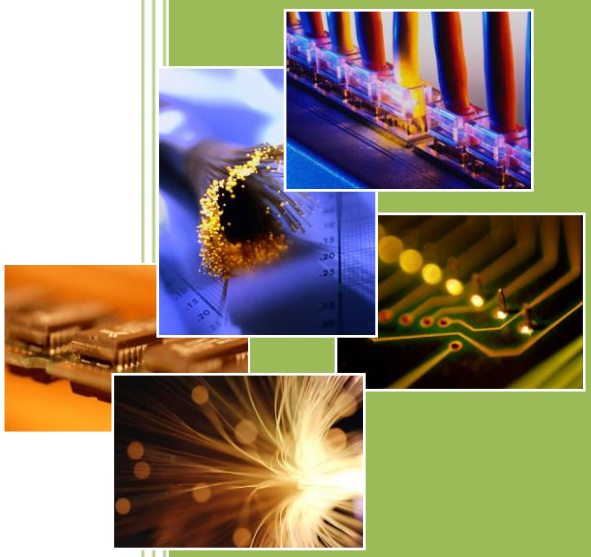
2010

ITS Strategic Plan



Moving Forward Together

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Executive Summary

In 1998 and 1999, the City of Peoria developed reports on "Traffic Signal Interconnection, Signal Feasibility Study – Phase I, Phase II and Phase III" with the help of Kimley Horn and Associates. These reports identified not only the need for coordination of the existing traffic signals but also identified the requirements of future traffic signal system upgrades including the hardware, software and the Intelligent Transportation System (ITS) infrastructure. Further, these reports laid the foundation for formation of the City's ITS infrastructure and the key important features for the future Traffic Management Center (TMC). Draft ITS strategic reports were then generated which created a platform for building the current TMC. However, the construction of TMC was delayed due to several factors and a formal ITS strategic report was not prepared or adopted by the City.

The City of Peoria has grown in population from 95,000 in 1999 to 158,227 in 2008 and currently the City has a land area of over 180 square miles. The City of Peoria is a suburb of Phoenix and is located in Maricopa County. The City had 69 signals in 1998 of which 17 were maintained by Arizona Department of Transportation (ADOT) and 9 were maintained by Maricopa Department of Transportation (MCDOT) while the City maintained the rest. The City currently operates and maintains 106 signalized intersections with 25 currently communicating to the Central Computerized Traffic Signal System. None of the signals were coordinated in 1998 and currently, most of the 106 signals are programmed locally with time base coordination (TBC). The City has been adding about 6 signals per year. These signals are added either by the City funds or through development projects.

The City is a participant in the AZTECH Model Deployment Initiative (MDI). This project involves the deployment of Intelligent Transportation Systems (ITS) equipment. AZTECH allows for the sharing of traffic control systems and traffic data to improve roadway operations and reduce congestion on the street system.

The City of Peoria has been approved for a federally funded project to establish a the TMC. The TMC allows the City to actively manage the traffic within the City's Jurisdiction, share traveler information with other jurisdictions and the public. In addition, the City will operate Dynamic Message Signs (DMS), Closed Circuit Television (CCTV) surveillance feeds, the signal system, automated count stations, and provide for information sharing between jurisdictions for traffic management, using the AZTECH Regional Model.

Along with serving the needs of the citizens of City of Peoria, the TMC will serve as an Alternate Traffic Operation Center (ATOC) for the Arizona Department of Transportation (ADOT). Peoria's location was selected from a list of available Valley TMC's as the ADOT's ATOC because of it's strategic location and configurability (i.e. freeway access, distance from the ADOT TOC, new building design and construction allowing easy accommodation of ADOT).

With the rapid growth of the valley's population in recent years, the City of Peoria (City) has experienced a corresponding increase in traffic resulting in a greater need to focus on traffic management. The management of existing and new signals is critical to operations as major cross-jurisdictional corridors become more crucial to traffic flow; travelers are demanding high quality information on roadway conditions; and incident response needs are growing. In order to provide better services to the commuters, it is vital that the City's real-time traffic management services are efficient and robust.

Traffic Management uses well-established traffic engineering techniques and principles to optimize the existing infrastructure. While traffic engineering applications follow time-tested procedures, a newer element available to agencies is ITS applications. ITS is quickly becoming the primary component of traffic engineering to achieve desired goals and objectives. Through ITS, the City maintains operations of the infrastructure in a real-time setting from the centralized Traffic Management Center. Adjustments to the traffic signal timing plans can be made to best fit the current roadway conditions. Additional subcomponents of ITS assist travelers in making informed decisions to expedite movement throughout the system.

The purpose of this plan is to provide the City with a sound approach to future ITS needs based on an assessment of both current and forecasted conditions. This plan is primarily focused on the ITS field infrastructure deployment, TMC, incident response and traveler information components of the City's ITS.

The City's Traffic Engineering Division developed the following goal and objectives for traffic management.

GOAL: Provide efficient congestion management through Intelligent Transportation Systems.

Objective 1: 100% of traffic signals communicating with the citywide traffic signal system.

Objective 2: 75% of major transportation corridors have automated traffic count devices.

Objective 3: 100% of traffic signals have reviewed timing and adjusted on a three-year minimum cycle.

Objective 4: 100% of major transportation corridors with up to date signal coordination plans uploaded on a three-year minimum cycle.

The City's Traffic Management team has developed definitions for the organization's service areas. Each service area helps to better address the arterial mobility needs of the traveling public throughout the City. The primary objectives defined for each service area include:

- **Arterial Traffic Management** - *Identify and update all City designated corridors for ITS deployment with established priority. Provide adequate signal timing for all modes of use on the arterial system*.
- **Communications** - *Achieve 100% communications to all field devices and deploy agency-owned communications.*
- **Advanced Traveler Information System (ATIS)** – *Deploy Dynamic Message Signs (DMS) at strategic locations on City roads, expand ATIS in City of Peoria by advancing the quality and extent of arterial information on RCRS, HCRS and 511 system, allowing the traveler the route selection information needed to better use the roadway system.*
- **Traffic Management Center (TMC)** - *Expand operations, establish communications, and secure funding for increasing staffing levels. The expanded hours of operation and better communications will allow the TMC Staff to better inform the public of incidents that will affedt their travel.*
- **Regional Emergency Action Coordinating Team (REACT)** – *Support the efforts of Maricopa County Department of Transportation to expand the REACT Teams through the Valley.*

The City has developed several projects deploying ITS devices to achieve these desired goals. Specific ITS deployment strategies are identified with suggested applications to the projects in order for the City to proceed in the direction of achieving their goals. The deployment strategy options and estimated costs for each project are presented in Table 1 on the following page.

The ITS Deployment Plan covers needed project programming for the next 5 years. Programming for each of the identified project has been suggested on Table 1. This includes the estimated year of deployment, the ITS deployment pack most reasonably selected for the corridor and estimated cost of deployment.

Additional projects will be identified as the City's system expands. Many ITS devices will be installed with the CIP Program eliminating the need for the City to retrofit ITS infrastructure improvements after the road is completed.

The City's TMC was built in FY-2010 and will need to plan for updating equipment and normal maintenance to the TMC. The annual cost of maintaining the TMC for the City is estimated at $184,000.00 per year. This cost will have to be budgeted in future years.

For a fully functioning TMC, it is recommended that the operational hours be expanded through a phased approach achieving a 6:00 am to 6:00 pm schedule.
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Table 1: Current ITS Projects:

Existing ITS Projects in the City of Peoria	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15
Traffic Management Center	$1,500,037					
Traffic Signal System & ITS	$563,000					
Traffic Signal Interconnect Program	$880,073		$202,000		$202,000	
Traffic Signal Emergency Operations ITS		$1,200,000				
Traffic Signal Equipment Replacement	$80,000	$65,650	$65,650	$65,650	$65,650	$65,650
Olive, Peoria, Northern Traffic Signal Upgrades					$859,616	
83rd Avenue north interconnect.				$801,000		

The approaches to the growth of the program include:

1. Employing a Full-Time REACT Team;
2. Established IGAs with Other Valley Agencies;
3. Creating a Training Academy;

City of Peoria promotes arterial traveler information programs and promotes the dissemination of the regional traveler information through az511.com and the 511 traveler information service. In its endeavor to provide customized traveler information to the public the City should work to expand the dissemination of information using innovative technologies such as deployment of traveler information display boards at strategic locations.

With the continuing rapid growth of the West Valley, DMS will be vital to the traveling public in providing options for driving pattern modifications at key decision points. The focus of ITS deployment and implementation is on high volume, multi-jurisdictional corridors. Based on the City's Major Streets and Routes Plan, several key arterials within the City have been classified as principal arterials. Locations of DMS along these arterials should be strongly considered to provide effective traveler information.

As a key partner in AZTECH, the City also needs to continue to serve its role within the consortium. AZTECH is not a legislatively mandated structure or entity with its own funding source. Recognizing the significant regional benefits that AZTECH provides to the traveling public, the City should, through its partnering in AZTECH, further advance regional institutional and operational integration of transportation systems. This is achieved through collaboration and partnership between public and private agencies

It is anticipated that most of the ITS infrastructure expansion can be funded through Capital Improvement Projects, new traffic signal installations, and modernization programs. Separate funding will be needed for on-going and growing operations and maintenance costs.

Chapter 1. Introduction

With the rapid growth of the valley's population, the City has experienced a corresponding increase in traffic resulting in a greater need to focus on traffic management. The management of existing and new signals is critical to operations as major cross-jurisdictional corridors become more crucial to traffic flow; travelers are demanding high quality information on roadway conditions; and incident response needs are growing. In order to provide better services to the commuters within the City, it is vital that the City of Peoria 's real-time traffic management services are efficient and robust.

Traffic Management uses well-established traffic engineering techniques and principles to optimize the existing infrastructure. While traffic engineering applications follow time-tested procedures, a newer element available to agencies is Intelligent Transportation Systems (ITS) applications. ITS is quickly becoming the primary component of traffic management to achieve desired goals and objectives. Through IT'S the City maintains operations of the infrastructure in a real-time setting from the centralized TMC. Adjustments to the traffic signal timing plans can be made to best fit the current roadway conditions. Additional subcomponents of ITS assist travelers in making informed decisions to expedite movement throughout the system.

