGA allows MCDOT and ADOT to collaborate and leverage infrastructure and systems for regional operations and mutually develop Intelligent Transportation Systems (ITS) projects. Under the terms of the Master IGA, such projects may be proposed by either entity and shall become effective upon mutual approval of project-specific addendums (Addendum). For the purpose of this Addendum, MCDOT and ADOT will collectively be referred to as “Partners”.

The Partners agree to:

- Proceed in a manner consistent with the provisions as set forth in the Master IGA, and collaborate with each other to maximize the availability of Third Party Probe Data where possible. This Addendum will subsequently allow MCDOT and other local agencies to access the resulting ADOT on-call contracts for maximum traveler information dissemination.
- Collaborate to develop the Scope of Work for a Request for Proposal (RFP) for establishing on-call procurement contracts with a qualified pool of vendors to procure third party probe data and analysis tools.
- Each contribute 50% of the estimated cost of developing the Scope of Work; current estimate is \$2,700.00 (\$1,350.00 per Partner).

MCDOT will:

- Hire a consultant to prepare and develop the Scope of Work for the RFP.

ADOT will:

- Advertise the RFP and establish contracts with a qualified pool of vendors.

**MARICOPA COUNTY**

Department of Transportation

DocuSigned by:  
*Jennifer Toth* 12/13/2016  
By 1524CAABEE9640C

**JENNIFER TOTH, P.E.**      **Date**  
Director  
Maricopa County Department of  
Transportation

**STATE OF ARIZONA**

Department of Transportation

DocuSigned by:  
*Brent Cain* 12/20/2016  
By 48C55E64D3CE49E...

**BRENT CAIN, P.E.**      **Date**  
TSMO Division Director  
Arizona Department of Transportation



**MARK BRNOVICH**  
**ATTORNEY GENERAL**

**OFFICE OF THE ARIZONA ATTORNEY GENERAL**  
**STATE GOVERNMENT DIVISION /**  
**TRANSPORTATION SECTION**

**DAWN NORTHUP**  
**DIVISION CHIEF COUNSEL**  
**SUSAN E. DAVIS**  
**ASSISTANT ATTORNEY GENERAL**  
**DIRECT LINE: 602-542-8855**  
**E-MAIL: SUSAN.DAVIS@AZAG.GOV**

**ADDENDUM TWO**  
**MASTER INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012014000457 (**ADOT JPA 14-0004045-I)(C64-15-049-M-00**), an Agreement between public agencies, the State of Arizona and Maricopa County Department for Traffic Management and Operations, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: December 22, 2016

**MARK BRNOVICH**  
Attorney General

  
\_\_\_\_\_  
**SUSAN E. DAVIS**  
Assistant Attorney General  
Transportation Section

SED:rl:#4545609  
Attachment

**ADDENDUM #THREE TO MASTER INTERGOVERNMENTAL  
AGREEMENT  
For Traffic Management and Operations  
Between  
The State of Arizona  
And  
Maricopa County  
(14-0004045-I and C-64-049-M-00, resp.)**

**PROJECT NAME:** Commercial Vehicle Information Systems and Networks (CVISN) Work Zone Notification System (**Project**)  
County Project # TE040

**PROJECT LOCATIONS:** 1) South Mountain Freeway interchange at I-10; and  
2) MC-85 arterial corridor

**PROJECT DESCRIPTION:** Participating agencies for this Project include Arizona Department of Transportation (**ADOT**), Maricopa County Department of Transportation (**MCDOT**) and the University of Arizona (**U of A**). The objectives of the Arizona CVISN Work Zone and Incident Electronic Notification Systems are to: 1) develop and demonstrate a work zone warning and alert system using connected vehicle technologies (5.9 GHz DSRC communications) to provide in-vehicle information for commercial vehicle operators; 2) develop and demonstrate the use of connected vehicle systems, including variable speed limits, queue warning, lane closure warning, and vehicle-to-vehicle messages to augment the operation of core CVISN capabilities (e.g. electronic credentialing and enforcement).

The Master Intergovernmental Agreement (**Master IGA**) between the State of Arizona and the County of Maricopa County for Traffic Management and Operations was approved by the County Board of Supervisors on November 19, 2014, and was executed by the State on December 22, 2014.

The County and State (**Partners**), acting through their respective Departments of Transportation (MCDOT and ADOT), elect to apply the terms of the Master IGA to the Project identified above. The Master IGA allows MCDOT and ADOT to collaborate and leverage infrastructure and systems for regional operations and mutually develop Intelligent Transportation Systems (ITS) projects. Under the terms of the Master IGA, such projects may be proposed by either entity and shall become effective upon mutual approval of project-specific addendums (Addendum).

MCDOT has a separate IGA with U of A (C-91-09-052-M-00, entered into October 15, 2008 and as amended June 20, 2012) (hereinafter County IGA), through which the County and U of A (outside the Master IGA) will coordinate the use of their resources to perform research-oriented traffic and ITS technology studies. The County IGA will allow MCDOT, as the sub-recipient of ADOT's award of CVISN funds from the Federal Motor Carrier Safety Administration (**FMCSA**), to proceed with U of A for related system development on this Project.

**Partners Responsibilities:**

- Agree to proceed in a manner consistent with the provisions as set forth in the Master IGA.
- Agree to proceed in a manner consistent with Project objectives, including schedule and deliverables, and resolving funding and resource challenges posed in the Arizona Expanded CVISN Grant Application - 2016.
- Partners will coordinate on the development of a concept of operations that captures stakeholder needs, operating concepts and maintenance concepts. Such concepts will be developed through a series of stakeholder and engineering design meetings.
- Upon development of a concept of operations, further address Project work plan by: developing system design requirements; system and software development; field integration and testing; and field demonstrations, once integrated and tested system and software is accepted by ADOT FMCSA representative.
- Per the CVISN grant application, the total matching in-kind contribution is estimated at \$337,800. Equipment and Supplies contributed by the Partners as in-kind match contributions will be split evenly between ADOT and MCDOT.
- Agree to contribute appropriate in-kind matching activities as indicated in Table 1 below:

TABLE 1			
In-Kind Contribution (quantities tbd later)	Cost Category	Cost Share Split	Match Amount
Roadside Units	Equipment	One-half	\$ 44,000
On-Board Units	Equipment	One-half	\$ 65,000
In-Vehicle Display Units	Supplies	One-half	\$ 10,000
Roadway Barricades	Equipment	One-half	\$ 80,000
Agency-furnished Equipment/Vehicle Charges*	Each Agency	Per Mileage	\$ 66,250
MCDOT furnished staff	Staff Time	MCDOT	\$ 15,750
ADOT furnished staff	Staff Time	ADOT	\$ 56,800
TOTAL			\$337,800

\*MCDOT REACT Program and ADOT ALERT Program

**MCDOT Responsibilities:**

- Exercise their option within the County IGA to have U of A develop the desired technology as discussed in this Addendum #3.
- Upon receipt of billing from U of A for Work Plan Task activities, and subsequent payment to U of A, submit related payment requests to ADOT for federal reimbursement of CVISN funds. These payment requests shall be submitted monthly to ADOT and include appropriate backup with ADOT's preferred progress payment form.
- In-kind match contribution for equipment, supplies, vehicle charges and staff as detailed in Table 1, as per matching requirements outlined in the Grant Agreement effective 9/2/2016 for the 2016 Expanded CVISN projects.

**ADOT Responsibilities:**

- ADOT shall be the lead agency.
- Reimburse MCDOT within 30 days of receipt of Payment Request documentation for U of A-related Project activities funded with CVISN funds passed through from MCDOT.
- In-kind match contribution for equipment, supplies, vehicle charges and staff as detailed in Table 1, as per matching requirements outlined in the Grant Agreement effective 9/2/2016 for the 2016 Expanded CVISN projects.

**IN WITNESS WHEREOF**, the Parties have executed this Addendum.

**MARICOPA COUNTY**

***Recommended by:***

DocuSigned by:  
*Jennifer Toth* 1/19/2017  
1524CAABEF9640C  
\_\_\_\_\_  
Jennifer Toth, P.E. Date  
Transportation Director  
Maricopa County  
Department of Transportation

**STATE OF ARIZONA**

***Recommended by:***

DocuSigned by:  
*Brent Cain* 1/30/2017  
48C55E54D3CE40E  
\_\_\_\_\_  
Brent Cain, P.E. Date  
Transportation Systems Management and  
Operations Division Director  
Arizona Department of Transportation



MARK BRNOVICH  
ATTORNEY GENERAL

OFFICE OF THE ARIZONA ATTORNEY GENERAL  
STATE GOVERNMENT DIVISION /  
TRANSPORTATION SECTION

DAWN NORTHUP  
DIVISION CHIEF COUNSEL  
SUSAN E. DAVIS  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8855  
E-MAIL: SUSAN.DAVIS@AZAG.GOV

**ADDENDUM #THREE**  
**MASTER INTERGOVERNMENTAL AGREEMENT**

A.G. Contract No. P0012014000457 (ADOT JPA 14-0004045-I)(C-64-049-M-00, resp.), an Agreement between public agencies, the State of Arizona and Maricopa County Department for Traffic Management and Operations, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: January 31, 2017

MARK BRNOVICH  
Attorney General

  
SUSAN E. DAVIS  
Assistant Attorney General  
Transportation Section

SED:rl:#5595667  
Attachment

ADOT CAR No.: IGA /JPA 14-0004451  
AG Contract No.: P0012014003210  
Project: Adaptive Traffic Signal Control  
Technology Development Project  
Section: Various Locations  
**Federal-aid No.: CM MMA-0(246)D**  
**ADOT Project No.: SZ087 01C**  
**TIP/STIP No.: MMA15-461**  
**CFDA No.: 20.205 - Highway Planning  
and Construction**  
**Budget Source Item No.: N/A**

## INTERGOVERNMENTAL AGREEMENT

BETWEEN  
THE STATE OF ARIZONA  
AND  
MARICOPA COUNTY

(C-64-14- \_\_\_\_\_ -2-00)

**THIS AGREEMENT** is entered into this date December 17, 2014, pursuant to the Arizona Revised Statutes §§ 11-951 through 11-954, as amended, between the STATE OF ARIZONA, acting by and through its DEPARTMENT OF TRANSPORTATION (the "State") and MARICOPA COUNTY, acting by and through its BOARD OF SUPERVISORS (the "County"). The State and the County are collectively referred to as the "Parties" or individually as a "Party".

