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9. **ITS ELEMENT**

A. **Fiber Optic Communications Network**

The planned Town’s fiber optic communications network is comprised of four backbone rings of fiber optic cable: one existing core ring and three partially built outlying rings. Fiber optic branch cables extend from those four rings at several locations to connect to nearby traffic signals and Town facilities. The fiber optic cables (typically containing 48 or 96 strands) are installed in conduits of various sizes, with the Town’s current standard conduit size being four inches.

When development occurs in Gilbert, the Town typically requires the developer to provide the adjacent public infrastructure, which includes half-street improvements for the adjacent roadway and two four-inch conduits for future use by the Town. The Town then typically installs fiber optic cable into the existing conduit infrastructure if there are traffic signals or Town facilities nearby that can be directly connected via fiber optic cable. When roadway widening projects are constructed by the Town, new conduit and fiber optic cable are typically installed as part of those projects.

Wherever existing traffic signals are not connected to the Town’s communications network via fiber optic cable, wireless radios are installed that link the traffic signals to the communications network. While wireless radios do not generally have as much capacity as fiber optic cable and are not as reliable, they provide a low-cost solution that allows the Town to communicate to traffic signals that otherwise are not yet connected to the communications network. Currently, some CCTV video feeds are being streamed to the TOC via wireless radios.

The Town’s Traffic Operations staff maintains the fiber optic communications network as well as the field devices that connect to that network such as traffic signals, wireless radios, and CCTV cameras. The Town’s IT department is responsible for maintaining the fiber optic cable connections inside Town facilities.
The Town developed a Fiber Optic Strategic Plan in 2012 with input from Town departments that either use the fiber optic network or may have an interest in the network. This Plan updated the Advanced Traffic Management System (ATMS) Design Memorandum developed in 2007 and outlines the unified strategic plan for the Town's fiber optic communications network, with long-term goals to expand the fiber optic communications network to connect all Town facilities, traffic signals, well sites and pump stations to the fiber network – either directly through fiber optic cable or indirectly through wireless radios – and to provide redundant communications to fire and police facilities.

**Program Support**

The Town’s Traffic Operations staff manages the operation of the Town’s traffic signals using a traffic signal system that communicates to all of the Town’s traffic signals, centralized at the Traffic Operations Center (TOC).

From the TOC, staff can respond to real-time events (such as special events, construction or traffic crashes) by monitoring live camera images on the video wall and by listening to the police radio scanner, and then actively managing the situation by updating signal timings as needed. The video wall is monitored by town staff Monday through Thursday from 7am-8am and 5pm-6pm, although there are numerous benefits to providing staff available to manage the transportation network during the entire business day as crashes rarely occur only in peak periods. In addition, the Town’s Traffic Engineer and Assistant Traffic Engineer have video screens in their offices from which they can monitor traffic conditions and access the traffic signal system via the TOC computer network. Traffic signal timing at intersections are regularly reviewed and adjusted as needed to meet traffic demands. While Traffic Operations staff are currently the only Town staff monitoring the video camera images at intersections, the capability exists for other Town departments, such as police or fire, to view camera images also.

There are currently three technicians and one-half full-time (FTE) traffic engineer that are responsible for TOC operations of the Town’s transportation network. Those staff personnel are supported by representatives from the Public Works Department for traffic maintenance. Information TOC operations of the Town’s transportation network are covered by one traffic
The staff available to monitor/manage the TOC and maintain ITS devices for the Town’s transportation network is only partially dedicated to ITS operations and maintenance. TOC operations require real-time decision-making by trained staff in how to utilize the central control systems to mitigate congestion and make an impact on the safety of travelers. Based on the total number of ITS devices (traffic signals, CCTV cameras, and DMS) and not including the number of miles of fiber for each jurisdiction, Gilbert is currently operating at a ratio of 296 devices to one staff person (296:1). Comparable jurisdictions in both population and number of devices include the City of Mesa operating at 223:1, the City of Chandler at 77:1, and the City of Scottsdale at 144:1. In terms of maintenance/technician staff, Gilbert is operating at 713:1 (including devices, miles of fiber, and number of wireless devices) whereas Mesa is operating at 132:1, Chandler is 299:1, and Scottsdale is 152:1. Based on these comparisons, Gilbert is currently understaffed in terms of operational support of the TOC as well as for maintenance/technician support of an already robust network of ITS devices and miles of fiber optic communications. Table 9-1 presents a peer city comparison of ITS features and staff.