The purpose of this ITS Strategic Plan is to provide the City of Peoria with a sound approach to future needs based on an assessment of both current and forecasted conditions. This plan is primarily focused on the ITS field infrastructure deployment, Traffic Management Center, incident response and traveler information components of the City's Intelligent Transportation System.

The goal of this document is to provide tools to help the City continue with its vision for ITS deployment. This includes documenting an overall review of the current functional service areas within the City's operations and establishing goals for each of the functional service areas to provide guidance for the next 5 years.

This plan also includes performance metrics to regularly assess progress towards each of the plan goals and objectives for each business or functional service area.

Background

Peoria is one of Arizona's fastest growing communities. This one-time farming community, founded in 1886 and located just 25 minutes from Sky Harbor International Airport, is a dynamic community of 180 square miles and more than 150,000 people today. Home to over 35 miles of trails, award-winning schools, well-planned residential neighborhoods, Spring Training of Major League Baseball, and the region's second largest lake, this progressive yet grounded

and well-balanced community is positioned to be a decisive component of Arizona's economic future. As a partner agency to the AZTECH Model Deployment Initiative, the City has been on the cutting edge of Intelligent Transportation Systems deployment throughout the country.

It is important to recognize the continued growth of the City. Along with Nevada, Arizona experienced the highest population growth in the country over the last few years. The key resulting factor from this population boom is that traffic volume continues to increase and it is vital that local funding maintain the pace of growth such that traffic management can deploy the right tools to facilitate traffic movement throughout the valley.

A number of strategies and successes have been realized for the City's Intelligent Transportation System. These successes include partnering and coordination, technology applications, incident management, and traveler information, and limited arterial DMS. Future plans include the phased build-out of the system, including additional infrastructure and communications technology improvements. Broader coverage is also planned, along with more of a focus on real-time communications. Continued deployment of ITS technologies is also projected.

CITY OF PEORIA Traffic Management Vision Statement
"Provide efficient congestion management through Intelligent Transportation Systems."

ADOT's EXISTING TRAFFIC OPERATIONS CENTER (TOC)
The 2,100-square-foot control room includes 32 video monitors mounted on a wall, and large screens used to display traffic speed and weather information. There are four workstations in the control room; operators at two of the stations monitor traffic in the Phoenix metropolitan area and the operators at the other two stations monitor traffic throughout the remainder of the state. There are 15 operators that work various shifts to ensure that there is 24 hour coverage in the control room. TOC Section staff constantly monitors the Department of Public Safety (DPS) Computer Aided Dispatch (CAD) system, speed maps, and CCTV monitors. When staff becomes aware of an incident, they use cameras to verify the incident and determine the appropriate response (e.g., dispatch DPS and/or ADOT staff, post messages on one or more Dynamic Message Signs (DMS), enter information into the Highway Condition Reporting System (HCRS) which automatically places this information into the 5-1-1 system, etc.). ADOT staff anywhere in the State of Arizona can also input information into HCRS regarding construction and maintenance activities on the 6,000 mile State highway system. Five valley television stations have access to live CCTV camera feeds from ADOT's cameras to show freeway conditions.

As the Alternate TOC all of these operations will move to the Peoria TMC when there is a need to close the TOC.

MARICOPA ASSOCIATION OF GOVERNMENTS (MAG)

MAG is a Council of Governments (COG) that serves as the regional agency for the metropolitan Phoenix area. When MAG was formed in 1967, the elected officials recognized the need for long-range planning and policy development on a regional scale. They realized that many issues such as transportation, air quality and human services affected residents beyond the borders of their individual jurisdictions. MAG was founded in the spirit of cooperation. MAG members believe that by uniting, they can solve common problems, take an active role in long-range regional issues and address concerns that affect all of the communities.

MAG is the designated metropolitan planning organization (MPO) for transportation planning in the Maricopa County region. MAG has also been designated by the Governor to serve as the principal planning agency for the region in a number of other areas, including air quality, water quality and solid waste management. In addition, through an Executive Order from the Governor, MAG develops population estimates and projections for the region.

An Update to the region's ITS Strategic Plan was completed by the Maricopa Association of Governments (MAG) in February 2001. This MAG project identified high-level ITS goals on a regional and local basis, and as such, the City is continuing to look ahead to identify specific needs and partnering opportunities that will allow the City to support regional ITS objectives.

The following future trends, identified in the Strategic Plan, will increase demand for Traffic Management services:

- Increased volume on existing roads – As the City continues to grow more vehicles will be using existing roads. This will lead to a greater demand for traffic management solutions to reduce (or hold steady) travel times.
- Regional coordination - Existing reputation and expertise in regional cooperation will lead to more demand for this function.
- Expanding regional arterial management by the TMC to achieve reduction of delays and accidents.
- Vision Zero-Zero approach (no fatalities and no delay) attitude change focuses efforts on safety and delay.
- Increase in traffic management infrastructure deployment maintenance needs.
- Home to the San Diego Padres and the Seattle Mariners since 1994, the Peoria Sports Complex draws nearly 230,000 fans for Major League Baseball Spring Training every year. The Complex, which has become the model for multi-team facilities that are being built today, is comprised of a main stadium and six and a half practice fields for each team. The unique setup is ideal for adult, college, high school and youth baseball

tournaments and championships and is also available for community events, concerts, art exhibits, car shows, and charitable functions.

- The Challenger Space Center of Arizona is a working memorial to the astronauts that lost their lives in the ill-fated space shuttle Challenger flight on January 28, 1986. As a premier learning hub, the Center has a unique affiliation with the Smithsonian Institute, offering access to national quality museum exhibits right here in Peoria.
- Situated just beyond the southern border are the homes of the Phoenix Coyotes and the Arizona Cardinals. Jobing.com Arena hosts numerous music and non-hockey events and University of Phoenix Stadium hosts the Fiesta Bowl and is also on the rotation for future Super Bowls as well as college football's National Championship games.

This Strategic Plan outlines the current capacity of the City's Traffic Management System. The current staff has the technical expertise to deliver the identified core programs, either through in-house capabilities or through third-party consulting arrangements. Based on previous projects and partnering events, traffic management has gained extensive program experience. Both public and private partnerships have led to extensive coalition building throughout the valley. The widespread knowledge of the personnel also tends to benefit the procurement activities. As the functional service areas have become more and more developed, the current staff has demonstrated more flexibility to assume different roles. All of these strengths have led to the building of a solid program.

The strategic plan also identifies some areas where potential for improvement and development exists. Through discussions with personnel as well as the challenges identified in the Strategic Plan, several functional service areas that can benefit from further development were identified. The existing staff could benefit from additional specialized training to better perform additional tasks either now or in the future.

Existing Functional Service Areas

To better help establish the direction of City of Peoria Traffic Management, the following strategic priorities are identified in the Strategic Plan:

1. Elevate the TMC functions to maximize the benefit of Traffic Management on City of Peoria roads and to support regional mobility and safety.

2. Facilitate expansion of traffic management control devices on City of Peoria roads and intersections.

3. Increase emphasis on traveler safety by helping to expand the REACT incident management program and by establishing new safety related programs such as safety audits of designs of new roads and evaluation of existing conditions.

4. Decrease delivery time for traffic engineering infrastructure deployment by implementing alternative delivery methods.

5. Continue to provide solid partnering to the AZTECH partnership program and to help leverage funding sources by expanding grants and AZTECH partner contributions.

6. Provide leadership for the administration of arterial ITS projects as proposed in the MAG's Regional Transportation Plan within the City.

To maintain this current direction, the focus of City's Traffic Management is on the existing functional service areas. These service areas include:

- Traffic Signal Program
- Traffic Impact Mitigation
- Special Event Management
- Arterial Traffic Management
- Communications
- Advanced Traveler Information System (ATIS)
- Traffic Management Center (TMC)

Current and future states of these functional service areas are explored in detail in the following chapters.

Organization of this Report

Following this introduction, this report is organized as follows:

- **Chapter 2: ITS Strategic Goals** details the overall recommended goals to focus the vision of the City such that growing needs of the functional service areas are adequately met.

- **Chapter 3: Arterial Traffic Management** describes the management of principal arterials throughout the City, including goals, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 4: ITS Field Infrastructure Deployment Strategies** identifies multiple solutions for deploying ITS devices, applies these strategies to designated corridors and provides recommendations for ITS deployment for the designated corridors.

- **Chapter 5: Communications** describes the infrastructure for communications throughout the City, including goals, existing infrastructure, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 6: Regional Emergency Action Coordinating Team (REACT)** discusses City of Peoria's incident response program, including business goals, existing resources, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 7: Advanced Traveler Information System (ATIS)** describes the means of dispersing information to roadway users and includes business goals, available information outlets, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 8: AZTECH: Regional ITS Support** describes interaction with other agencies that supplement the City's ITS operations, including business goals, existing resources, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 9: Traffic Management Center (TMC)** describes the operations of the TMC and includes business goals, key challenges, future expansion, performance measures, and suggested milestones.

- **Chapter 10: Staffing and Organization** identifies necessary resource needs for the functional service areas to achieve the suggested milestones.

LIST OF ACRONYMS

The following acronyms are used in this report:

Acronym	Definition
ADOT	Arizona Department of Transportation
ALERT	Arizona Local Emergency Response Team
ATIS	Advanced Traveler Information System
AVL	Automatic Vehicle Locator
CAD	Computer Aided Dispatch
CCTV	Closed-Circuit Television
CPR	Cardiopulmonary Resuscitation
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EOC	Emergency Operations Center
FCD	Flood Control District
GIS	Geographic Information Systems
HazMat	Hazardous Materials
HCRS	Highway Conditions and Reporting System
I2TMS	Siemens System Control Software
IGA	Intergovernmental Agreement
IP	Internet Protocol
IMSA	International Municipal Signal Association
kbps	kilobits per second
ITS	Intelligent Transportation System
LAN	Local Area Network
LOS	Level of Service
Mbps	Megabits per second
CITY	City of Peoria
MCSO	Maricopa County Sheriff's Office
MDI	Model Deployment Initiative
PPB	Pedestrian Push Button
RCC	Rental Car Center

Acronym	Definition
RCN	Regional Community Network
RCRS	Roadway Closure and Restriction System
REACT	Regional Emergency Action Coordinating Team
TMC	Traffic Management Center
TOC	Traffic Operations Center
UPS	Uninterruptible Power Supply
VSAT	Very Small Aperture Terminal

Chapter 2. ITS Strategic Goals

In order to focus on the operation, growth, and development of City of Peoria's Intelligent Transportation Systems Program, it is necessary to have challenging yet attainable goals to establish a direction for the next three to five years. Several goals have been recommended for each of the ITS functional service areas. The goals provide a framework for the potential expansion of each of the functional service areas. Each goal is designed to be readily measurable to help assess progress towards the goal and the level of success of the program. The goals also provide focus for management and staff by identifying specific levels of achievement that everyone can strive for. Defining these goals establishes a sound structure that matches the City's capabilities with the operational and technological integration needs of an intelligent transportation system.