### I. RECITALS

1. The State is empowered by Arizona Revised Statutes § 28-401 to enter into this Agreement and has delegated to the undersigned the authority to execute this Agreement on behalf of the State.
2. The County is empowered by Arizona Revised Statutes § 11-251 et.seq. to enter into this Agreement for the provision of services or for joint or cooperative action.
3. The purposes of this Agreement are to identify the roles and responsibilities for the Parties with respect to the Project and define the cost sharing of the local match for the Project.

### II. BACKGROUND

1. The County, acting through the Maricopa County Department of Transportation (MCDOT) and the State, are members of the regional traffic management and traveler information system known as AZTech™ (AZTech). Led by the State and MCDOT, AZTech develops and supports traffic management projects along many of the Valley's heavily traveled roadways.
2. Bell Road and its extension as Frank Lloyd Wright Boulevard is identified as a key east-west arterial extending from SR 303L on the west to SR 101L on the east.
3. Adaptive Traffic Signal Control Technology (ASCT) has been identified as an important tool to provide improved traffic signal timing adjustments in response to varying traffic volumes and congestion.

4. In association with the AZTech program, the current Project consists of the installation of adaptive traffic signal control technology at 52 signalized intersections in four (4) distinct areas along Bell Road and Frank Lloyd Wright Boulevard as identified below:

4.1 Area 1 – 7.0 miles – 21 intersections – Bell Road from Cotton Lane, through Avenue of the Arts/114<sup>th</sup> Avenue, including SR 303L & Grand Avenue (US 60).

4.2 Area 2 – 3.4 miles – 13 intersections – Bell Road from 99<sup>th</sup> Avenue, through 73<sup>rd</sup> Avenue, including SR 101L.

4.3 Area 3 – 3.2 miles – 10 intersections – Frank Lloyd Wright from Scottsdale Road, through Thompson Peak Parkway, including SR 101L.

4.4 Area 4 – 2.0 miles – 8 intersections – Bell Road from 35<sup>th</sup> Avenue, through 19<sup>th</sup> Avenue, including I-17.

5. Associated with the AZTech Program, this Project is part of an ongoing joint effort by the County and the State to provide for the efficient management of traffic on Bell Road and Frank Lloyd Wright Boulevard in Maricopa County.

6. The Project is funded from local and federal funds. The estimated construction cost is \$2,455,000 with federal funds of \$2,315,065 and a local match of \$139,935.

7. This Agreement is contingent upon the availability of federal funds through the MAG TIP:

7.1 Federal Contract Number: CM-MMA-0(246)D

7.2 Catalog of Federal Domestic Assistance (CFDA) Number: CFDA# 20.205

7.3 Fiscal Years: FY 2015

7.4 Total Project Cost: \$2,455,000

7.5 Federal Obligation Award: \$2,315,065

7.6 Funding Sources:

i. Congestion Mitigation and Air Quality Funds (CMAQ) – \$2,315,065 Federal Highway Administration (FHWA).

ii. Highway User Revenue Funds (HURF) and local revenues – \$139,935 – Local Match – distributed proportionally between the participating agencies: Arizona Department of Transportation (ADOT), Peoria, Glendale, Phoenix, Surprise, Scottsdale and the County. Independent of this agreement the County has commitment letters from other participating agencies.

7.7 Project Contact Information:

Name: Paul Porell, Project Manager

Agency: Maricopa County Department of Transportation

Phone: 602-506-7174

Email: PaulPorell@mail.maricopa.gov

### III. TERMS OF THE AGREEMENT

1. The County shall:

1.1 Be the lead agency on all construction and construction management, and shall provide certification of right-of-way with the assistance of the State.

1.2 Coordinate local match contributions from local agencies.

1.3 Request from the State any necessary right-of-way, utility and environmental clearance background information.

1.4 Provide design and installation documents to the State for review in a timely manner.

1.5 Apply for no-cost permits for Project work within the State boundaries.

1.6 Contribute the local match for the construction costs for, three (3) County signals, estimated at \$7,695.00 and four (4) State signals, estimated at \$10,260.00 in exchange for in-kind services. This includes one (1) signal along Bell Road between Cotton Lane and Avenue of the Arts/114<sup>th</sup> Avenue (Area 1), four (4) signals along Bell Road between 99<sup>th</sup> Avenue and 73<sup>rd</sup> Avenue (Area 2), and two (2) signals along Bell Road between 35<sup>th</sup> Avenue and 19<sup>th</sup> Avenue (Area 4), with a total contribution currently estimated at \$17,955.00.

i. State Intersections are located at:

1.1 Bell Road and Grand Avenue

2.1 Bell Road and SR 101L (Agua Fria Freeway)

3.1 Bell Road and I-17 West Ramp

4.1 Bell Road and I-17 East Ramp

1.7 Contribute the balance necessary to meet the total federally-mandated local match of 5.7 percent of the total construction cost of the Project, if the sum of the local match contributions provided by all of the participating agencies participating agencies is insufficient, currently estimated at a balance of \$6,555.00.

1.8 Provide the construction documents for the Project to the State's representative when completed.

1.9 Request and maintain, per established procedures of the State's Phoenix District Permit Office, a valid blanket Encroachment Permit for the routine/normal maintenance and emergency maintenance work provided by the County within the State's rights-of-way as may be applicable. Agree to obtain separate permits for any new construction and/or installations in accordance with the Phoenix District established procedures. The County agrees all activities performed by the County under this Agreement shall be set forth in and covered by the appropriate Encroachment Permit.

2. The State shall:

2.1 Provide the County any necessary right-of-way, utility and environmental clearance background information.

2.2 Provide timely review of all design and installation documents provided by the County. The State shall provide comments to the County within 30 calendar days after receiving documents for review from the County.

2.3 Own, operate and maintain the equipment installed within the State's jurisdiction as part of this Project upon completion of the Project.

2.4 Be responsible for restoring ASCT functionality in the interest of regional corridor operations, in the event of any modifications to the signal configuration.

2.5 Provide the in-kind service of replacing the existing two (2) signal controllers at the I-17/Bell Road Interchange with a single controller before the construction begins, in exchange for the County's contribution in the State's portion of the local match for the construction costs.

2.6 Issue, per established procedures of the State's Phoenix Maintenance District Office, a valid blanket Encroachment Permit for the routine/normal maintenance and emergency maintenance work to be provided by the County within the State's rights-of-way. Process any other Encroachment Permits that may be needed to work within the State's right-of-way to effectively meet the obligations set forth for the County in this Agreement. The State agrees all activities that are reasonably required to be performed by the County under this Agreement shall be set forth in and covered by the appropriate Encroachment Permit.

#### **IV. GENERAL TERMS AND CONDITIONS**

1. The terms, conditions and provisions of this Agreement shall remain in full force and effect until completion of said Project and related deposits or reimbursement, except any provisions for maintenance shall be perpetual, unless assumed by another competent entity. This Agreement may be cancelled at any time prior to the award of the Project construction contract, upon thirty (30) days written notice to the other Party. It is understood and agreed that, in the event the County terminates this Agreement, the County will be responsible for all costs incurred by the State up to the time of termination. It is further understood and agreed that in the event the County terminates this Agreement, the State shall in no way be obligated to maintain said Project.

2. The State assumes no financial obligation or liability under this Agreement, or for any resulting construction Project. The County, in regard to the County's relationship with the State only, assumes full responsibility for the design, plans, specifications, reports, the engineering in connection therewith and the construction of the improvements contemplated, cost over-runs and construction claims. It is understood and agreed that the State's participation is confined solely to securing federal aid on behalf of the County and the fulfillment of any other responsibilities of the State as specifically set forth herein; that any damages arising from carrying out, in any respect, the terms of this Agreement or any modification thereof shall be solely the liability of the County and that to the extent permitted by law, the County hereby agrees to save and hold harmless, defend and indemnify from loss the State, any of its departments, agencies, officers or employees from any and all costs and/or damage incurred by any of the above and from any other damage to any person or property whatsoever, which is caused by any activity, condition, misrepresentation, directives, instruction or event arising out of the performance or non-performance of any provisions of this Agreement by the State, any of its departments, agencies, officers and employees, or its independent contractors, the County, any of its agents, officers and employees, or its independent contractors. Costs incurred by the State, any of its departments, agencies, officers or employees shall include in the event of any action, court costs, and expenses of litigation and attorneys' fees.

3. The cost of construction and construction engineering work under this Agreement is to be covered by the federal funds set aside for this Project, up to the maximum available. The County acknowledges that the eventual actual costs may exceed the maximum available amount of federal funds, or that certain costs may not be accepted by the federal government as eligible for federal funds. Therefore, the County agrees to pay the difference between actual Project costs and the federal funds received.