**TABLE 9-1: COMPARISON OF ITS FEATURES AND STAFF**

<table>
<thead>
<tr>
<th>Devices/Staffing</th>
<th>Mesa</th>
<th>Chandler</th>
<th>Scottsdale</th>
<th>Gilbert</th>
</tr>
</thead>
<tbody>
<tr>
<td># of signals</td>
<td>405</td>
<td>199</td>
<td>301</td>
<td>174</td>
</tr>
<tr>
<td># of CCTV</td>
<td>157</td>
<td>20</td>
<td>82</td>
<td>60</td>
</tr>
<tr>
<td># of DMS</td>
<td>2</td>
<td>3</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td># miles of fiber</td>
<td>150</td>
<td>57</td>
<td>85</td>
<td>29</td>
</tr>
<tr>
<td># of wireless devices</td>
<td>106</td>
<td>10</td>
<td>15</td>
<td>135</td>
</tr>
<tr>
<td># of manager/operator/analyst (FTE)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1.25</td>
</tr>
<tr>
<td># of technicians (FTE)</td>
<td>14</td>
<td>1</td>
<td>3.5</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Considering the growth of ITS already programmed and the benefits seen both regionally and nationally for more support of ITS operations, it is recommended that
the Town consider identifying additional support for TOC operations and field maintenance/technician support dedicated to the ITS network.

**Regional Connectivity**

The Town has recognized the importance of regional connectivity since the inception of its TOC and first installations of segments of the fiber optic communications network. The Town has partnered with the Cities of Mesa and Chandler on projects aimed at reducing congestion and improving air quality through ITS and coordinated with various regional partners during the establishment of the Regional Community Network (RCN) regional fiber optic network.

The Town of Gilbert’s fiber optic network is connected to the City of Chandler’s fiber optic network at the Gilbert Road/Williams Field Road intersection. The Town of Gilbert TOC and the City of Chandler Traffic Management Center (TMC) are sharing traffic video feeds.

Fiber optic cable will be installed in 2013 along Gilbert Road from Civic Center Drive to Baseline Road. At the Baseline Road/Gilbert Road intersection, the Gilbert fiber optic network will then be connected to the Mesa fiber optic network, giving the Town the opportunity to connect Gilbert’s TOC to Mesa’s TMC to share video data and other information. The Town of Gilbert also has plans to connect to the Town of Queen Creek fiber optic network at the Power Road/Germann Road intersection in the future.

A congestion management project for Gilbert, Chandler, and Mesa has been identified that would utilize technology to determine travel times along selected arterial roadways. The data would feed into a public website that shows travel times and areas of congestion. Implementation is anticipated for late 2015 and would include the area within the Town north of Warner Road and west of Val Vista Drive. A connection to the Regional Archived Data System (RADS) network, which centralizes the Phoenix metropolitan area real-time and archived transportation system data, is also part of the contract for the travel time project.
B. Goals

The Vision and Goals of the TMP identify several over-arching goals. The recommendations contained in the ITS Element directly support the vision and the following goals:

**Vision:** A comprehensive, integrated multimodal transportation system that promotes and enhances safety, mobility, efficiency, quality of life, and sustainability.

**Goal 1 - Economic Development:** Foster economic development through an integrated multimodal transportation system that connects major generators to the region, each other and to neighborhoods and facilitates the movement of people and goods between different modes of travel.

**Goal 3 - Arterial Roadways:** Establish a safe, continuous arterial street network that can accommodate all modes, minimize congestion, and connect to arterial street networks of neighboring communities.

**Goal 4 - Collector and Local Roadways:** Develop a safe, continuous network of collector and local streets that connects neighborhoods to the arterial street network, encourages bicycling and walking, and incorporates traffic calming strategies.

**Goal 7 - Transit:** Work with regional transit partners to develop a transit network that meets the needs of Gilbert residents and serves local employment centers, shopping, schools, and neighborhoods and also connects to regional destinations.