This plan establishes goals for each of the following functional service areas:

- Traffic Signal Operations.
- Traffic Signal Timing.
- Incident Detection.
- Special Event Management.
- Field Communications.
- Traffic Management Center (TMC) Operations.
- Regional Emergency Action Coordinating Team (REACT).
- Advanced Traveler Information System (ATIS).

The recommended goals are listed below; the list of goals is supplemented by Appendix A, which suggests measures of effectiveness and potential milestones to assess progress towards the goals.

Goals for Traffic Signal Operations:

- Effectively Manage Arterial Traffic Flows through Appropriate Signalization, Signal Coordination and Remote Monitoring
- Provide and maintain appropriate detection for signalized intersections including advance detection in dilemma zones for arterials with a speed limit of 35 mph or higher.
- Provide coordinated traffic signal operations for intersections spaced less than one mile apart.
- Make real-time adjustments to traffic signals in response to incidents or special events.
- Monitor the operation of traffic signals remotely to rapidly detect faults.
- Extend coordination to adjacent jurisdictionss.

Goals for Traffic Signal Timing:

- Establish signal interconnect and remote monitoring of every new intersection concurrently with signal turn-on.
- Coordinate traffic signal timing plans with adjacent jurisdictions at boundaries.
- Provide detection at each intersection that allows accurate counting of through traffic on major arterials using the traffic signal system.

Goals for Incident Detection:

- Implement CCTV monitoring of every City intersection on the one mile grid, when such detection is required, or having a cumulative Traffic Count of 20,000 vehicles per day or more.
- Obtain video images from jurisdictions (including ADOT freeways) near City arterials to better understand traffic conditions for real time traffic response.

Goals for Special Event Management:

- Develop special signal timing plans for ingress and egress for every special event venue that has the potential to draw 5,000 or more patrons.
- Monitor the traffic flow during each special event with more than 5,000 patrons using the TMC.
- Provide event specific traveler information and routing plans for special events attended by 5,000 or more patrons.

Goals for Field Communications:

- Implement bi-directional real-time communications with 100% of City of Peoria's intersections within 5 years.

Goals for TMC Operations:

- Provide real-time traffic management through monitoring and control of traffic signals, CCTV cameras, dynamic message signs and other traffic management systems in the TMC.
- Provide regional traffic management support to various agencies by proactively coordinating and disseminating information on incidents and closures.
- Monitor and collect count station data on City of Peoria Arterials.
- Monitor, collect and archive detector data on City of Peoria arterials.
- Coordinate traffic operations with the Emergency Operations Center facility during an emergency or homeland security incident.

Goals for REACT:

- Assist MCDOT with Expanding REACT program coverage through partnerships with local jurisdictions.

Goals for ATIS:

- Ensure that the City of Peoria closure and restriction information is posted on the web, and is forwarded to HCRS and AZ511.
- Install DMS on appropriate City arterials approaching freeways.

- Install DMS on City arterials in special event areas that are regularly subject to events with an attendance of more than 5,000 patrons.

Chapter 3. Arterial Traffic Management

Over the past several years, Traffic Management for the City has found it's focus and efforts split between its responsibilities to manage the roads "owned" by the City and it's role assisting in regional traffic management due to the regional corridors that pass through the City. The Traffic Management leaders sought to better understand how their resources were being used and to develop a strategic approach that applies those resources in the best possible manner.

The defined objective of arterial traffic management is to deliver a continuously managed roadway system responsive to changing conditions for safe, efficient and predictable travel. The Strategic Plan identified the following priority in regard to traffic management:

> "Provide efficient congestion management through Intelligent Transportation Systems."

Several key arterials are identified as major thoroughfares for City operations, where these arterials service traffic from other municipalities and facilitate movement to freeways or to other jurisdictions. These key arterials include Bell Road, Thunderbird Road, Olive Avenue, Peoria Avenue, 83rd Avenue, Lake Pleasant Parkway, Happy Valley Road/Parkway, 75th Avenue and Northern Avenue.

Key regional corridors such as Bell Road play a very significant part in the transportation system, and efficient operation of such facilities is critical to City residents. ITS elements are being deployed by agencies adjacent to the City, including State, county, and City traffic management entities, to optimize the utilization of the roadways. Key intersections in the City are being improved and ITS devices are being placed in operation to improve the operation and safety at these locations.

Finally, the growth in the west valley is resulting in rapid increase in traffic volumes. Through a robust arterial management plan the City will be better positioned strategically to serve the transportation needs of its citizens.

3.1 Description

As one of the primary services delivered through the City, advanced traffic management includes the following:

- Traffic Signal Operations;
- Synchronized Signal Systems;
- Traveler Information
- Incident Detection & Response; and
- Special Event Traffic Management.

Tools are allocated to monitoring arterials, responding to events (planned or unintended), and dissemination of information. For real-time monitoring of City arterials Traffic Management uses traffic signal communications, CCTV cameras, vehicle detectors, and communications with other agencies. Response measures include signal system modifications and REACT incident response. Information is disseminated via regional website az511.com, telephone, cell phone, and email/pager notification. The public is alerted to information through dynamic message signs, radio and television broadcasts, and the internet. The key tools utilized by the City include the central signal system for signal control, Camera Cameleon for video control, and the REACT program for incident control.

In order to effectively manage traffic all throughout the City, the following goals have been identified:

1) 100% of traffic signals communicating with the citywide traffic signal system.

2) 75% of the Major transportation corridors with automated traffic count devices.

3) 100% of the Traffic signals for which timing has been reviewed and if necessary adjusted on a three-year minimum cycle.

4) 100% of major corridors with up to date signal coordination plans on a three-year minimum cycle.

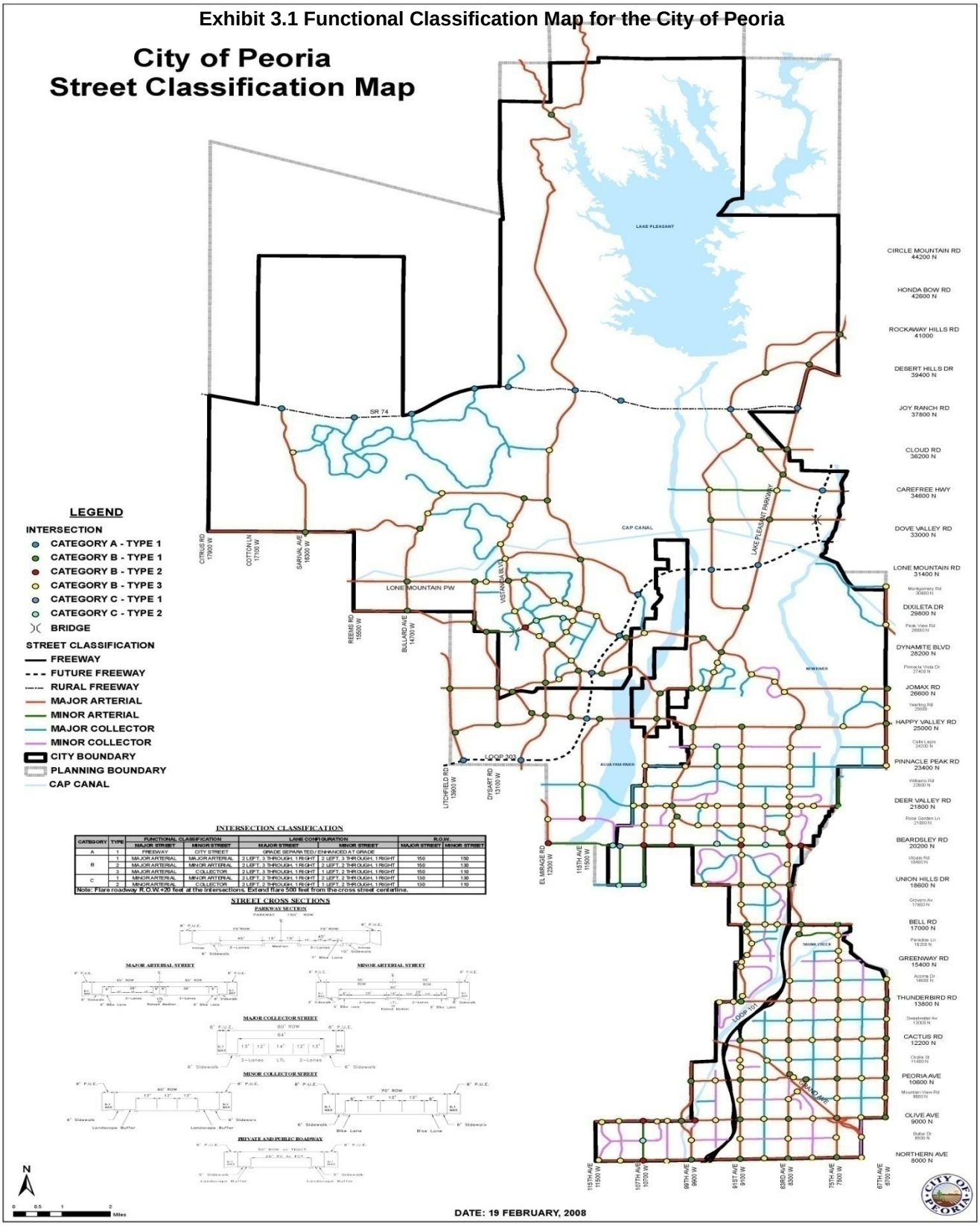
The goals for traffic signal operations, synchronized signal systems, incident detection, and special event traffic management are identified in Appendix A.