4. Should the federal funding related to this Project be terminated or reduced by the federal government, or Congress rescinds, fails to renew, or otherwise reduces apportionments or obligation authority, the State shall in no way be obligated for funding or liable for any past, current or future expenses under this Agreement.

5. The cost of the project under this Agreement includes indirect costs approved by FHWA, as applicable.

6. The Parties warrant compliance with the Federal Funding Accountability and Transparency Act of 2006 and associated 2008 Amendments (the "Act"). Additionally, in a timely manner, the Town will provide information that is requested by the State to enable the State to comply with the requirements of the Act, as may be applicable.

7. The County acknowledges compliance with federal laws and regulations and may be subject to the Office of Management and Budget (OMB), Single Audit, Circular A-133 (Audits of States, Local Governments, and Non-Profit Organizations). Entities that expend \$500,000.00 or more (prior to 12/26/14) and \$750,000.00 or more (on or after 12/26/14) of federal assistance (federal funds, federal grants, or federal awards) are required to comply by having an independent audit. Either an electronic or hardcopy of the Single Audit is to be sent to Arizona Department of Transportation Financial Management Services within the required deadline of nine (9) months of the sub recipient fiscal year end.

ADOT – FMS  
Attn: Cost Accounting Administrator  
206 S 17<sup>th</sup> Ave. Mail Drop 204B  
Phoenix, AZ 85007  
[SingleAudit@azdot.gov](mailto:SingleAudit@azdot.gov)

8. This Agreement shall become effective upon signing and dating of the Determination Letter by the State's Attorney General.

9. This Agreement may be cancelled in accordance with Arizona Revised Statutes § 38-511.

10. To the extent applicable under law, the provisions set forth in Arizona Revised Statutes §§ 35-214 and 35-215 shall apply to this Agreement.

11. This Agreement is subject to all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable federal regulations under the Act, including 28 CFR Parts 35 and 36. The parties to this Agreement shall comply with Executive Order Number 2009-09 issued by the Governor of the State of Arizona and incorporated herein by reference regarding "Non-Discrimination".

12. Non-Availability of Funds: Every obligation of the State under this Agreement is conditioned upon the availability of funds appropriated or allocated for the fulfillment of such obligations. If funds are not allocated and available for the continuance of this Agreement, this Agreement may be terminated by the State at the end of the period for which the funds are available. No liability shall accrue to the State in the event this provision is exercised, and the State shall not be obligated or liable for any future payments as a result of termination under this paragraph.

13. In the event of any controversy, which may arise out of this Agreement, the Parties hereto agree to abide by required arbitration as is set forth for public works contracts in Arizona Revised Statutes § 12-1518.

14. The Parties shall comply with the applicable requirements of Arizona Revised Statutes § 41-4401.

15. The Parties hereto shall comply with all applicable laws, rules, regulations and ordinances, as may be amended.

16. All notices or demands upon any Party to this Agreement shall be in writing and shall be delivered in person or sent by mail, addressed as follows:

For Agreement Concerns:  
Arizona Department of Transportation  
Joint Project Administration  
205 S. 17<sup>th</sup> Avenue, Mail Drop 637E  
Phoenix, Arizona 85007  
(602) 712-7124  
(602) 712-3132 Fax

Maricopa County Department  
of Transportation  
Attn: Intergovernmental Relations  
2901 West Durango Street  
Phoenix, Arizona 85009  
(602) 506-8672

For Project Concerns:  
Arizona Department of Transportation  
Attn: Stephanie Wilhardt-Smith  
206 South 17<sup>th</sup> Avenue, MD EM01  
Phoenix, AZ 85003

17. In accordance with Arizona Revised Statutes § 11-952 (D) attached hereto and incorporated herein is the written determination of each Party's legal counsel and that the Parties are authorized under the laws of this State to enter into this Agreement and that the Agreement is in proper form.

**IN WITNESS WHEREOF**, the Parties have executed this Agreement the day and year first above written.

**MARICOPA COUNTY**

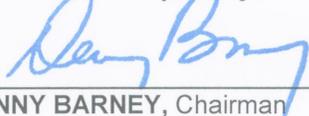
**STATE OF ARIZONA**

Department of Transportation

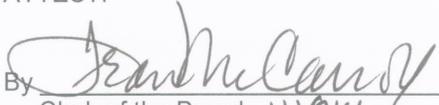
By   
\_\_\_\_\_  
**JENNIFER TOTH, P.E.**  
Transportation Director

By   
\_\_\_\_\_  
**DALLAS HAMMIT, P.E.**  
Senior Deputy State Engineer, Development

**Approved and Accepted by:**

By   
\_\_\_\_\_  
**DENNY BARNEY**, Chairman  
Board of Supervisors

**ATTEST:**

By   
\_\_\_\_\_  
Clerk of the Board 111914

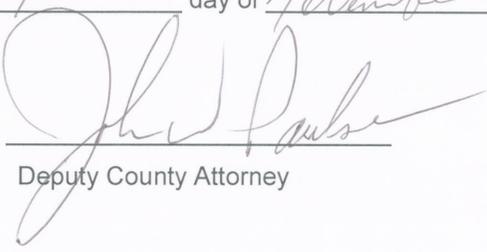
JPA 14-0004451-I

ATTORNEY APPROVAL FORM FOR THE COUNTY OF MARICOPA

I have reviewed the above referenced Intergovernmental Agreement between the State of Arizona, acting by and through its DEPARTMENT OF TRANSPORTATION, and the COUNTY OF MARICOPA, an Agreement among public agencies which, has been reviewed pursuant to Arizona Revised Statutes §§ 11-951 through 11-954 and declare this Agreement to be in proper form and within the powers and authority granted to the County under the laws of the State of Arizona.

No opinion is expressed as to the authority of the State to enter into this Agreement.

DATED this 19<sup>th</sup> day of November, 2014.

  
Deputy County Attorney



THOMAS C. HORNE  
ATTORNEY GENERAL

OFFICE OF THE ATTORNEY GENERAL  
TRANSPORTATION SECTION

SUSAN E. DAVIS  
ASSISTANT ATTORNEY GENERAL  
DIRECT LINE: 602-542-8855  
E-MAIL: [SUSAN.DAVIS@AZAG.GOV](mailto:SUSAN.DAVIS@AZAG.GOV)

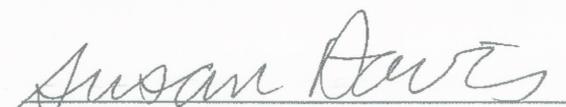
**INTERGOVERNMENTAL AGREEMENT**  
**DETERMINATION**

A.G. Contract No. P0012014003210 (ADOT IGA/JPA 14-0004451-I), an Agreement between public agencies, the State of Arizona and Maricopa County, has been reviewed pursuant to A.R.S. §§ 11-952, as amended, by the undersigned Assistant Attorney General who has determined that it is in the proper form and is within the powers and authority granted to the State of Arizona.

No opinion is expressed as to the authority of the remaining Parties, other than the State or its agencies, to enter into said Agreement.

DATED: December 17, 2014

THOMAS C. HORNE  
Attorney General

  
SUSAN E. DAVIS  
Assistant Attorney General  
Transportation Section

SED:rl:#4261479  
Attachment

**MASTER INTERGOVERNMENTAL AGREEMENT BETWEEN  
MARICOPA COUNTY AND THE CITY OF PHOENIX  
FOR TRAFFIC MANAGEMENT AND OPERATIONS  
(C-64-16-075-M-00)**

This Master Intergovernmental Agreement ("**Agreement**") is between the County of Maricopa, a political subdivision of the State of Arizona (the "**County**"), and the City of Phoenix, a municipal corporation (the "**City**"). The County and the City are collectively referred to as the **Parties** and individually as a **Party**.

**STATUTORY AUTHORIZATION**

1. A.R.S. §§11-251 and 28-6701, *et seq.*, authorize the County to lay out, maintain, control and manage public roads within its respective County, to acquire and condemn property necessary for such purposes, and to enter into this Agreement.
2. A.R.S. §11-951, *et seq.*, provides that public agencies may enter into Intergovernmental Agreements for the provision of services or for joint or cooperative action.
3. A.R.S. §§9-240 and 9-276, *et seq.*, authorize the City to lay out and establish, regulate and improve streets within the City and to enter into this Agreement.

**BACKGROUND**

4. The Parties currently each own and operate separate Intelligent Transportation Systems.
5. The Parties recognize their extensive infrastructure and systems foundation and agree to advance collaboration with each other to leverage infrastructure and systems for regionally integrated operations.
6. The Parties recognize that collaborating on Integrated Corridor Management (ICM) initiatives provides a mutual benefit and cost savings by expanding their respective systems and contributing to the regional communications effort.
7. The Parties are committed to continuing efforts associated with regional initiatives that leverage existing infrastructure and resources and implementing new initiatives to support coordinated traffic management, traveler information dissemination, and ongoing operations and maintenance.
8. The Parties are committed to continuing their participation in the AZTech™ regional transportation operations partnership.

## PURPOSE OF THE AGREEMENT

9. The purpose of the Agreement is to set forth the general terms and conditions whereby the County and City will collaborate to share infrastructure and execute ICM projects (with respect to each engagement "the Project"), with the specifics of each engagement to be set forth in an executed Addendum to this Agreement.
10. Projects under this Agreement will detail processes for coordination, communication, freeway and arterial system operations when a freeway closure necessitates diverting freeway traffic onto City and County arterial streets. The Projects may outline sharing of infrastructure, such as conduit or fiber. If shared, the Project will specify in detail what is being shared, who has primary responsibility, and how it will be maintained.