C. ITS Toolbox

Intelligent Transportation System (ITS) infrastructure and processes are generally utilized to manage traffic, to reduce congestion and promote safety as well as to provide real-time traveler information. ITS infrastructure and processes are used by public agencies to share information with the public and with neighboring agencies, monitoring traffic on corridors and at key intersections, collecting and disseminating information that affects reliability (event closures, construction limits, restrictions, others), and using central systems to measure effectiveness of operations.
ITS infrastructure and processes can be used in multiple ways to improve the management of traffic, incidents, special events, and work zones. Implementing ITS can provide the following benefits for the Town, and the traveling public:

- Increase the capacity of roadways by 10 percent to 15 percent;
- Provide real-time traveler information;
- Reduce delays, vehicle emissions, and energy consumption;
- Reduce impacts of incidents on the roadway and improve incident clearance times;
- Improve the response time of emergency services;
- Be implemented within existing right-of-way – minimizing time for approvals/clearances and travel lane restrictions;
- Provide a cost-effective alternative to road widening or new roadway infrastructure;
- Leverage data and situational awareness of the transportation system to support multiple agencies’ objectives; and
- Support other agency functions with operational data.

Table 9-2 provides an ITS “toolbox” that identifies multiple ITS technologies or methods that can be used for monitoring, traffic control, work zone management, lane management, information dissemination, parking management, and central system management. Where infrastructure is required for a particular ITS function, a general lifecycle is provided based on applications throughout the country where the technology is typically rendered obsolete, the manufacturer replaces or upgrades the technology, or where the technology still may be effective but becomes more expensive to maintain than replace.
<table>
<thead>
<tr>
<th>ITS Function</th>
<th>Example</th>
<th>Purpose</th>
<th>Lifecycle of Applicable Technology</th>
<th>Benefits (Pros)</th>
<th>Considerations (Cons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>Video Image Detection (VIDs) and Closed Circuit Television Cameras (CCTV)</td>
<td>To monitor traffic on corridors and at key intersections in real-time</td>
<td>VID – 10 years CCTV – 10 years</td>
<td>Situational awareness</td>
<td>Requires maintenance and upgrades Additional training needed to support operations and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cost-effective capacity enhancement by operations without adding lanes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Roadway efficiency improvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Control</td>
<td>Traffic signals, pedestrian-activated crosswalks (HAWK signals), transit signal priority, off-site TOC operation of signals, emergency vehicle preemption, school flashers, and adaptive signal control</td>
<td>To support the movement of traffic on the roadway network</td>
<td>Traffic signals – 10 years for electronics and 30 years for infrastructure HAWK signals – 15 years Signal priority – 10 years Adaptive control – 5 years Detection – 10-15 years School zone flashers – 10 years</td>
<td>Enhancements that are very visible to the traveling public</td>
<td>Integration (if not a priority in deployment) can be challenging</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Warrants and safety considerations drive investments, which provide good justification</td>
<td>Upfront capital cost and ongoing operations and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Potential lack of public understanding or acceptance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Staff training and expertise required for effective operation and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Staff training and expertise required for effective operation and maintenance</td>
</tr>
<tr>
<td>Work Zone Management</td>
<td>Portable traffic control devices (CCTV, dynamic message signs [DMS]), permitting system reporting, restriction notifications</td>
<td>To effectively manage/monitor work zone sites for traffic control and safety</td>
<td>Portable CCTV cameras – 10 years Portable DMS – 10 years</td>
<td>Improves safety of work zones</td>
<td>Determining when, where, how, and why to deploy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Visible to traveling public</td>
<td>System sharing / control permissions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coordination with public safety for improved management of work zone</td>
<td>Increased maintenance responsibilities</td>
</tr>
<tr>
<td>ITS Function</td>
<td>Example</td>
<td>Purpose</td>
<td>Lifecycle of Applicable Technology</td>
<td>Benefits (Pros)</td>
<td>Considerations (Cons)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Information Dissemination</td>
<td>DM S, in-vehicle systems, websites, mobile applications, or other information dissemination services</td>
<td>To provide real-time information about road conditions, incidents or closures</td>
<td>Permanent DMS - 10 years Portable DMS - 10 years Website - 5 years List Serv Accounts - 2 years</td>
<td>Visible benefit to traveling public Public expectation to receive information provided in these formats</td>
<td>Upfront capital or development cost and ongoing operations and maintenance Visible information creates accountability for jurisdiction Data collection and management costs</td>
</tr>
<tr>
<td>Parking Management</td>
<td>Data collection and/or parking information dissemination</td>
<td>To provide parking availability, access, or restrictions</td>
<td>Parking management devices – 10 years</td>
<td>Partnering with parking providers can prove to be a bi-directional benefit</td>
<td>Can be a costly system to deploy if publically operated Potential lack of public understanding or acceptance</td>
</tr>
<tr>
<td>Signal Central Systems</td>
<td>Fiber optic network, wireless network, traffic management software, processing data to measure effectiveness for operations, Town intranet, regional systems, lane use, construction permitting system, and other system types</td>
<td>To collect, store or use data to support operational, situational, or planning decision for the transportation network</td>
<td>Fiber optic cable – 20 years Wireless devices – 10 years System servers – 10 years System Software – 7-10 years</td>
<td>Cost-effective for the public agency when strategically implemented Serves multiple agency purposes Reduces personnel time needed to go into field if can be monitored and operated via a central system</td>
<td>Sometimes costly to deploy if trying to implement “after the fact” Requires regular maintenance and knowledge base to operate and keep system functioning at a high level</td>
</tr>
</tbody>
</table>
D. Programmed ITS Projects