Based on the current City's Geographical Information Systems (GIS) Map, the City Traffic Management is responsible for approximately 901 miles of roadway within the City network: 140 miles of which are designated as collectors; 196 miles designated as arterials. See Exhibit 3.1, "Functional Classification Map" for the City of Peoria.

The City controls approximately 106 signalized intersections, with established communications to approximately 25 of the intersections. Exhibit 3.2 shows the existing and planned signals in the City of Peoria.

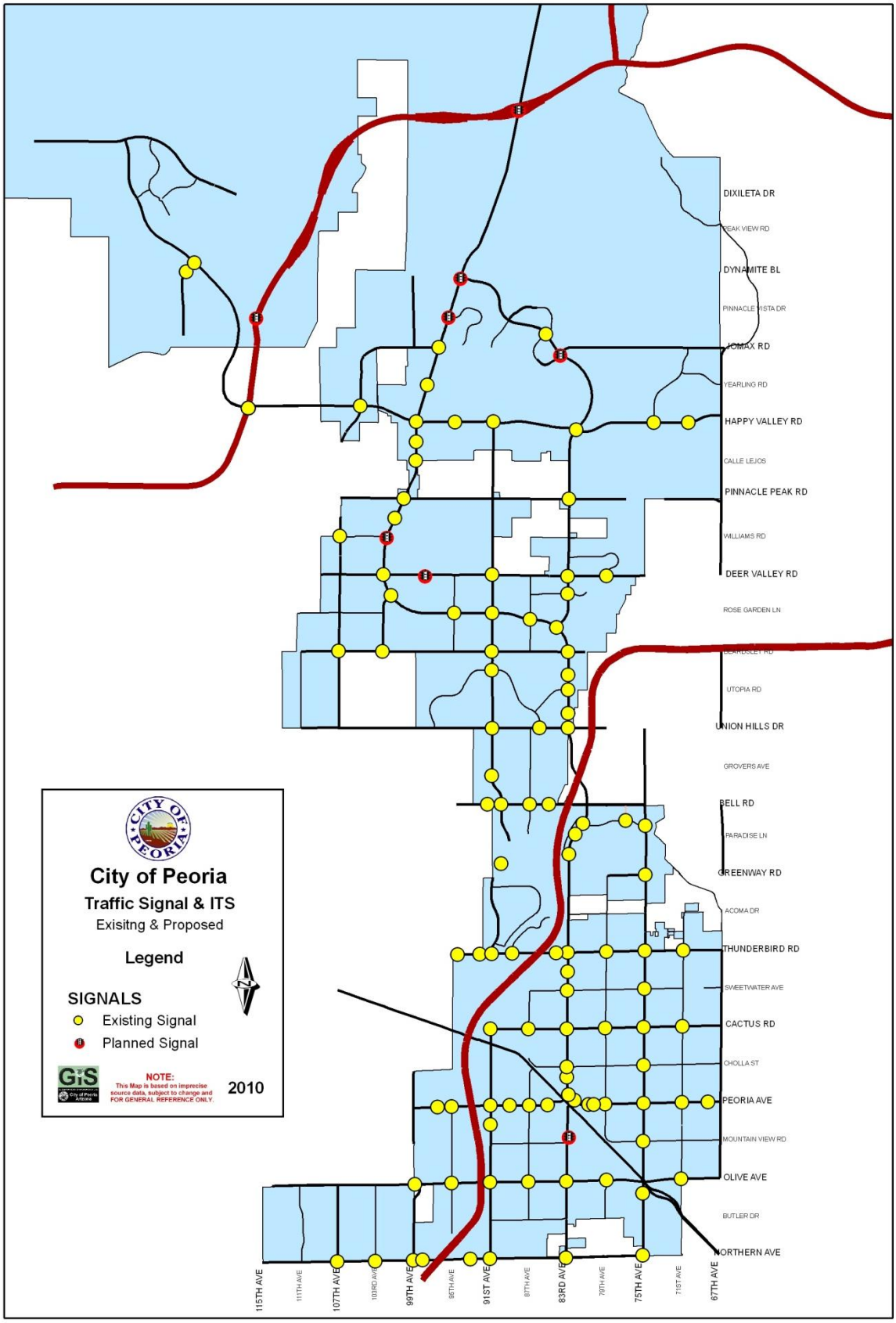
The City has eighteen existing cameras that have been integrated into the system, with additional cameras anticipated within a year.

Exhibit 3.1 Functional Classification Map for the City of Peoria



CATEGORY	TYPE	FUNCTIONAL CLASSIFICATION		LANE CONFIGURATION		R.O.W.	
		MAJOR STREET	MINOR STREET	MAJOR STREET	MINOR STREET	MAJOR STREET	MINOR STREET
A	1	FREEWAY	CITY STREET	GRADE SEPARATED / ENHANCED AT GRADE			
B	1	MAJOR ARTERIAL	MAJOR ARTERIAL	2 LEFT, 3 THROUGH, 1 RIGHT	2 LEFT, 3 THROUGH, 1 RIGHT	150	150
	2	MAJOR ARTERIAL	MINOR ARTERIAL	2 LEFT, 3 THROUGH, 1 RIGHT	2 LEFT, 2 THROUGH, 1 RIGHT	150	130
	3	MAJOR ARTERIAL	COLLECTOR	2 LEFT, 3 THROUGH, 1 RIGHT	1 LEFT, 2 THROUGH, 1 RIGHT	150	110
C	1	MINOR ARTERIAL	MINOR ARTERIAL	2 LEFT, 2 THROUGH, 1 RIGHT	2 LEFT, 2 THROUGH, 1 RIGHT	130	130
	2	MINOR ARTERIAL	COLLECTOR	2 LEFT, 2 THROUGH, 1 RIGHT	1 LEFT, 2 THROUGH, 1 RIGHT	130	110

Note: Flare roadway R.O.W.+20 feet at the intersections. Extend flare 500 feet from the cross street centerline.


City of Peoria
Traffic Signal & ITS
Exisitng & Proposed
Legend
SIGNALS
Existing Signal
Planned Signal
NOTE:
This Map is based on imprecise source data, subject to change and FOR GENERAL REFERENCE ONLY.
2010
DIXILETA DR
PEAK VIEW RD
DYNAMITE BL
PINNACLE VISTA DR
JOMAX RD
YEARLING RD
HAPPY VALLEY RD
CALLE LEJOS
PINNACLE PEAK RD
WILLIAMS RD
DEER VALLEY RD
ROSE GARDEN LN
UTOPIA RD
UNION HILLS DR
GROVERS AVE
BELL RD
PARADISE LN
GREENWAY RD
ACOMA DR
THUNDERBIRD RD
SWEETWATER AVE
CACTUS RD
CHOLLA ST
PEORIA AVE
MOUNTAIN VIEW RD
OLIVE AVE
BUTLER DR
NORTHERN AVE
115TH AVE
111TH AVE
107TH AVE
103RD AVE
99TH AVE
95TH AVE
91ST AVE
87TH AVE
83RD AVE
79TH AVE
75TH AVE
71ST AVE
67TH AVE

Every signal within City of Peoria jurisdiction will be retimed a minimum of every third year.

3.2 Key Challenges

Arterial traffic management is dependent upon reliable and timely traffic information and data. A primary concern is collecting data to provide real-time traffic conditions throughout the City especially along principal arterials. The City is dual-purposing the video detection cameras at the intersections to save money. The video detection cameras are used for stop line detection, as well as count stations. This allows the City to get the data needed, but also to save money.

3.3 Future Expansion

The following actions are identified in the Strategic Plan as activities to accomplish the previously defined objectives:

1) Provide adequate video detection at all signalized intersections and other relevant locations under City of Peoria jurisdiction

2) Install CCTV Cameras at 55 key intersections.

3) Install DMS at 19 strategic locations with adequate compatibility with the existing program.

The goals identified in the strategic plan have been expanded and coordinated with the business goals.

The strategic direction should be to make the signalized intersection the primary data collection means in addition to the installation of mid-block isolated detector stations at specified locations. This would allow use of the existing traffic signal controller, communications and i2TMS infrastructure to enable data collection features. This would be achieved by detecting arterial traffic by lane approximately 300 feet in advance of the intersection. This detection equipment can be installed as part of new traffic signal installation projects or as part of signal modernization activities.

A signal modernization plan has been prepared and is shown in the table below, with implementation currently in progress.

Table 3.1 – CITY OF PEORIA Signal Modernization Plan

2014 MAG Grant – from Donnie

Metrics and key milestones have been identified for traffic signal operations, synchronized signal systems, incident detection, and special event traffic management and are included in Appendix A.

Specific traffic management tools were identified through interviews conducted with management and personnel. These tools include video surveillance and signalized intersection design and construction. It is anticipated that the video surveillance for the City will expand to include 50 to 75 new CCTV cameras. Locations for the placement of cameras should be at a minimum every mile along major arterials throughout the City. Additional locations for CCTV cameras include areas surrounding major traffic generators including Peoria Sports Complex, Rio Vista Park, and any other facilities with high volumes of special event traffic.. Also, CCTV cameras should be considered within City jurisdiction near major thoroughfares including, Loop 303, Loop 101, and Grand Avenue.

The next chapter details the strategies for developing and expanding the specific areas of City of Peoria ITS program to provide an effective arterial management.

Chapter 4. ITS Field Infrastructure Deployment Strategies

As previously discussed in the arterial traffic management chapter, several key arterials have been identified. The existing traffic signal inventory for the City of Peoria is shown in Exhibits 4.1 through 4.6.

PRIMARY DEPLOYMENT STRATEGY GOAL

Establish a reliable communications network capable of supporting data transfer for all ITS field devices including traffic signal control, vehicle detection, video streaming, DMS controls, etc.

It is important to identify the ultimate goal of establishing a complete and reliable communications network capable of supporting data for all ITS components. To address anticipated communications bandwidth requirements, a fiber/wireless hybrid solution is ideal for the final product. .

4.1 ITS Deployment Description

The City of Peoria has chosen to deploy a hybrid communications system for deploying ITS field devices. This deployment includes the installation of conduit and fiber along major corridors throughout the City. Many corridors already have conduit installed, and only need to have fiber installed. Those corridors without conduit, and with no current projects to install conduit will be connected with wireless devices. The wireless devices are 54 meg devices and are stable on the system.

Any deployment would include a feasibility study, detailed design, and deployment of ITS features for a particular corridor. ITS items such as Communications, CCTV cameras, and video detection will be installed with any roadway project Count Stations, DMS Signs and other features will be added on a project specific basis.