## TERMS OF THE AGREEMENT

### 11. The Parties Agree To:

#### 11.1 Integrated Corridor Management

- i. Mutually develop ICM Projects and initiatives. Such Projects under this Agreement may be proposed by either Party, and will become effective, as an Addendum, upon mutual approval of the Phoenix Street Transportation Department Director, or designee and the Maricopa County Department of Transportation (MCDOT) Director or designee.
- ii. Limit the geographical area of the ICM Projects and initiatives through this Agreement to all freeways and arterial roads within the jurisdictions of the County and City.
- iii. Provide prompt written notice to the other Party whenever the County or the City observes or otherwise becomes aware of any development that affects the scope, timing, or payment of Party's services.
- iv. Designate the Phoenix Street Transportation Department Director or designee and the MCDOT Director, or designee, to act as the Party's representative; with authority to transmit instructions, receive information, and make or interpret the Party's decisions regarding Project execution.
- v. Provide all criteria, terms, requirements, objectives, and expectations for the Project, including all numerical criteria and all standards of development, design, or construction.
- vi. Assist the other Party by providing information pertinent to the Project, including previous reports and any other data relative to studies, design, construction or operation.

- vii. Arrange for access to, and make all provisions for, the other Party to enter upon public property as required to perform services under this Agreement.

#### **11.2 Regional Systems Integration**

- i. Jointly develop plans of collecting, processing, analyzing and disseminating regional freeway and arterial data through the Regional Archived Data Server (RADS). The plans will expand the ongoing collaboration between the County and City in administering and maintaining the RADS services.
- ii. Cooperate in coordinating the traffic management systems and signals for a regional traffic transportation system.
- iii. Allow timely access to City traffic system databases to enhance integration into the system. Participate in the development and execution of multi-jurisdictional Project plans to establish interoperability between the State, County, City and other jurisdictions regarding traveler information, data collection/reporting efforts and compatibility of field equipment and corridor signal timing plans.
- iv. Share real-time closed-circuit television (CCTV) camera images as described in the published AZTech™ Center-to-Center Video Feed & Camera Control Guidelines. Any changes in permissions shall be agreed to by specified designees on behalf of each Party.
- v. Provide access to post messages on the other Party's owned Dynamic Message Signs (DMS) per mutually agreed operational procedures, as developed. Any changes in permissions shall be agreed to by specified designees on behalf of each Party.

#### **11.3 Infrastructure and Systems**

- i. Share the infrastructure and system resources in order to collaborate on efforts associated with Intelligent Transportation Systems initiatives.
- ii. Define and implement the sharing of existing fiber communications infrastructure within common jurisdiction boundaries.
- iii. Operate and maintain existing systems in a manner that supports infrastructure sharing.
- iv. Share primary and secondary contact information for approved staff to report problems with the shared infrastructure or systems.
- v. In the event either Party experiences a shortage of available communications bandwidth to meet its needs at any location in its system, Parties will collaborate to make adjustments to maintain communications.

- vi. No Party will make payments to the other Party for the use of the shared resources.
- vii. Notify the other Party of planned or unplanned downtime that impacts shared infrastructure.
- viii. Maintain and provide continuous technical support of hardware or software physically in the other Party's facility as needed to support Intelligent Transportation Systems initiatives.

#### **11.4 Incident Management**

- i. Provide traffic management support services for incident management purposes where agreed within a specific Project. This includes County Regional Emergency Action Coordination Team (REACT) team response services on arterials.
- ii. Designate appropriate representatives of response teams to attend collaborative discussions related to incident debriefs, AZTech™ Working Groups or Committees, or ICM discussions according to their best effort.

#### **11.5 AZTech™ Partnership**

- i. Continue commitment to their participation in the AZTech™ regional transportation management and operations partnership including representation on the AZTech™ standing committees.
- ii. Participate in developing AZTech™ Transportation System Management and operation initiatives and Projects to improve regional transportation management.

### **GENERAL TERMS AND CONDITIONS**

12. By entering into this Agreement, the Parties agree that to the extent permitted by law, each Party will defend, indemnify and save the other Parties harmless, including any of the Parties' departments, agencies, officers, employees, elected officials or agents, from and against all loss, expense, damage or claim of any nature whatsoever which is caused by any activity, condition or event arising out of the performance or nonperformance by the indemnifying Party of any of the provisions of this Agreement. By entering into this Agreement, each Party indemnifies the other against all liability (including but not limited to vicarious liability), losses and damages of any nature for or on account of any injuries or death of persons or damages to or destruction of property arising out of or in any way connected with the performance or nonperformance of this Agreement, except such injury or damage that is occasioned by the negligence of that other Party. The damages which are the subject of this indemnity shall include but not be limited to the damages incurred by any Party, its departments, agencies, officers, employees, elected officials or agents. In the event of an action, the damages which are the subject of this indemnity shall include costs, expenses of litigation and reasonable attorney's fees.

13. This Agreement shall become effective as of the date it is approved by the Maricopa County Board of Supervisors and remain in full force and effect for a period of ten (10) years, except that it may be amended upon written agreement by all Parties. Any Party may terminate this Agreement upon furnishing the other Party with a written notice at least thirty (30) days prior to the effective termination date.
14. This Agreement shall be subject to the provisions of A.R.S. Section 38-511.
15. The Parties warrant that they are in compliance with A.R.S. Section 41-4401 and further acknowledge that:
  - 15.1 Any contractor or subcontractor who is contracted by a Party to perform work on the Project shall warrant their compliance with all federal immigration laws and regulations that relate to their employees and their compliance with the E-Verify program under A.R.S. Section 23-214(A), and shall keep a record of the verification for the duration of the employee's employment or at least three years, whichever is longer.
  - 15.2 Any breach of the warranty shall be deemed a material breach of the contract that is subject to penalties up to and including termination of the contract.
  - 15.3 The Parties retain the legal right to inspect the papers of any contractor or subcontractor employee who works on the Project to ensure that the contractor or subcontractor is complying with the warranty above and to require that the contractor make all papers and employment records of said employee available during normal working hours in order to facilitate such an inspection.
  - 15.4 Nothing in this Agreement shall make any contractor or subcontractor an agent or employee of the Parties to this Agreement
16. Each Party to this Agreement warrants that neither it nor any contractor or vendor under contract with the Party to provide goods or services toward the accomplishment of the objectives of this Agreement is suspended or debarred by any federal agency which has provided funding that will be used in the Project described in this Agreement.
17. Each of the following shall constitute a material breach of this Agreement and an event of default ("Default") hereunder: A Party's failure to observe or perform any of the material covenants, conditions or provisions of this Agreement to be observed or performed by that Party ("Defaulting Party"), where such failure continues for a period of thirty (30) days after the Defaulting Party receives written notice of such failure from the non-defaulting party provided, however, that such failure shall not be a Default if the Defaulting Party has commenced to cure the Default within such thirty (30) day period and thereafter is diligently pursuing such cure to completion, but the total aggregate cure period shall not exceed ninety (90) days unless the Parties agree in writing that additional time is reasonably necessary under the circumstances to cure the default. In the event a Defaulting Party fails to perform any of its material obligations under this

Agreement and is in Default, the non-defaulting party, at its option, may terminate this Agreement. Further, upon the occurrence of any Default and at any time thereafter, the non-defaulting party may, but shall not be required to, exercise any remedies now or hereafter available to it at law or in equity.

18. All notices required under this Agreement to be given in writing shall be sent to:

Maricopa County Department of Transportation  
Intergovernmental Relations  
2901 West Durango Street  
Phoenix, AZ 85009

City of Phoenix  
Plan Review Coordinator, Street Transportation  
200 West Washington Street, 5<sup>th</sup> Floor  
Phoenix, AZ 85003

All notices required or permitted by this Agreement or applicable law shall be in writing and may be delivered in person (by hand or courier) or may be sent by regular, certified or registered mail or U.S. Postal Service Express Mail, with postage prepaid, and shall be deemed sufficiently given if served in a manner specified in this paragraph. Either Party may by written notice to the other specify a different address for notice. Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, the postmark thereon. If sent by regular mail, the notice shall be deemed given 72 hours after the notice is addressed as required in this paragraph and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantee next day delivery shall be deemed given 24 hours after delivery of the notice to the Postal Service or courier.

19. This Agreement does not grant authority to control the subject roadway, except to the extent necessary to perform the tasks expressly undertaken pursuant to this Agreement.
20. Any funding provided for in this Agreement, other than in the current fiscal year, is contingent upon being budgeted and appropriated by the Maricopa County Board of Supervisors and the Phoenix City Council in such fiscal year. This Agreement may be terminated by any Party at the end of any fiscal year due to non-appropriation of funds.
21. This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors and assignees. Neither Party shall assign its interest in this Agreement without the prior written consent of the other Party.
22. This Agreement and all Exhibits attached to this Agreement set forth all of the covenants, promises, agreements, conditions and understandings between the Parties to this Agreement, and there are no covenants, promises, agreements, conditions or understandings, either oral or written, between the Parties other than as set forth in this Agreement, and those agreements which are executed

contemporaneously with this Agreement. This Agreement shall be construed as a whole and in accordance with its fair meaning and without regard to any presumption or other rule requiring construction against the party drafting this Agreement. This Agreement cannot be modified or changed except by a written instrument executed by all of the Parties hereto. Each Party has reviewed this Agreement and has had the opportunity to have it reviewed by legal counsel.