The Town has plans to continue to expand and enhance the ITS infrastructure in Gilbert. Several ITS-related projects are included in the Town’s 2013-2018 Capital Improvement Plan (CIP). Based on recent discussions with Town staff about their vision for ITS in Gilbert, adjustments may need to be made to some of the CIP projects due to recently implemented ITS infrastructure, changes in technology, or shifts in the Town’s priorities and goals. Table 9-3 identifies the Town’s ITS-related CIP projects (excluding the traffic signal installation projects, which will be implemented as warranted) and indicates what adjustments to those projects should be considered to better align the projects with the Town’s ITS vision. There is also a project identified in the MAG Transportation Improvement Program (Project # MES16-401) which will install 91 Bluetooth devices focused in west Mesa in 2016. An extension to this project will be a partnership between the City of Mesa, the Town of Gilbert, and the City of Tempe to deploy additional sensors for broad East Valley coverage.

**TABLE 9-3: REVIEW OF CIP ITS PROJECTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Description</th>
<th>Fiscal Year</th>
<th>Amount</th>
<th>Proposed Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS131</td>
<td>Advanced Traffic Management System – Phase III</td>
<td>2022</td>
<td>$2,007,000</td>
<td>Adjust project limits to Val Vista Drive: Warner Road to Baseline Road to connect to the TS165 project at Val Vista Drive/Guadalupe Road. Adjust budget required for project to match new project limits.</td>
</tr>
<tr>
<td>TS132</td>
<td>Advanced Traffic Management System – Phase IV</td>
<td>2015-2016</td>
<td>$1,437,000</td>
<td>Construct as planned to complete Northwest Ring.</td>
</tr>
<tr>
<td>TS133</td>
<td>Advanced Traffic Management System – Phase V</td>
<td>2022</td>
<td>$4,178,000</td>
<td>Adjust Northeast Ring project limits to Baseline Road: Greenfield Road to Higley Road, and Higley Road: Baseline Road to Williams Field Road. Adjust budget required for project to match new project limits. Per Town input, the alignment may shift from Higley Road to Recker Road depending on future development in the area.</td>
</tr>
<tr>
<td>TS134</td>
<td>Advanced Traffic Management System – Phase VI</td>
<td>2022</td>
<td>$7,307,000</td>
<td>Adjust project limits to Queen Creek Road: Power Road to Higley Road, and Higley Road: Queen Creek Road to Riggs Road. Adjust budget required for project to match new project limits.</td>
</tr>
</tbody>
</table>
TABLE 9-3: REVIEW OF CIP ITS PROJECTS (CONTINUED)