4.2 Undesignated Corridor ITS Deployment Options

Not all future growth can be precisely predicted and, while several key corridors are identified for ITS deployment, additional corridors are undesignated in this plan which may warrant ITS deployment. The corridors defined as principle arterials, minor arterials, and collectors would take precedence. For continuous traffic flow and efficient traffic monitoring and management, a signal spacing of 1/2 mile or less as anticipated over the next 20 years would warrant the installation of conduit. Significant cost savings can be achieved if land developers incorporate ITS infrastructure in the design and construction of arterial projects. In preparing for future expansion, City of Peoria can anticipate the needs of roadway users and allot for adequate ITS deployment.

Exhibit 4.1 Existing Traffic Signals in City of Peoria

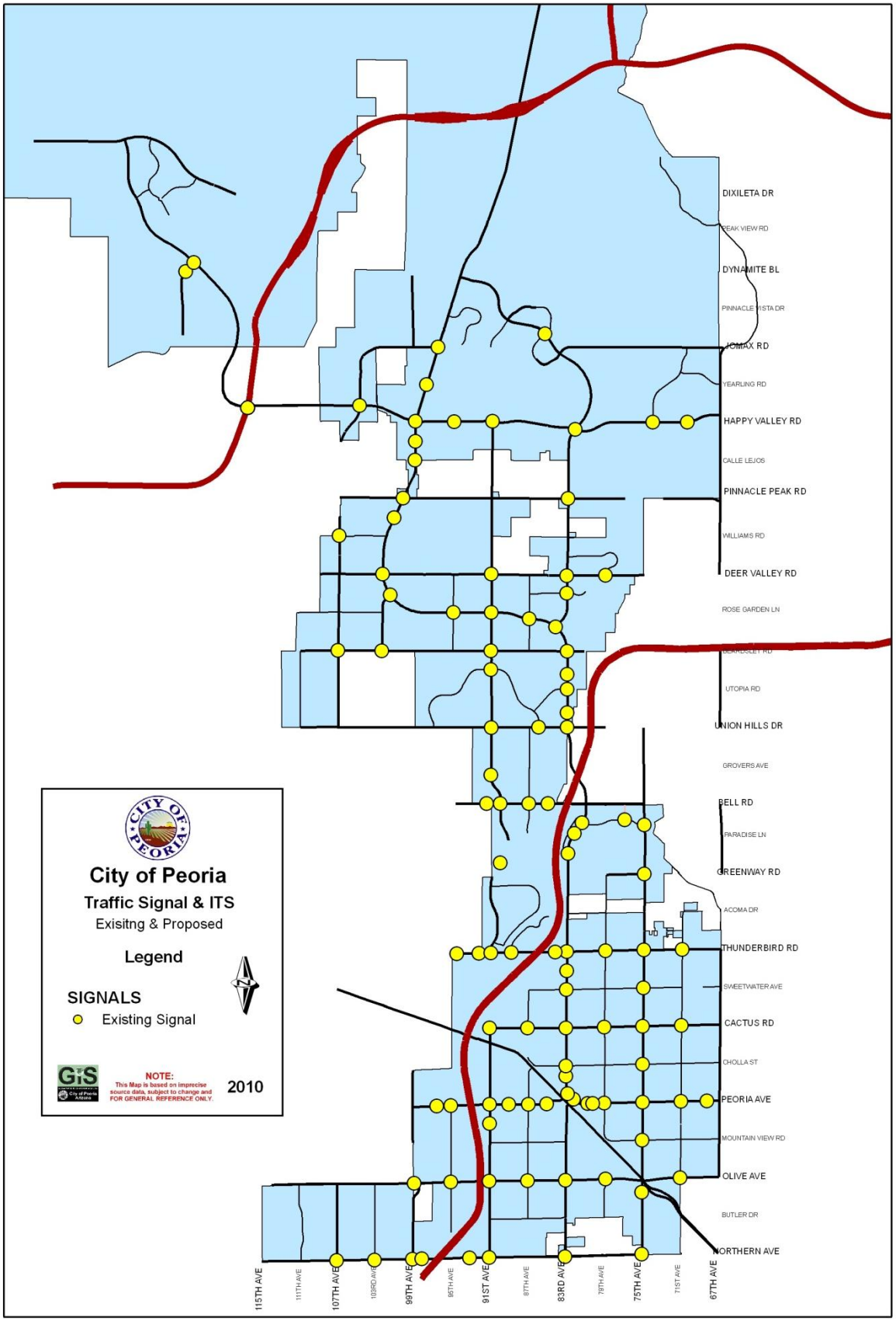


Exhibit 4.2 Existing Conduit Location and Fiber Ownership in City of Peoria

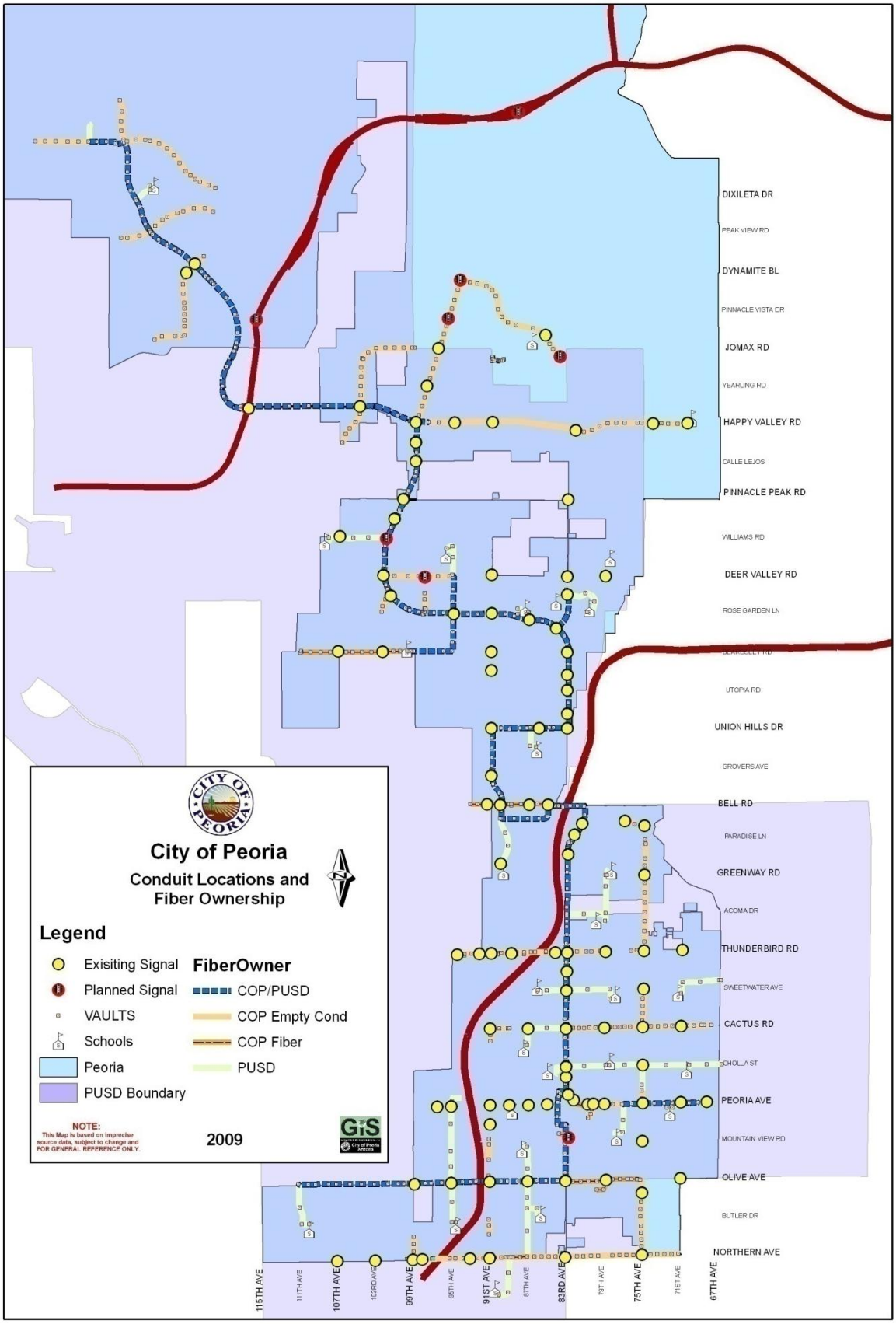


Exhibit 4.3 CCTV Cameras in City of Peoria

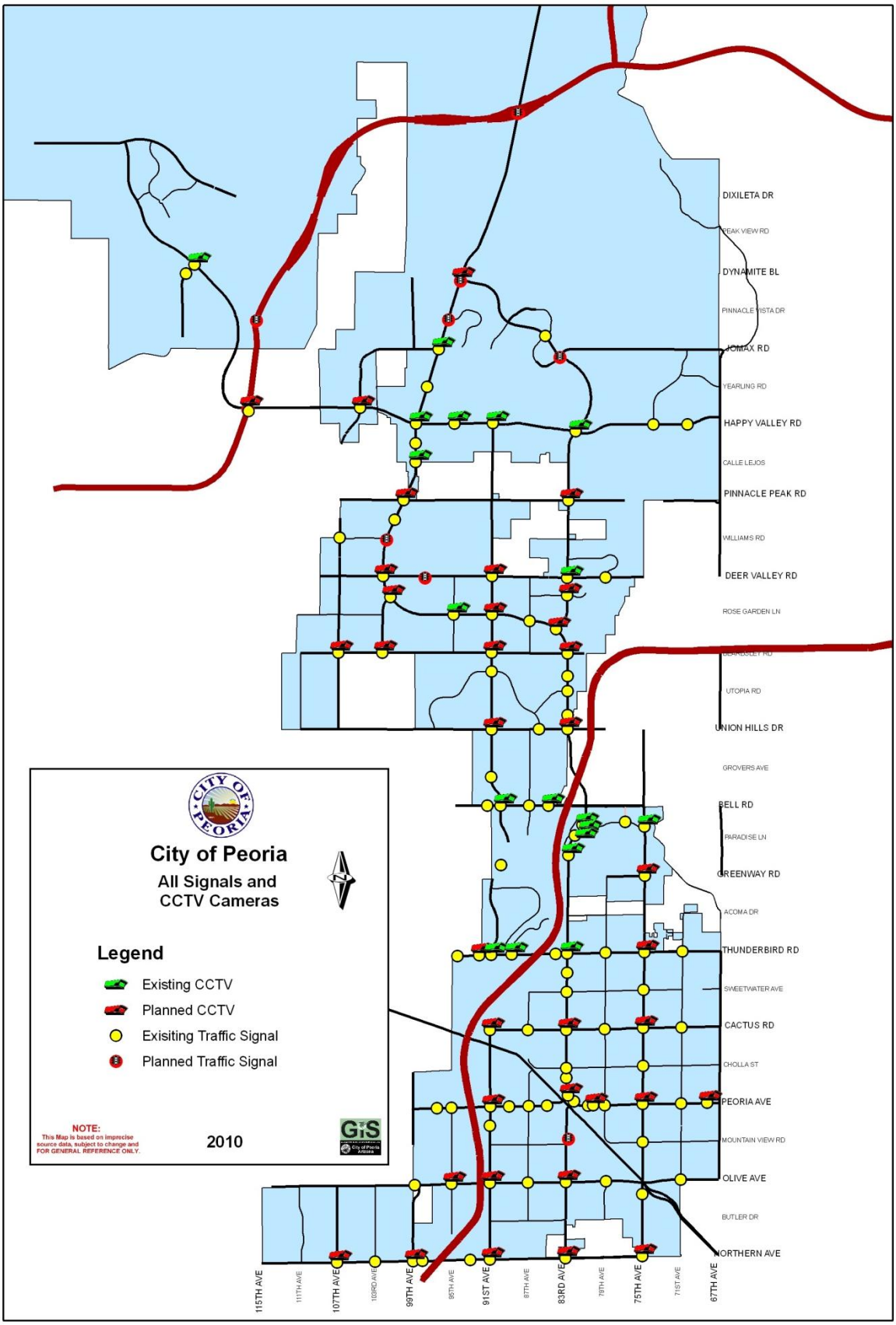


Exhibit 4.4 Traffic Count Locations in City of Peoria

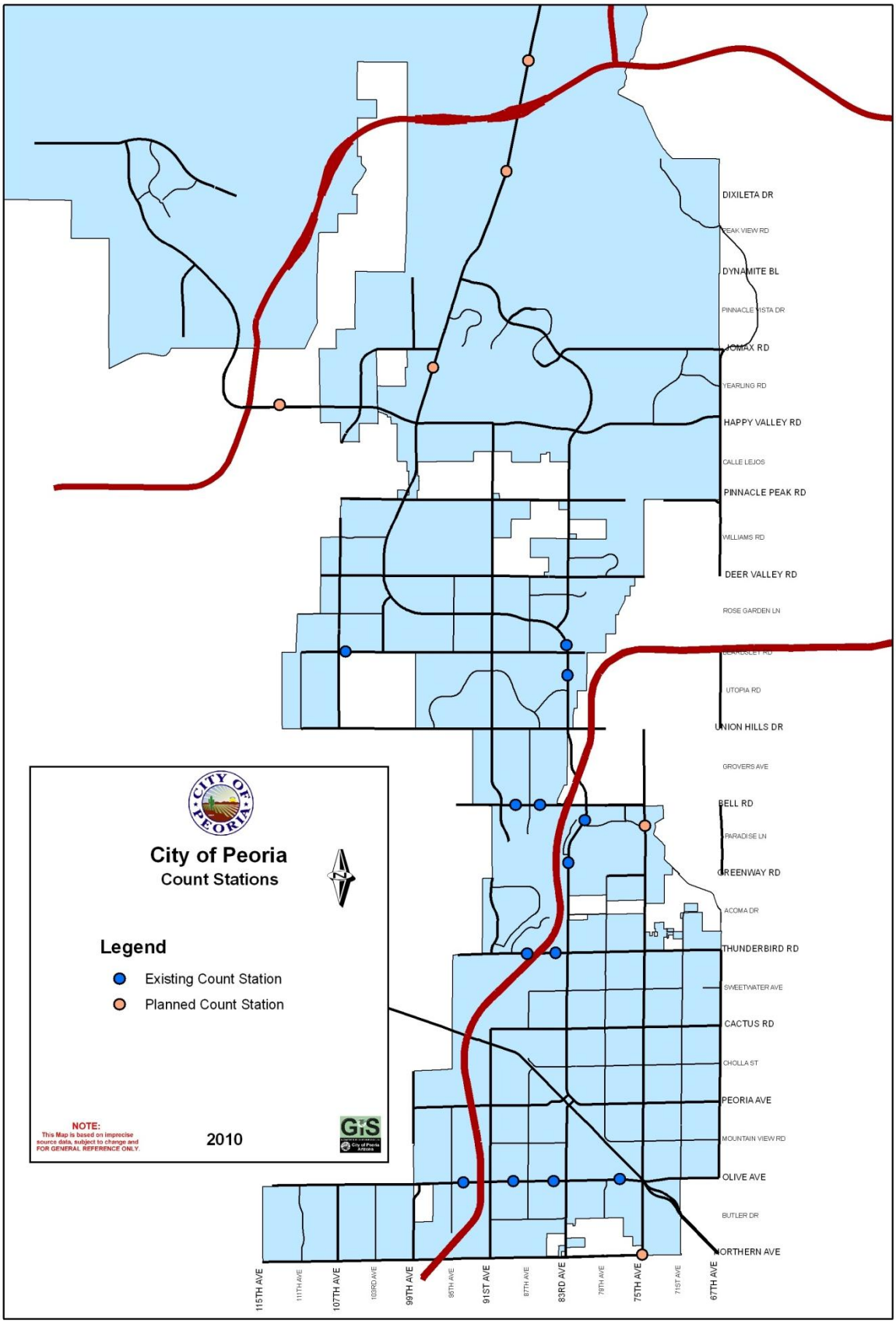


Exhibit 4.5 Video Detection Cameras in City of Peoria

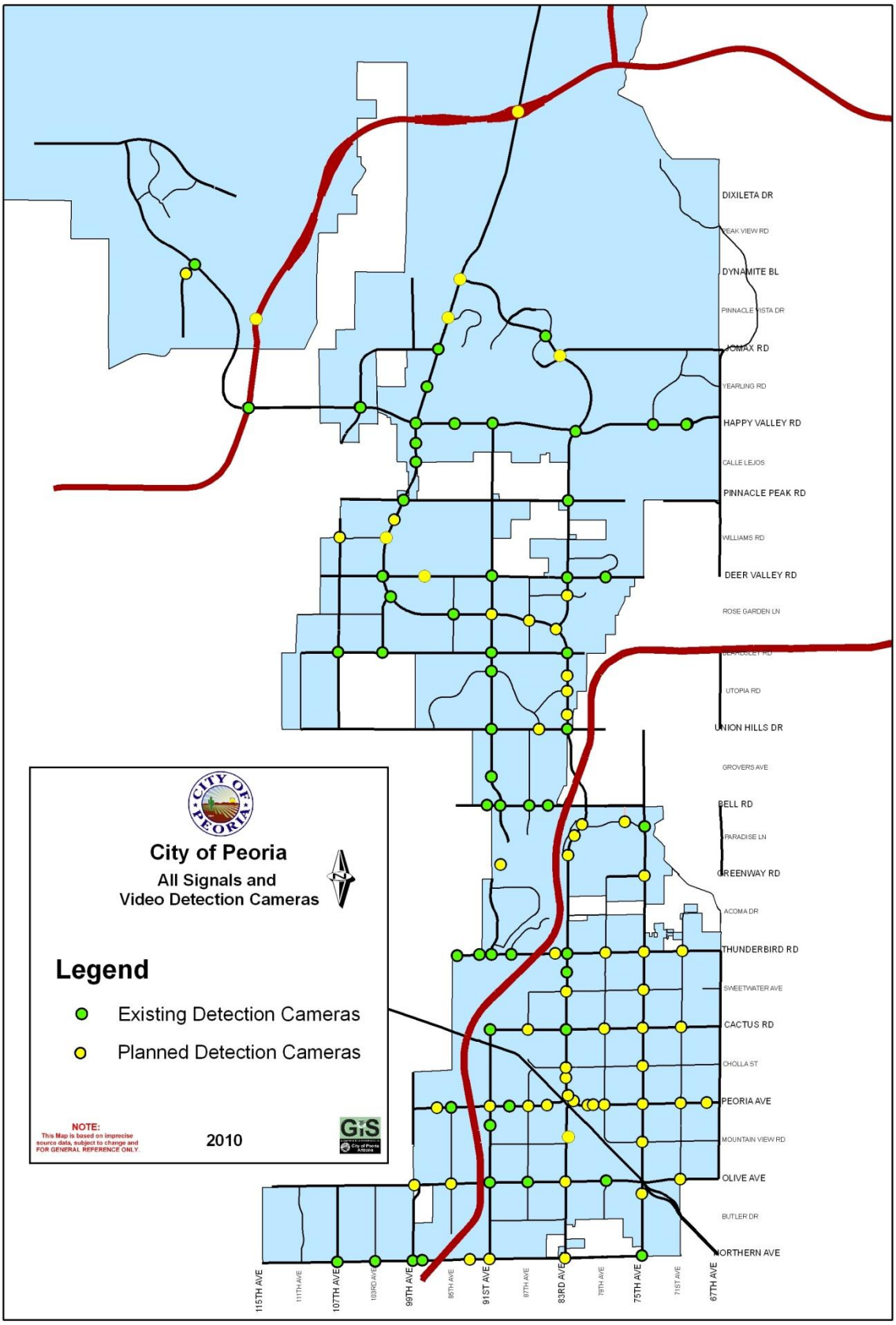


Exhibit 4.6 Traffic Pre-empted Signals in City of Peoria