23. The waiver by any Party of any right granted to it under this Agreement is not a waiver of any other right granted under this Agreement, nor may any waiver be deemed to be a waiver of a subsequent right obtained by reason of the continuation of any matter previously waived.
24. Wherever possible, each provision of this Agreement shall be interpreted in such a manner as to be valid under applicable law, but if any provision shall be invalid or prohibited under the law, such provision shall be ineffective to the extent of such prohibition or invalidation but shall not invalidate the remainder of such provision or the remaining provisions.
25. Except as otherwise provided in this Agreement, all covenants, agreements, representations and warranties set forth in this Agreement or in any certificate or instrument executed or delivered pursuant to this Agreement shall survive the expiration or earlier termination of this Agreement for a period of one (1) year.
26. Nothing contained in this Agreement shall create any partnership, joint venture or other agreement between the Parties hereto. Except as expressly provided in this Agreement, no term or provision of this Agreement is intended or shall be for the benefit of any person or entity not a party to this Agreement, and no such other person or entity shall have any right or cause of action under this Agreement.
27. Time is of the essence concerning this Agreement. Unless otherwise specified in this Agreement, the term "day" as used in this Agreement means calendar day. If the date for performance of any obligation under this Agreement or the last day of any time period provided in this Agreement falls on a Saturday, Sunday or legal holiday, then the date for performance or time period shall expire at the close of business on the first day thereafter which is not a Saturday, Sunday or legal holiday.
28. Sections and other headings contained in this Agreement are for reference purposes only and shall not affect in any way the meaning or interpretation of this Agreement.
29. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute the same instrument. Faxed, copied and scanned signatures are acceptable as original signatures.
30. The Parties agree to execute and/or deliver to each other such other instruments and documents as may be reasonably necessary to fulfill the covenants and obligations to be performed by such party pursuant to this Agreement.

31. The Parties hereby agree that the venue for any claim arising out of or in any way related to this Agreement shall be Maricopa County, Arizona.
32. This Agreement shall be governed by the laws of the State of Arizona.
33. Unless otherwise lawfully terminated by the Parties, this Agreement expires upon completion and acceptance of the Project and fulfillment of all terms of the Agreement.

***End of Agreement - Signature Page Follows***





**ITEM**

**CITYWIDE**

**IGA WITH MARICOPA COUNTY  
FOR TRAFFIC MANAGEMENT  
AND OPERATIONS**

Request to authorize the City Manager, or his designee, to enter into an Intergovernmental Agreement (IGA) with the Maricopa County Department of Transportation (MCDOT) to delineate agency responsibilities for traffic management and operations along the street transportation network within the City.

Maricopa County owns, operates, and maintains a number of roadways within the City's jurisdictional boundaries. Both the City and MCDOT own their traffic management systems and infrastructure, such as traffic signals, video/camera monitoring devices, dynamic message signs, and traffic data fiber communications. This agreement will enable both agencies to leverage each other's existing infrastructure and traffic information to implement new initiatives to support and improve traffic flows, disseminate traveler information, and respond to freeway closures. As an example, both agencies will be able to share real-time closed circuit television camera images, and access and post messages on the other agency's dynamic message signs.

Individual projects that fall under the scope of this agreement will be formalized through amendments to this IGA.

As part of the IGA, the City and MCDOT agree to save and hold harmless, defend and indemnify each other from claims resulting from the negligent or wrongful acts or omissions by either party. Per City Code 42-20 (B) indemnification of another public entity requires approval from the City Council.

**Responsible Department**

This item is recommended by Deputy City Manager Mario Paniagua and the Street Transportation Department.

ORDINANCE S-42231

AN ORDINANCE AUTHORIZING THE CITY MANAGER TO ENTER INTO AN INTERGOVERNMENTAL AGREEMENT WITH THE MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION TO DELINEATE RESPONSIBILITIES FOR TRAFFIC MANAGEMENT AND OPERATIONS ALONG COUNTY ROADWAYS WITHIN THE CITY; AND GRANTING AN EXCEPTION TO PCC § 42-18 TO INCLUDE INDEMNIFICATION AND ASSUMPTION OF LIABILITY PROVISIONS IN THE AGREEMENT.

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BE IT ORDAINED BY THE COUNCIL OF THE CITY OF PHOENIX as follows:

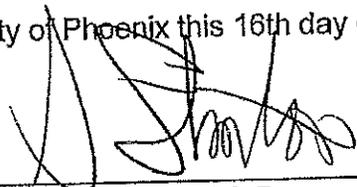
SECTION 1. The City Manager, or his designee, is authorized to enter into an intergovernmental agreement (IGA) with the Maricopa County Department of Transportation (MCDOT) for shared traffic management and operational responsibilities for county roadways located within the city limits.

SECTION 2. The City Council authorizes an exception, pursuant to Phoenix City Code Section 42-20, to include indemnification and assumption of liability provisions in the IGA that would otherwise be prohibited by Phoenix City Code Section 42-18(A) and (B). The City and MCDOT agree to save and hold harmless, defend and indemnify each other from claims resulting from either's negligent or wrongful acts or omissions.

PASSED by the Council of the City of Phoenix this 16th day of December,

2015.

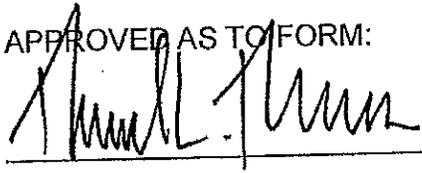


  
MAYOR

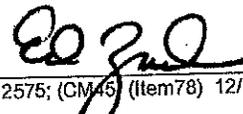
ATTEST:

  
ACTING  
City Clerk

APPROVED AS TO FORM:

  
ACTING  
City Attorney 

REVIEWED BY:

  
City Manager  
JMK:ab:1212575; (CM45) (Item78) 12/16/15



# US-60/Grand Avenue TMP

Loop 303 to Willetta Street

Concept of Operations

## *APPENDIX TM2-2*

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**Intergovernmental Agreement Template for EVP Devices**

ADOT File No.: [            ]  
AG Contract No.: [        ]  
Project: EVP Traffic Signals  
Section: Citywide  
**Federal-aid No.: N/A**  
**ADOT Project No.: N/A**  
**TIP/STIP No.: N/A**  
**CFDA No.: 20.205 - Highway Planning  
and Construction**  
**Budget Source Item No.: N/A**

**INTERGOVERNMENTAL AGREEMENT**

**MASTER MAINTENANCE  
FOR EVP TRAFFIC SIGNALS**

BETWEEN  
THE STATE OF ARIZONA  
AND  
THE CITY OF [            ]

**THIS AGREEMENT** is entered into this date, \_\_\_\_\_, 2016, pursuant to the Arizona Revised Statutes §§ 11-951 through 11-954, as amended, between the STATE OF ARIZONA, acting by and through its DEPARTMENT OF TRANSPORTATION (the “State” or “ADOT”) and the CITY OF [            ], acting by and through its MAYOR and CITY COUNCIL (the “City”). The State and the City are collectively referred to as “Parties.”

**I. RECITALS**

1. The State is empowered by Arizona Revised Statutes § 28-401 to enter into this Agreement and has delegated to the undersigned the authority to execute this Agreement on behalf of the State.

2. The City is empowered by Arizona Revised Statutes § 48-572 to enter into this Agreement and has, by resolution, a copy of which is attached hereto and made a part hereof, resolved to enter into this Agreement and has authorized the undersigned to execute this Agreement on behalf of the City.

3. The purpose of this Agreement is to authorize the City to install and establish maintenance responsibilities for emergency vehicle pre-emption (EVP) systems within the ADOT right-of-way within the Corporate boundaries of the City, in accordance with Traffic Engineering Policies, Guidelines and Procedures, number 624 (PGP 624), hereinafter referred to as the “Project”.

**THEREFORE**, in consideration of the mutual covenants expressed herein, it is agreed as follows:

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## **II. SCOPE OF WORK**

### 1. The State will:

a. Issue, per established procedures of the State's Phoenix District Permit Office, an Encroachment Permit to authorize the City to install EVP systems on current, as well as future, traffic signals, as identified from time to time by the City, within ADOT's right-of-way within the corporate boundaries of the City.

b. Upon completion of construction and acceptance of the Project, provide maintenance for the Project in accordance with Traffic Engineering Policies, Guidelines and Procedures (PGP), number 624.

c. Issue, per established procedures of the State's Phoenix District Permit Office, a valid blanket Encroachment Permit for the routine/normal maintenance and emergency maintenance work to be provided by the City within the State's rights-of-way. Process any other Encroachment Permits that may be needed to work within the State's right-of-way to effectively meet the obligations set forth for the City in this Agreement. The State agrees all activities that are reasonably required to be performed by the City under this Agreement shall be set forth in and covered by the appropriate Encroachment Permit.

### 2. The City will:

a. Obtain an Encroachment Permit through the Phoenix Maintenance District Permit Office for the installation of each EVP system

b. Install and maintain all EVP systems in accordance with PGP 624.

c. Be responsible for maintaining a reasonable inventory of all associated EVP system components, including transmitters installed on fire trucks or ambulances; EVP system components located in the controller cabinet, any optical sensor devices, and an emitter for testing as needed and appropriate.

d. Be responsible for all costs associated with training traffic signal technicians.

e. Request and maintain, per established procedures of the State's Phoenix District Permit Office, a valid blanket Encroachment Permit for the routine/normal maintenance and emergency maintenance work provided by the City within the State's rights-of-way. Agree to obtain separate permits for any new construction and/or installations in accordance with the Phoenix District established procedures. The City agrees all activities performed by the City under this Agreement shall be set forth in and covered by the appropriate Encroachment Permit.

### 3. The Parties will:

a. Agree in the event that the system must be removed, the State will remove everything inside the cabinet and the City will remove equipment from the signal poles.