<table>
<thead>
<tr>
<th>Project #</th>
<th>Description</th>
<th>Fiscal Year</th>
<th>Amount</th>
<th>Proposed Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS152</td>
<td>Gilbert – Queen Creek Interconnect</td>
<td>2015</td>
<td>$195,000</td>
<td>Construct as planned to complete Gilbert-Queen Creek Interconnect. Will utilize connection listed in TS169 to complete project.</td>
</tr>
<tr>
<td>TS165</td>
<td>Baseline Fiber Optic Infrastructure</td>
<td>2014-2015</td>
<td>$569,000</td>
<td>Project is ongoing.</td>
</tr>
<tr>
<td>TS166</td>
<td>Fiber Optic Communications Infrastructure Replacement</td>
<td>2020</td>
<td>$444,000</td>
<td>Construct as planned to replace 48-fiber cable with 96-fiber cable along northern part of the Core ring.</td>
</tr>
<tr>
<td>TS167</td>
<td>Traffic Operations Center Signal Subsystem Replacement</td>
<td>2014</td>
<td>$523,000</td>
<td>Project is ongoing.</td>
</tr>
<tr>
<td>TS168</td>
<td>Traffic Operations Center Video Wall Replacement</td>
<td>2015</td>
<td>$339,000</td>
<td>Consider adjusting this project to make video feed multicast and to provide more screens in individual offices rather than to replace the video wall.</td>
</tr>
<tr>
<td>TS169</td>
<td>Pecos Road Conduit Installation – EMF &amp; RWCD Crossing</td>
<td>2014</td>
<td>$129,000</td>
<td>Already completed – verify conduit during TS152 project implementation.</td>
</tr>
<tr>
<td>TS170</td>
<td>Adaptive Signal Control System – San Tan Village Mall</td>
<td>2014</td>
<td>$385,000</td>
<td>Delay project to fiscal year 2016 to give time for new central signal system (TS167) to be implemented and then evaluate if adaptive system is still needed.</td>
</tr>
</tbody>
</table>

E. Emerging Trends

The need for personnel support, integration, and interagency and interdepartmental coordination will not diminish with the introduction of emerging technology. TOC staffing and skills will need to be bolstered to support actively operating more infrastructure, more interconnectivity, and facilitate new relationships with other departments or other agencies not already happening.

Specific technologies that will be available for use by the Town in the future are difficult to identify beyond a five year horizon based on the continually evolving
nature of the technology industry. Examples of technology applications or uses that
the Town may find value in for the future include (list is intended to be technology-
neutral):

- Variable speed limits;
- Adaptive signal timing;
- Detector-based activation or preemption to signal timing plans at signalized
  intersections;
- Transit queue jumping or priority;
- Shared control/permissions with other agencies for regional corridor
  operations;
- Automated vehicle location for transit, emergency services, police/fire vehicles,
  and maintenance vehicles to be viewable by TOC to help manage corridors for
  response;
- Dedicated safety or traffic calming systems for school zones, hospitals, fire
  station locations, libraries, downtown, and other areas of the Town that
  experience heavy mixing of vehicular, pedestrian, bicyclist, and transit travelers;
  and
- Intelligent integration with infrastructure at, near, or related to the
  freeway/highway/arterial interchanges with Loop 202, SR-87 (Arizona Avenue),
  or Hunt Highway through the Town.

Newer initiatives like Connected Vehicles (vehicle-to-vehicle and vehicle-to-
infrastructure real-time communications on status of road conditions and congestion
conditions) and Integrated Corridor Management (ICM) are supported on a federal
level and are in constant development in terms of what those initiatives mean to the
state, county, and local agencies. ICM specifically is an important concept that the
Phoenix metropolitan region is pursuing through a few efforts and the Town of
Gilbert could benefit from preparation for implementation strategies that will relate
to enhanced arterial-freeway-transit-incident management coordination. ICM can be
used to support more effective traffic management during incidents and other non-
recurring events, but also can be used to better balance freeway/arterial capacity
during typical recurring traffic conditions. Multi-jurisdictional projects will continue to
be important for the Town to be involved in where the Town and another
neighboring agency collaborate on a joint goal to acquire funding or leverage
infrastructure/assets to better all agencies involved.
While the Town could leverage federal, state or local support for investing in enhancement to systems and integration, it is important to not forget how accessible private sector applications are to Gilbert’s traveling public. Agencies are allocating portions of server-space dedicated to allowing data to be used by private companies to be able to develop applications to support mobility, accessibility, and most importantly safety. Real-time road conditions or historical data could be of benefit to provide more accurate private sector use of that data. Public-private partnerships are also being leveraged in some areas of the country to support specific-application development for special event parking availability, or detour routing during incidents.