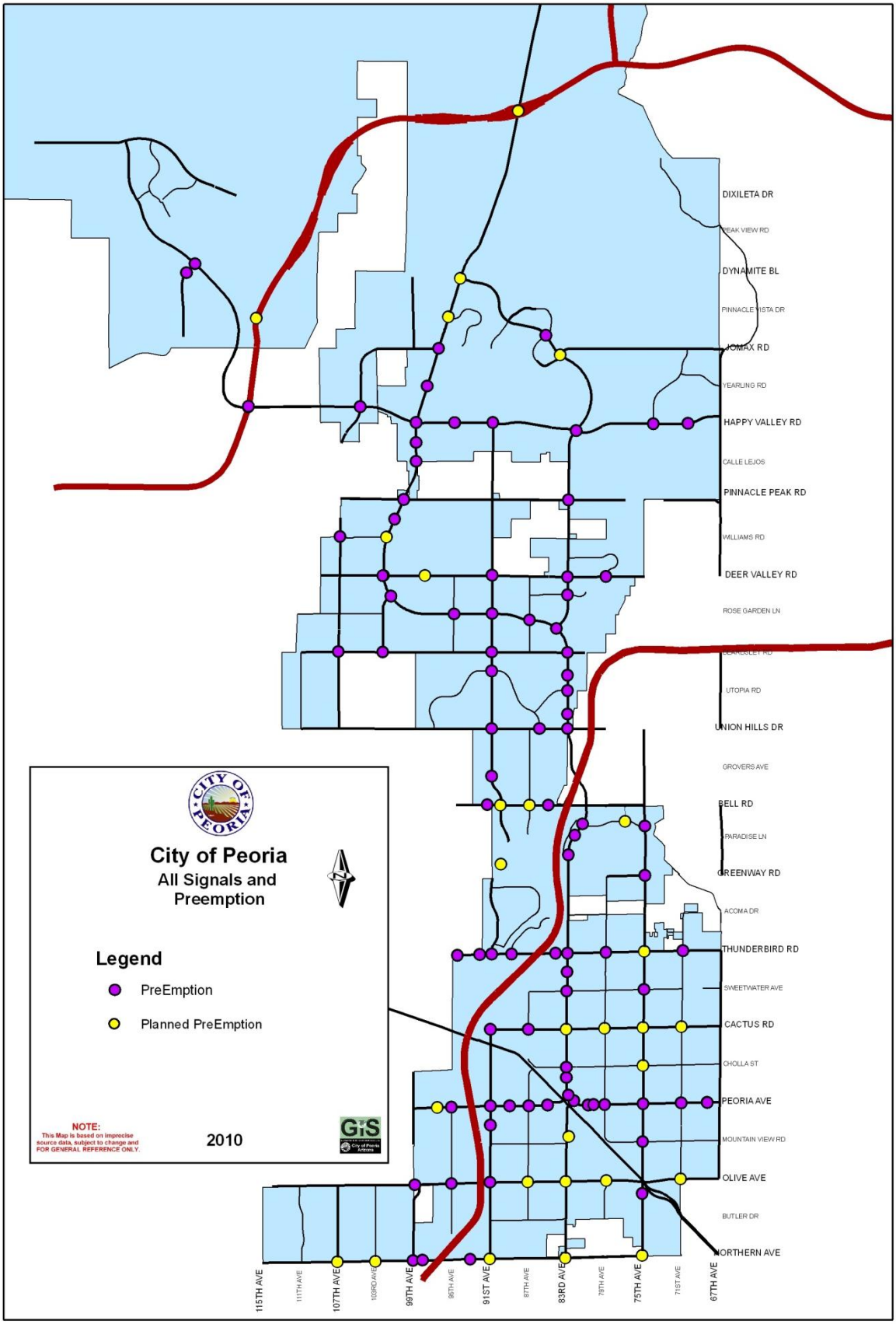


Exhibit 4.7 Dynamic Message Signs (DMS) in City of Peoria

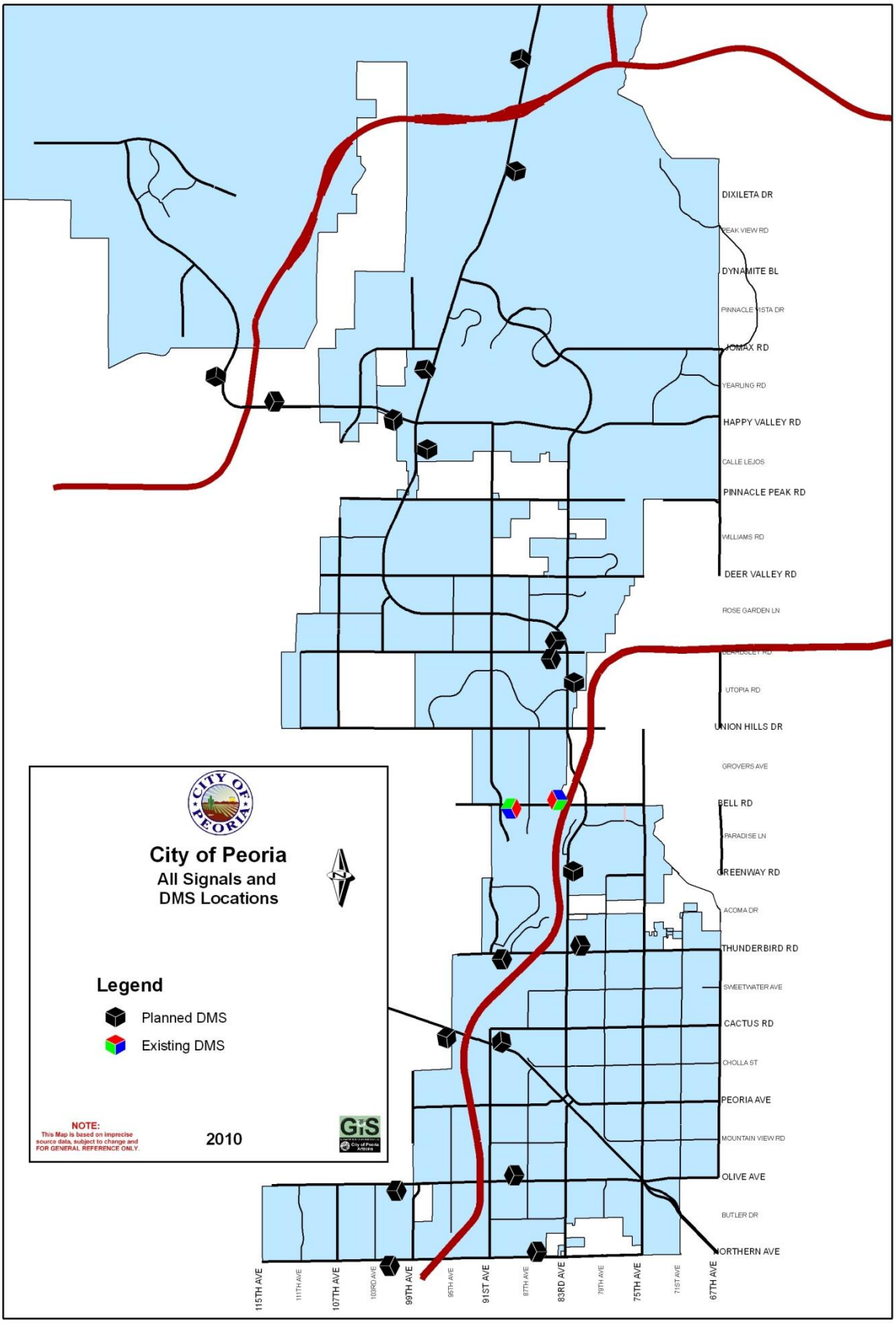
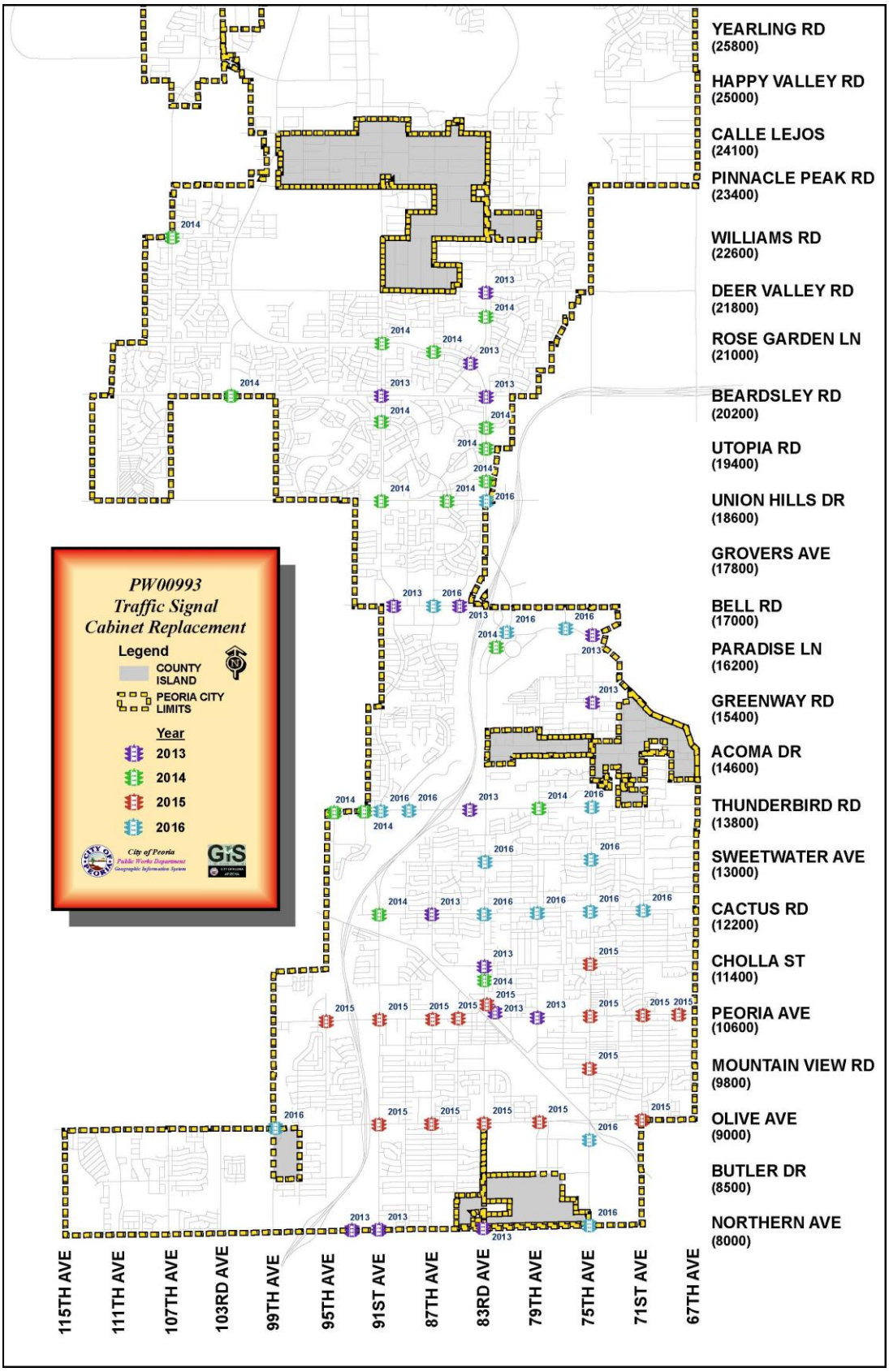


Exhibit 4.8 City of Peoria Traffic Controller and Signal Cabinet Replacement Program



Chapter 5. Communications

5.1 Description

For communications to signalized intersections and ITS field devices, City of Peoria currently employs 1 GIG fiber backbone network with wireless connection to side locations. Because of bandwidth requirements, video data from the CCTV cameras that City of Peoria currently operates comes back to the TMC over both wireless and fiber

The goals for communications are identified in Appendix A.