## **III. MISCELLANEOUS PROVISIONS**

1. The terms, conditions and provisions of this Agreement shall remain in full force and effect until completion of the Project. All maintenance obligations contained herein shall be perpetual, unless assumed by another competent agency. This Agreement may be cancelled at any time, upon thirty (30) days written notice to the other party. It is further understood and agreed that, in the event City cancels this Agreement the State will have no obligation to continue with the Project.

2. The State assumes no financial obligation or liability under this Agreement, or for any resulting Project. The City, in regard to the City's relationship with the State only, assumes full responsibility for the maintenance, cost over-runs and claims. It is understood and agreed that the State's participation is confined solely to the fulfillment of responsibilities of the State as specifically set forth herein; and that any damages arising from carrying out, in any respect, the terms of this Agreement or any modification thereof shall be solely the liability of the City.

3. To the extent permitted by law, the City hereby agrees to save and hold harmless, defend and indemnify from loss the State, any of its departments, agencies, officers or employees from any and all liability, costs and/or damage incurred by any of the above arising or resulting from the Agreement; and from any other liability, damage to any person or property whatsoever, which is caused by any activity, negligence, condition, misrepresentation, directives, instruction or event arising out of the performance or non-performance of any provisions of this Agreement by (a) the State, any of its departments, agencies, officers and employees, or its independent contractors; or (b) the City, any of its agents, officers and employees, or its independent contractors. Costs incurred by the State, any of its departments, agencies, officers or employees shall include in the event of any action, court costs, and expenses of litigation and attorneys' fees.

4. This Agreement shall become effective upon signing and dating of the Determination Letter by the State's Attorney General.

5. The Parties warrant compliance with the Federal Funding Accountability and Transparency Act of 2006 and associated 2008 Amendments (the "Act"). Additionally, in a timely manner, the City will provide information that is requested by the State to enable the State to comply with the requirements of the Act, as may be applicable.

6. This Agreement may be cancelled in accordance with Arizona Revised Statutes § 38-511.

7. The provisions of Arizona Revised Statutes § 35-214 are applicable to this Agreement.

8. This Agreement is subject to all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. 12101-12213) and all applicable Federal regulations under the Act, including 28 CFR Parts 35 and 36. The parties to this Agreement shall comply with Executive Order Number 09-09 issued by the Governor of the State of Arizona and incorporated herein by reference regarding "Non-Discrimination".

9. Non-Availability of Funds: Every obligation of the State under this Agreement is conditioned upon the availability of funds appropriated or allocated for the fulfillment of such obligations. If funds are not allocated and available for the continuance of this Agreement, this Agreement may be terminated by the State at the end of the period for which the funds are available. No liability shall accrue to the State in the event this provision is exercised, and the State shall not be obligated or liable for any future payments as a result of termination under this paragraph.

10. In the event of any controversy which may arise out of this Agreement, the Parties hereto agree to abide by required arbitration as is set forth for public works contracts in Arizona Revised Statutes § 12-1518.

11. The Parties shall comply with the applicable requirements of Arizona Revised Statutes § 41-4401 and Title 34 of the Arizona Revised Statutes.

12. The Parties hereto shall comply with all applicable laws, rules, regulations and ordinances, as may be amended.

All notices or demands upon any party to this Agreement shall be in writing and shall be delivered in person or sent by mail, addressed as follows:

Arizona Department of Transportation  
Joint Project Administration  
205 S. 17th Avenue, Mail Drop 637E  
Phoenix, Arizona 85007-3212  
Fax: 602-712-3132

City of [ ]  
City Engineer  
[Address ]  
[ ], Arizona [Zip Code]  
Phone [ ]  
Fax [ ]

13. In accordance with Arizona Revised Statutes § 11-952 (D) attached hereto and incorporated herein is the written determination of each Party's legal counsel and that the parties are authorized under the laws of this State to enter into this Agreement and that the Agreement is in proper form.

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**IN WITNESS WHEREOF**, the Parties have executed this Agreement the day and year first above written.

**CITY OF [ ]**

**STATE OF ARIZONA**  
Department of Transportation

By \_\_\_\_\_  
[ ]  
Mayor

By \_\_\_\_\_  
**DALLAS HAMMIT, P.E**  
Senior Deputy State Engineer, Development

ATTEST:

By \_\_\_\_\_  
[ ]  
City Clerk

IGA/JPA [            ]

**ATTORNEY APPROVAL FORM FOR THE CITY OF [       ]**

I have reviewed the above referenced Intergovernmental Agreement between the State of Arizona, acting by and through its DEPARTMENT OF TRANSPORTATION, and the CITY OF [     ], an agreement among public agencies which, has been reviewed pursuant to Arizona Revised Statutes §§ 11-951 through 11-954 and declare this Agreement to be in proper form and within the powers and authority granted to the City under the laws of the State of Arizona.

No opinion is expressed as to the authority of the State to enter into this Agreement.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
City Attorney



# **US-60/Grand Avenue TMP**

**Loop 303 to Willetta Street**  
**Infrastructure Improvements and Cost Estimate**

## ***APPENDIX TMP-3***

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### **Infrastructure Improvements and Cost Estimate**

# **US-60/Grand Avenue Traffic Management Plan**

**Loop 303 to Willetta Street**

## **Infrastructure Improvements and Cost Estimate**

Prepared for:



Prepared By:

Burgess & Niple, Inc.

March 2017

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**List of Acronyms**

ADOT – Arizona Department of Transportation

AZDPS – Arizona Department of Public Safety

CCTV – Closed Circuit Television

DMS – Dynamic Messaging Sign

El Mirage – City of El Mirage

FHWA – Federal Highway Administration

Glendale – City of Glendale

I – Interstate

MAG – Maricopa Association of Governments

MCDOT – Maricopa County Department of Transportation

PTZ – Pan-Tilt-Zoom

Peoria – City of Peoria

Phoenix – City of Phoenix

RCN – Regional Community Network

SR – State Route

Surprise – City of Surprise

TMP – Traffic Management Plan

TOC – Traffic Operations Center

TSMO - Transportation Systems Management and Operations

US – United States Route

Wickenburg – Town of Wickenburg

Youngtown – Town of Youngtown

## 1.0 Introduction and Purpose

The United States Route 60 (US-60)/Grand Avenue Traffic Management Plan (TMP) is being conducted by the Maricopa Association of Governments (MAG) in partnership with the Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), City of Surprise (Surprise), City of El Mirage (El Mirage), Town of Youngtown (Youngtown), City of Peoria (Peoria), City of Glendale (Glendale), and City of Phoenix (Phoenix). The purpose of the project is to develop a Traffic Management and Operations Plan that will identify:

- Infrastructure improvements necessary to create the Intelligent Transportation Systems (ITS) traffic management infrastructure across multiple jurisdictions within the corridor; and
- An overall Concept of Operations which describes in detail how this corridor is/will be managed and operated utilizing ITS infrastructure and the roles and responsibilities of jurisdictions within the corridor.

### 1.1. Purpose of This Paper

This paper is the third in a series of four US-60/Grand Avenue TMP documents; it was prepared to summarize the ITS infrastructure improvements and cost estimate to implement the system. The first US-60/Grand Avenue TMP document provides an inventory of existing traffic management infrastructure. The second US-60/Grand Avenue TMP document provides an overview of the concept of operations and traffic incident management procedures.

This Infrastructure Improvements and Cost Estimate memorandum summarizes the ITS infrastructure improvements necessary to more efficiently operate and monitor the corridor and the potential costs.

### 1.2. Study Area

The US-60/Grand Avenue study corridor, shown in **Figure 1**, begins at the Traffic Interchange (TI) with State Route 303 Loop (SR-303L) in Surprise at reference marker 138.051 (expressed in miles) and ends at the Willetta Street intersection in Phoenix at US-60X reference marker 161.880 (expressed in miles). The 24-mile corridor is oriented northwest-southeast, and passes through portions of Surprise, El Mirage, Youngtown, Peoria, Glendale, Phoenix, and unincorporated Maricopa County.

US-60/Grand Avenue is a regionally significant six-lane roadway that is part of the National Highway System (NHS). It serves as a vital link connecting four important regional freeways: I-10, I-17, SR-101L, and SR-303L. US-60/Grand Avenue extends north to the Town of Wickenburg, where it turns west to western Arizona and California. In Wickenburg, US-60/Grand Avenue connects with US-93, which is the primary link to northwestern Arizona and Las Vegas from the Phoenix metropolitan area.

**Figure 1 – Study Area Map**



**1.3. Key Agencies, Stakeholders**

The Traffic Management and Operations Plan was developed with involvement and input from the following stakeholders:

- MAG – Regional Coordination;
- ADOT – Transportation Systems Management and Operations (TSMO) Division, Traffic Operations Center (TOC), Arizona Local Emergency Response Teams (ALERT), Traffic Signals and Maintenance;
- Arizona Department of Public Safety (AZDPS) – Highway Patrol Incident Management;
- MCDOT – Transportation Systems Management Division, Regional Emergency Action Coordinating Team (REACT) Traffic Incident Management; and
- Municipalities – Surprise, El Mirage, Youngtown, Peoria, Glendale, and Phoenix.

## **2.0 Recommended Infrastructure and Devices**

Based on the inventory of existing traffic management devices identified in the first TMP document and the concept of operations and incident management procedures from the second TMP document, infrastructure requirements were identified and coordinated with ADOT, Phoenix, and AZDPS. The infrastructure requirements include potential device types, quantities, locations, and an estimated cost for fiber, data collection equipment, Closed Circuit Television (CCTV) cameras, Dynamic Message Signs (DMS), and Emergency Vehicle Preemption (EVP) devices. **Appendix TM3-1** shows the approximate locations and quantities of ITS infrastructure recommended along the corridor.