F. Recommendations

Below is a listing of recommended future projects or activities that the Town should consider to further help the Town achieve the vision for how ITS can benefit traffic operations for the traveling public and enhance communications capabilities between and within the various Town departments (ordered in terms of priority within each grouping):

- **Town ITS Strategic Plan:**
  - Develop an ITS Strategic Plan that includes device-specific and technology-specific master plans (CCTV, DMS, detection, wireless and fiber communications, bike/ped applications, central systems, traveler information dissemination systems, etc.);
  - Concepts/plans for use and sharing of the ITS components, data, and information; and
  - Communications master design (including outlining internet protocol (IP) addressing, fiber strand/splice mapping, wireless backhaul, and redundant ring connection layout mapping).

- **Fiber Optic Communications Network:**
  - Upgrade 48-fiber cables to 96-fiber cables in backbone rings to eliminate bottleneck in fiber capacity; and
  - Connect all Town buildings, well sites, and pump stations, as well as all ITS devices either directly or wirelessly, that are not connected as part of the aforementioned CIP projects.
- Traffic Signals:
  - Develop corridor and intersection operating guidelines and objectives
  - Connect traffic signals to the fiber network
  - Upgrade traffic signal controllers to newer versions for more operating options and to report performance measures
  - Provide advance detection at identified intersections for safety and operational benefits
  - Determine which signalized pedestrian crossings would operate more effectively as Pedestrian Hybrid Beacon crossings and convert them
  - Explore adaptive signal control and transit signal priority where a need is identified

- CCTV Cameras:
  - Coordinate with other Town departments to share video images as needed; and
  - Install a CCTV camera at every major intersection (arterial to arterial) in the Town that does not currently have one, as well as at high interest and congested areas such as downtown Gilbert, commercial corridors, hospitals, and high schools.

- Dynamic Message Sign:
  - Relocate existing DMS to face incoming traffic toward downtown area and connect DMS to fiber optic network so the DMS can be centrally controlled; and
  - Invest in Town-owned portable DMS that can be moved around for seasonal, incident, or event purposes.

- Regional Connectivity:
  - Share and request data from other agencies that may be beneficial to the Town’s operations such as:
    - Freeway incident notifications from the Arizona Department of Transportation (ADOT);
    - Arterial incident notifications from emergency responders;
    - Event coordination meetings and management with neighboring jurisdictions;
    - Arterial traveler information dissemination methods through social media, Town website, ADOT’s 511 system, or other outlets;
    - Support regional efforts to increase connectivity and redundancy in the regional communications network;
    - Continue participation in the MAG ITS Committee, AZTech, RADS and other regional initiatives to stay apprised of activities and potential funding/integration opportunities.
Chapter 9: ITS Element

- **Performance Measures:**
  - Define and implement ITS performance metrics for the Town’s ITS program. Ultimate metrics that are chosen should be tied directly to the Transportation Master Plan goals and should have data sets that can be queried to supply information, rather than needing to implement new methods of collecting data to support metrics. Examples of performance metrics that the Town could utilize include:
    - Limiting the percent increase in average arterial travel time to less than the percent increase in traffic volume – for arterials with ITS infrastructure only
    - Number of system or device failures reported and repaired
    - Percentage of uptime for ITS devices and fiber communications
    - Percent of unscheduled signal, CCTV, and fiber communications failures repaired within two business days after diagnosis
    - Number of incidents for which traffic signal timing changes occurred versus number of incidents
    - Number of notifications received from other agencies and other departments directly alerting to incidents, road conditions, or construction activities
    - Develop performance reporting methods (dashboard, report, newsletter, etc.) to display successes/challenges with the Town’s TOC

- **Traffic Operations Center:**
  - Improve remote accessibility to TOC systems and provide large monitors within existing workspaces of personnel that manage TOC systems to reduce the dependency on the TOC space.
  - Provide more staff coverage during work hours
  - Expand hours per day and/or days per week of coverage

- **Programming:**
  - Educate staff and elected officials on the benefits of ITS to gain support and recognition for ITS;
  - Develop CIP projects that implement the recommendations proposed herein;
  - Submit eligible projects to the MAG ITS Committee for potential inclusion in the MAG Transportation Improvement Program (TIP); and
  - Identify potential additional funding sources to support ITS capital, operations and maintenance.