5.2 Key Challenges

The key challenge with communications remains establishing and maintaining communications with each traffic signal and ITS field device. Approximately 75% of all signals controlled by City of Peoria lack established communications with the TMC. The agency objective is to establish communications with 100% of all field devices under its control. Although the current CCTV cameras have communications to the TMC, any new device installed require a connection and should be connected to the fiber either directly or through a wireless hop.

5.3 Future Expansion

It is anticipated that 75 new signals will be brought on-line within the next year, as well as nine new CCTV cameras established throughout the City. With a desired result of established communications, this has been an identified requirement during the design stage.

Metrics and key milestones have been identified for communications and are included in Appendix A. Through the identified performance measures and the suggested milestones, communications can be established with the remaining 75% of signalized intersections controlled by City of Peoria. Because maintaining communications with these signals is an ever-present operational cost, City of Peoria should investigate intergovernmental agreements that generate partial control of available bandwidth in other agencies' communications infrastructure.

Chapter 6. Regional Emergency Action Coordinating Team (REACT)

6.1 Description

- The Regional Emergency Action Coordination Team (REACT) program comprises of a team of rapid responders to incidents in the County. The major objective of the REACT program is to provide responder and road user safety, orderly traffic control and traffic management in the incidents activity area. The REACT team seeks to enhance the safety of emergency responders at the incident locations by applying necessary traffic control strategies and plans at or adjacent to the incident location.

The Strategic Plan identified the following priority with regards to the REACT incident response program:

> "The City of Peoria should be a player in the REACT program and support that program in any way possible.."

REACT Service

Incident Scene Protection - Provides pedestrians and vehicles involved at the incident location with protection and safety through the use of traffic control devices and variable/static signage that inform motorists about the incident and advise motorists to reduce speeds, change lanes etc. Incident Scene Protection seeks to protect on-scene personnel from injury and fatalities, reduce conflict between vehicles and incident response activity and reduce the possibility of damage to equipment from secondary crashes.

Traffic Control - The traffic control strategy varies from partial closures where one or more lanes are closed for traffic to complete route closures that necessitate detour routes depending upon the severity of an incident.

The business goals for REACT are identified in Appendix A.

Chapter 7. Advanced Traveler Information System (ATIS)

7.1 Description

The City of Peoria has developed an Advanced Traveler Information System (ATIS) to provide real-time information on current valley roadway conditions primarily through the regional 511 system.

The objective of the Traveler Information is defined in the Plan and is stated as:

> "Disseminate information to the public on incidents, road closures and restrictions by collecting and inputting the Information in the City of Peoria and ADOT road closure systems."

The goals for ATIS are identified in Appendix A.

City of Peoria is a vital partner to the regional ATIS program through the collection, integration and dissemination of traveler information related to arterial roads. City of Peoria enters data on HCRS and RCRS systems for the local events and supports the development of 511 System. It promotes deployment and shared operations of arterial Dynamic Message Signs. Also City of Peoria, through the AZTECH program, has played a key role in the development of various components of the travel time information program.

7.2 Future Expansion

The following actions are identified in the Strategic Plan as activities to accomplish the previously defined objective:

1) Implement new traveler information technologies within the City and integrate with TMC for monitoring and control.
2) Establish and maintain data feeds from private partners to provide information from field infrastructure. Establish data feed for automated transmission to the operators.
3) Support and advance the goals and objectives of the AZTECH Regional ATIS Working Group.

PRIMARY ADVANCED TRAVELER INFORMATION SYSTEM GOAL

Advance arterial ATIS in the City through better collection, integration and dissemination of traveler information on arterials and continue to provide leadership in travel time information.

Metrics and milestones have been identified for ATIS and are included in Appendix A.

7.2.2 Expand DMS Deployment

DMS are a key component to arterial traffic management. City of Peoria currently has primary control over two arterial DMS. And an existing project along Bell Road will result in secondary control over four DMS to be installed, two within the City of Surprise and two within the Maricopa County. As defined in the concept of operations, City of Peoria will be able to control the DMS when not in use by the corresponding agency. If City of Peoria requires the use of the DMS while the corresponding agency displays a message, City of Peoria must contact the agency and request control. Secondary control will be from the TMC.

With the growth of the west valley, DMS will be vital to the traveling public in being able to make driving pattern modifications at key decision points. The focus of ITS deployment and implementation is on the west valley where the City controls larger portions of the metropolitan area. Specifically a prioritization of DMS in this part of the City would most benefit the traveling public. Based on the City Major Streets and Routes Plan, several key arterials within the City have been classified as principal arterials throughout the City. Locations of DMS along these arterials must be strongly considered such that they are effective in having drivers make informed decisions. Several recommended locations for DMS sites are identified in the previous Exhibit 4.7.

Establishing data collection points also would enable City of Peoria to depict real-time traffic conditions as well as provide real-time traffic control in response to changing roadway conditions. In order to provide travel speeds and volumes, data collection points need to be located mid-block between signals and work in conjunction with advanced detection utilized at signalized intersections.

Chapter 8. Traffic Management Center (TMC)

With the rapid growth of the valley's population in recent years, the City has experienced a correlating increase in traffic resulting in a greater need to focus on traffic management. As growth continues, more intersections are meeting warrants for traffic signal installation. Managing existing and new signals, monitoring traffic conditions, and providing timely traveler information to the public are all functions critical to Traffic Management. Major cross-jurisdictional corridors are becoming more crucial to traffic flow. In order to provide a greater focus on this management, it is vital that the operations of the Traffic Management Center be efficient and robust.

A comprehensive, technologically advanced, efficient and robust TMC is needed to better coordinate activities and manage the transportation system and supporting field devices to maintain safety and mobility on City of Peoria's roadways. .

8.1 Description

City of Peoria's Traffic Management Center is responsible for the following tasks: management and surveillance, real-time data analysis, interagency signal coordination, incident detection, public notification, construction information updates, special event management, modernization of the existing signals and support for design and implementation of new ITS infrastructure. The following table describes the components that the TMC is responsible for as well as the corresponding functions.

The objectives of the TMC as defined in the Plan:

1. Provide real-time traffic management on City of Peoria roadways through monitoring and control of traffic management systems in the TMC.

2. Provide regional traffic management support to various agencies by proactively coordinating and disseminating information about incidents and closures.

3. Monitor, collect, and archive detector data on City of Peoria arterials.

4. Exchange data with AZTECH partners.

5. Assist and support the City Emergency Operations Center with traffic management during emergency operations.

6. Provide messages on arterial DMS.

City of Peoria is responsible for approximately 106 traffic signals, of which only 26 have established communications links with the TMC. Existing communication is over Hybrid fiber/wireless links.

Appendix A: Suggested Goals, Measures of Effectiveness & Milestones

Signal Operations

No.	Goal	MOE	How Measured	Milestone
1.	Effectively Manage Arterial Traffic Flows through Appropriate Signalization, Signal Coordination and Remote Monitoring	Intersection Level of Service	Tri-annual Survey	Maintain a minimum level of service D for 75% of signals within the City
2.	Provide automated traffic count devices along major corridors.	% of intersections equipped with built in count stations.	Annual Survey	75% of major corridors have automated Traffic Counts installed.
3.	Provide updated pedestrian timing at signalized intersections.	% of intersections with updated pedestrian timing.	Tri-annual Survey	100% of signals will have updated pedestrian timing.
4.	Improve Safety at locations exhibiting high accident rates in the City.	Actual collision rate versus statistically expected collision rate	5 year safety reviews	Identify high accident locations and conduct a safety audit and recommend counter measures for each of the top 10 high accident locations.
5.	Provide up to date traffic signal timing plans based on recent traffic conditions	# of Timing Plans Updated Versus Number of Signals	Tri-annual review	All signals have timing plans that are less than 3 years old.
6.	Provide coordinated traffic signal operations along major corridors.	% of major corridors with updated signal coordination plans.	Tri-annual Review	100% of major corridors have updated signal coordination plans.
7.	Provide uninterruptible power at major intersections	% of major intersections equipped with UPS	Annual Review	All newly installed or modernized intersections are equipped with UPS.

No.	Goal	MOE	How Measured	Milestone
8.	Plan for traffic signal interconnect and remote monitoring of every intersection in the City.	% of intersections with remote monitoring	Annual Review	100% of traffic signals are interconnected or remotely monitored.
9.	Coordinate traffic signal timing plans with adjacent jurisdictions at boundaries.	% of Major cross jurisdictional corridors that are coordinated with other agencies.	Annual Review	50% of major cross jurisdictional corridors are coordinated with adjoining agencies.
10.	Develop special signal timing plans for ingress and egress for every special event that has the potential to draw 5,000 or more patrons.	% of special events that have recently updated event specific timing plans	Annual Review	Current special event management plan on file for each event.
11.	Operate the TMC to capture peak hours every week.	Hours of Operation	Annual Review	Operating hour schedule met during current and subsequent years.
12.	Install and integrate ITS Field Devices as per the City's ITS **Strategic** Plan.	% of devices installed per the City's ITS Strategic Plan.	Annual Review	All devices installed by 2020