### **2.1. Fiber**

ADOT has installed conduit and fiber along a few short sections of US-60/Grand Avenue as part of recent construction in the corridor. Agencies along the corridor including, Surprise, Peoria, Glendale, and Phoenix are known to have fiber intersecting US-60/Grand Avenue within their jurisdictions. Maricopa County is also known to have fiber along intersecting roads within Sun City, Youngtown, and El Mirage. These fibers are part of the Regional Community Network (RCN) to allow communication and sharing of information. It is recommended that, upon agreement, the existing conduit and fiber of other agencies be used as a tie-in location by ADOT for US-60/Grand Avenue. This will allow for a wireless system with minimal impacts to the existing roadway, until such time conduit and fiber may be installed.

In the near term, in order to maintain a good connection at all times, it is recommended that the location of a fiber tie-in should occur every four to six miles at major intersections. In addition, it is recommended that up to three jumps, or bridges, are made from each fiber tie-in location in each direction. Based on these constraints, it is estimated that a total of six connections will be made along the corridor at existing fiber locations. Existing fiber locations intersecting the corridor have not been confirmed; this will be done in the future as part of a later project.

### **2.2. Data Collection and Video Detection**

Currently, ADOT and Phoenix lack data collection methods that provide real-time information about the corridor. Data collection is important in allowing the agencies to efficiently plan for high traffic volumes and unexpected events such as crashes and inclement weather.

It is recommended that a video detection system with surveillance, vehicle detection, and data collection capabilities be installed at signalized intersections. This technology will allow for multiple stakeholder needs to be met at a reduced price.

### **2.3. Closed Circuit Television Cameras**

Currently, one CCTV camera is located at Myrtle Avenue and a CCTV camera at Northern Avenue was installed, but later removed. According to ADOT, bandwidth limitations prevent communication with the ADOT TOC for both CCTV cameras. Phoenix has four cameras located at 35th Avenue/Indian School Road, Osborn Road, Encanto Boulevard, and McDowell Road. Phoenix has full viewing capabilities from the Phoenix TMC and is better able to monitor the corridor within their jurisdiction.

It is recommended that ADOT install and maintain CCTV cameras at major and minor intersections in order to obtain full surveillance along US-60/Grand Avenue. At major intersections, it is recommended that a video detection system be installed that provides surveillance, vehicle detection, and data collection capabilities. Alternatives include placing multiple CCTV cameras with surveillance, vehicle detection, and data collection capabilities, or using a standard CCTV camera and installing a separate technology for detection. It is estimated that there will be a total of 38 intersections with CCTV cameras and vehicle detection, and data collection capabilities. At minor intersections, it is recommended that traditional CCTV cameras be installed to supplement the multi-purpose technology at major intersections. These traditional CCTV cameras, in addition to wireless radio units can be used at midblock locations where jumps, or bridges, are made if not at a major intersection. It is estimated that there will be a total of 13 locations where these will be necessary. All cameras should have Pan-Tilt-Zoom (PTZ) capabilities. Exact types, locations, and placement of CCTV cameras, poles, and other necessary equipment will be determined in the future as part of a later project.

#### 2.4. Dynamic Message Signs

ADOT does not currently have DMS along US-60/Grand Avenue. The *ADOT Statewide Dynamic Message Sign Masterplan Guidelines for Location and Placement of Permanent DMS* identified eight locations for DMS along the corridor per District choice. With this in mind, it is recommended that a total of 12 DMS be installed. **Table 1** provides approximate locations for DMS locations and the purpose they serve. Exact types, locations, and placement of DMS, structures, and other necessary equipment will be determined in the future as part of a later project.

**Table 1 – Proposed DMS Locations**

DMS Location (Approximate MP)	Direction	Purpose/Reasoning
W of SR-303L MP 136	EB	Allow detour through SR-303L
W of SR-303L MP 138	EB	Allow detour through SR-303L
E of SR-303L MP 139	WB	DMS Masterplan (District Choice)
E of SR-303L MP 141	WB	DMS Masterplan (District Choice)
W of SR-101L MP 146	EB	DMS Masterplan (District Choice)
W of SR-101L MP 148	EB	DMS Masterplan (District Choice)
E of SR-101L MP 151	WB	DMS Masterplan (District Choice)
E of SR-101L MP 153	WB	DMS Masterplan (District Choice)
E of SR-101L MP 155	WB	Location of stadium, allow detour through Northern Parkway
W of I-17 MP 157	EB	DMS Masterplan (District Choice)
W of I-17 MP 159	EB	DMS Masterplan (District Choice)
W of I-17 MP 160	WB	Provide Travel Times

DMS will be placed following the guidelines in the *ADOT Statewide Dynamic Message Sign Masterplan Guidelines for Location and Placement of Permanent DMS*. It is anticipated that DMS will be used to post information on crashes, travel times, weather conditions, construction activities, special events, etc. Specific message details will be determined by ADOT and the Federal Highway Administration (FHWA).

## **2.5. Emergency Vehicle Preemption**

Currently, the existing signalized intersections along the corridor are not using Emergency Vehicle Preemption (EVP) devices. During a field review, four intersections within Surprise were identified to be equipped with EVP devices. No one has assumed responsibility of the devices and therefore they are not being used.

EVP devices are recommended at every signalized intersection to aid with incident management. A hybrid solution will be necessary to allow various types of EVP devices to be used if necessary. This will also allow the system along the corridor to coordinate with intersecting roads. A total of 38 EVP devices are recommended at the 38 signalized intersections.

## **2.6. Traffic Signal Upgrades**

The existing traffic signals maintained by Phoenix do not conform to ADOT standards. The traffic signals will need to conform to ADOT standards before ADOT can assume maintenance responsibility for these traffic signals. It is anticipated that this traffic signal maintenance responsibility transition will occur after projects from the US-60/Grand Avenue COMPASS are implemented. It is assumed the traffic signal upgrades will be part of those projects and therefore are not included in the estimate provided herein.

### 3.0 Cost Estimate

A cost estimate was prepared to determine how much funding will be needed to implement the system. The items included in the cost estimate include wireless to fiber tie-in connections, CCTV cameras and vehicle detection at major intersections, CCTV cameras and radio units for midblock locations, DMS, radio units/antennas for signalized intersections, and EVP devices. The following assumptions were made for cost estimating purposes:

- Wireless to fiber tie-in connections will occur every 4 to 6 miles.
- Existing light poles or mast arms/signal supports can be used to mount CCTV cameras and no additional poles will be required.
- Existing poles at traffic signals can accommodate radio antenna and no additional poles will be required.
- Poles for CCTV cameras at midblock locations will be placed within 100 feet of power service.
- A video detection system with surveillance, vehicle detection, and data collection capabilities was priced to develop the cost estimate.
- Agency fiber node cabinets are within 500 feet of the signal cabinet.
- DMS can be mounted on cantilever supports.
- DMS cabinet will be placed within 50 feet of the support and power service will be within 100 feet of the support.
- DMS support can be located behind existing guardrail or barrier. No additional costs for guardrail or barrier were included in the estimate and it will need to be added if necessary.
- ADOT will use arterial-type (17 feet by 5 feet) DMS along US-60/Grand Avenue. This is subject to change.
- EVP devices will be installed at every signal.

Unit costs were developed using ADOT historical bid tabulations in 2016 dollars. Below is a summary of the cost estimate. A detailed cost estimate can be found in **Appendix TM3-2**.

## US-60/Grand Avenue TMP

### Loop 303 to Willetta Street

### Infrastructure Improvements and Cost Estimate

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost/Each</u>	<u>Total Cost</u>
Wireless to Fiber Tie-in Locations	6	\$25,100	\$150,600
Camera Video Detection System	38	\$35,000	\$1,330,000
Radio Units/Antennas for Signalized Intersections	38	\$2,500	\$95,000
Radio Units/CCTV Cameras for Midblock Locations	13	\$43,600	\$566,800
Arterial-Type DMS	12	\$170,000	\$2,040,000
Emergency Vehicle Preemption	38	\$15,000	\$570,000
<b>Subtotal</b>			<b>\$4,752,400</b>
<u>Item</u>		<u>Percentage of Subtotal (%)</u>	<u>Total Cost</u>
Unidentified Items		15%	\$712,860
Contingency		20%	\$950,480
Traffic Control		7%	\$332,668
Mobilization		10%	\$475,240
System Integration		5%	\$237,620
Design Engineering		15%	\$712,860
Construction Engineering		14%	\$665,336
<b>TOTAL</b>			<b>\$8,839,464</b>

## 4.0 Summary

This study investigated infrastructure requirements and estimated a cost for implementation. Infrastructure improvements considered included installation of fiber, CCTV cameras, which provide video detection and data collection capabilities, DMS, and EVP devices. Stakeholders provided input on location and type of devices to be used through the corridor, but this will not be finalized during this study.

The following lists the recommendations for infrastructure improvements along US-60/Grand Avenue:

- ADOT should use intersecting fiber lines owned by the agencies along the corridor to tie-in and connect to the RCN.
- Wireless to fiber tie-in locations should occur every 4 to 6 miles depending on the agency fiber locations. Up to 3 jumps, or bridges, should be made from each tie in location in each direction.
- CCTV Cameras, with surveillance and data collection capabilities, should be installed at major intersections. Traditional CCTV cameras should be installed at midblock locations to serve as jumps, or bridges.
- DMS should be installed to communicate information such as travel times, crashes, and weather conditions to allow drivers to select alternate routes.
- EVP devices should be installed at signalized intersections to aid with incident management.

Based on these recommended improvements, it is estimated that the system will cost approximately \$8.8 million. This cost is subject to change based on the number and types of devices selected.

The recommendations included herein are conceptual in nature; the formal ADOT Scoping Phase will need to be completed, including required typical local, state, and federal agencies approvals. Additional design concept alternatives may be developed through ADOT's process and should be consistent with the fundamental objectives of this study.



# **US-60/Grand Avenue TMP**

**Loop 303 to Willetta Street**  
**Infrastructure Improvements and Cost Estimate**

## ***APPENDIX TM3-1***

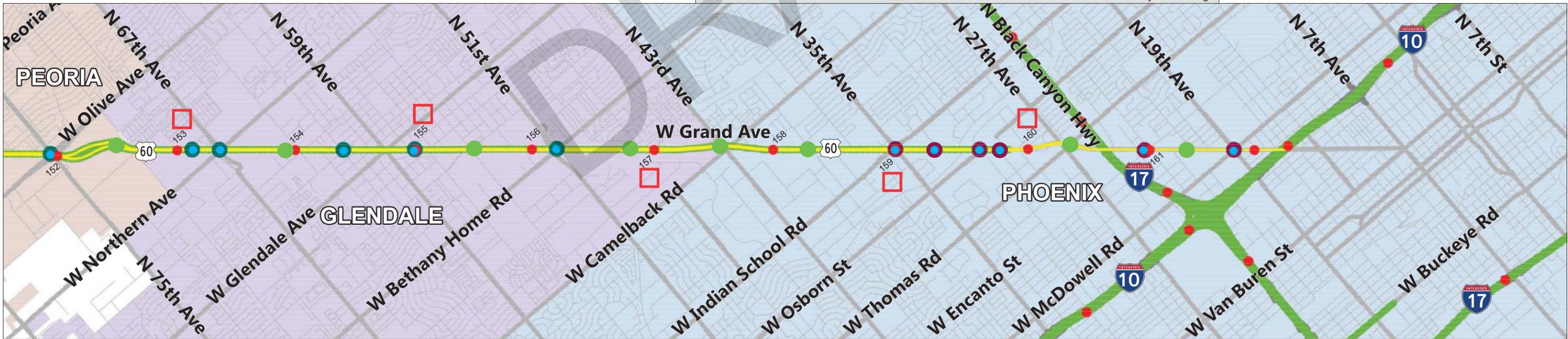
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### **ITS Infrastructure Recommendations**



# US-60/GRAND AVENUE TRAFFIC MANAGEMENT PLAN RECOMMENDATIONS

<b>Signal Owner</b>	<span style="color: blue;">●</span> GRIDSMA <span style="color: blue;">RT</span>	<span style="color: yellow;">—</span> Study Corridor
<span style="color: green;">●</span> ADOT	<span style="color: green;">●</span> Midblock CCTV	<span style="color: red;">●</span> Milepost - MP
<span style="color: purple;">●</span> City of Phoenix	<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span> DMS	<small>*Infrastructure locations are estimated and subject to change.</small>





# US-60/Grand Avenue TMP

Loop 303 to Willetta Street  
Infrastructure Improvements and Cost Estimate

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## *APPENDIX TM3-2*

**Cost Estimate**

### **Vehicle Detection/Data Collection**

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Gridsmart Dual Camera Video Detection System

38 Intersections @ \$35,000 each

**\$1,330,000**

- assumed existing light poles or mast arms/signal supports can be used to mount Gridsmart and no additional poles would be required

### **Radio Units/Antenna for Signalized Intersections**

38 Intersections @ \$2500 each

**\$95,000**

- Assumed existing poles at the traffic signals can accommodate radio antenna and no additional poles would be required

### **Radio Units/CCTCV for Midblock Locations**

13 Locations @ \$43600 each

**\$566,800**

### **DMS Signs**

12 Locations @ \$170,000 each

**\$2,040,000**

### **Fiber Optic Tie-in Locations**

6 Locations @ \$25,100 each

**\$150,600**

### **Emergency Vehicle Preemption**

38 Locations @ \$15,000 each

**\$570,000**

	<b>SubTotal</b>		<b>\$4,752,400</b>
Unidentified Items	15%	\$712,860	
Contingency	20%	\$950,480	
Traffic Control	7%	\$332,668	
Mobilization	10%	\$475,240	
System Integration	5%	\$237,620	
Design Engineering	15%	\$712,860	
Construction Engineering	14%	\$665,336	
	<b>Total</b>		<b>\$8,839,464</b>

**EVP Locations (per location)**

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Amount</b>
	Emergency Vehicle Preemption Device	EACH	38	\$15,000.00	\$570,000

**TOTAL \$570,000**

- assumed EVP placed at every signalized intersection

**DMS Locations (per location)**

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Amount</b>
6060037	Bridge Sign Structure (SD9.52, Type 3F, DMS)	EACH	1	\$130,000.00	\$130,000
6060080	Foundation for Bridge Sign Structure (Shoulder Mounted)	EACH	2	\$11,000.00	\$22,000
7020011	Impact Attenuation Device (Sand Barrel Crash Cushion, Type A)	EACH	1	\$10,000.00	\$10,000
7320060	Electrical Conduit (2 1/2") (PVC)	L.FT.	100	\$11.00	\$1,100
7320073	Electrical Conduit (2-3") (PVC)	L.FT.	50	\$18.00	\$900
7320455	Pull Box (No. 9)	EACH	1	\$3,000.00	\$3,000
7320521	Conductor (No. 8) (GB)	L.FT.	300	\$1.50	\$500
7340101	Control Cabinet (Type 343)	EACH	1	\$3,000.00	\$3,000
7340305	Control Cabinet Foundation (DMS & Transformer)	EACH	1	\$2,500.00	\$2,500
	DMS	EACH	1	\$85,000.00	\$85,000
	Power Service Connection	EACH	1	\$8,000.00	\$8,000
	Miscellaneous Work (GigE Switch)	EACH	1	\$2,500.00	\$2,500
	Wireless Radio Unit	EACH	1	\$2,500.00	\$2,500
				<b>TOTAL</b>	<b><u>\$271,000</u></b>

- assumed cabinet placed within 50' of support and power service within 100 feet of support

<b>DMS Locations (per location)</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Amount</b>
6060037	Cantilever Sign Structure (SD9.10, Type 4C)	EACH	1	\$70,000.00	\$70,000
6060080	Foundation for Cantilever Sign Structure (SD9.10, Type 4C)	EACH	1	\$11,000.00	\$11,000
7320060	Electrical Conduit (2 1/2") (PVC)	L.FT.	100	\$11.00	\$1,100
7320073	Electrical Conduit (2-3") (PVC)	L.FT.	50	\$18.00	\$900
7320455	Pull Box (No. 9)	EACH	1	\$3,000.00	\$3,000
7320521	Conductor (No. 8) (GB)	L.FT.	300	\$1.50	\$500
7340101	Control Cabinet (Type 343)	EACH	1	\$3,000.00	\$3,000
7340305	Control Cabinet Foundation (DMS & Transformer)	EACH	1	\$2,500.00	\$2,500
	DMS	EACH	1	\$65,000.00	\$65,000
	Power Service Connection	EACH	1	\$8,000.00	\$8,000
	Miscellaneous Work (GigE Switch)	EACH	1	\$2,500.00	\$2,500
	Wireless Radio Unit	EACH	1	\$2,500.00	\$2,500
<b>TOTAL</b>					<b><u>\$170,000</u></b>

- assumed cabinet placed within 50' of support and power service within 100 feet of support
- assume can be mounted on cantilever support
- assume support can be located behind existing guardrail or barrier. If not, this cost would need included.
- assume 17'x5' DMS size

**CCTV Midblock (per location)**

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Amount</b>
7310190	Pole (55' w/Lowering Device)	EACH	1	\$13,000.00	\$13,000
7310371	Pole Foundation (55' CCTV Pole)	EACH	1	\$4,000.00	\$4,000
7320060	Electrical Conduit (2 1/2") (PVC)	L.FT.	100	\$11.00	\$1,100
7320455	Pull Box (No. 9)	EACH	1	\$3,000.00	\$3,000
7320521	Conductor (No. 8) (GB)	L.FT.	300	\$1.50	\$500
7340101	Control Cabinet (Type 343)	EACH	1	\$3,000.00	\$3,000
7370705	CCTV Field Equipment	EACH	1	\$6,000.00	\$6,000
	Power Service Connection	EACH	1	\$8,000.00	\$8,000
	Miscellaneous Work (GigE Switch)	EACH	1	\$2,500.00	\$2,500
	Wireless Radio Unit	EACH	1	\$2,500.00	\$2,500

**TOTAL \$43,600**

- assumed pole placed within 100 feet of power service
- have 11 locations listed on figure, assumed 2 additional locations TBD

**Wireless to Fiber Locations (per location)**

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Amount</b>
7320073	Electrical Conduit (2-3") (PVC)	L.FT.	500	\$18.00	\$9,000
7320455	Pull Box (No. 9)	EACH	2	\$3,000.00	\$6,000
7320788	Single Mode Fiber Optic Cable (12 Fibers)	L.FT.	550	\$5.00	\$2,800
7320794	Fiber Optic Splice Closure	EACH	1	\$1,750.00	\$1,800
	Fiber Optic Cable Modem	EACH	1	\$3,000.00	\$3,000
	Miscellaneous Work (GigE Switch)	EACH	1	\$2,500.00	\$2,500

**TOTAL \$25,100**

- Assumed City fiber node cabinet within 500 feet of the signal cabinet
- Located every 4 to 6 miles. Assume 6 connections.