DuPage County
Transportation Coordination Initiative (TCI)

FINAL
CONCEPT OF OPERATIONS

December 2006
<table>
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<th>Concept of Operations Issue No.</th>
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<td>1.0</td>
<td>December, 2006</td>
<td>Initial release</td>
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<tr>
<th>Acronym</th>
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<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
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<tr>
<td>AVL</td>
<td>Automatic Vehicle Location</td>
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<tr>
<td>CAD</td>
<td>Computer-Aided Dispatch</td>
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<td>CATS</td>
<td>Chicago Area Transportation Study</td>
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<tr>
<td>CCTV</td>
<td>Closed-Circuit Television</td>
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<tr>
<td>CMAQ</td>
<td>Congestion Mitigation and Air Quality (Improvement Program)</td>
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<tr>
<td>CMAP</td>
<td>Chicago Metropolitan Agency for Planning</td>
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<tr>
<td>CVO</td>
<td>Commercial Vehicle Operations</td>
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<td>DMMC</td>
<td>DuPage Mayors and Managers Conference</td>
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<tr>
<td>DMS</td>
<td>Dynamic Message Signs</td>
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<td>DOT</td>
<td>Division of Transportation</td>
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<tr>
<td>Du-COMM</td>
<td>DuPage Public Safety Communications</td>
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<tr>
<td>ESDA</td>
<td>Emergency Services and Disaster Agency</td>
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<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
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<tr>
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<td>Federal Railroad Administration</td>
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<tr>
<td>FTA</td>
<td>Federal Transit Administration</td>
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<tr>
<td>GCM Corridor</td>
<td>Gary-Chicago-Milwaukee ITS Priority Corridor</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>HAR</td>
<td>Highway Advisory Radio</td>
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<tr>
<td>HOV</td>
<td>High Occupancy Vehicle (lane)</td>
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<td>HRI</td>
<td>Highway Railroad Intersection</td>
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<td>IDOT</td>
<td>Illinois Department of Transportation</td>
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<td>IEMA</td>
<td>Illinois Emergency Management Agency</td>
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<td>IEPA</td>
<td>Illinois Environmental Protection Agency</td>
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<td>IFERN</td>
<td>Interagency Fire Emergency Radio Network</td>
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<td>IREACH</td>
<td>Illinois Radio Emergency Assistance Channel</td>
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<td>IRP</td>
<td>International Registration Plan</td>
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<td>ISP</td>
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<td>ISPERN</td>
<td>Illinois State Police Emergency Radio Network</td>
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<td>ISTHA</td>
<td>Illinois State Toll Highway Authority</td>
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<td>ITS</td>
<td>Intelligent Transportation Systems</td>
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<td>ITSPPO</td>
<td>Intelligent Transportation System Program Office</td>
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<td>Illinois Terrorism Task Force</td>
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<td>IWIN</td>
<td>Illinois Wireless Information Network</td>
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<td>LRTP</td>
<td>Long Range Transportation Plan</td>
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<td>MABAS</td>
<td>Mutual Aid Box Alarm System</td>
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<td>MDT</td>
<td>Mobile Data Terminal</td>
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<tr>
<td>MOE</td>
<td>Measures of Effectiveness</td>
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<td>MPO</td>
<td>Metropolitan Planning Organization</td>
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<td>NIMS</td>
<td>National Incident Management System</td>
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<td>NTCIP</td>
<td>National Transportation Communications for ITS Protocol</td>
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<td>PSAP</td>
<td>Public Safety Answering Point</td>
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<td>RTA</td>
<td>Regional Transportation Authority</td>
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<tr>
<td>RTIP</td>
<td>Regional Transit ITS Plan</td>
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*FINAL Concept of Operations  
DuPage County Transportation Coordination Initiative (TCI)*
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>SEDP</td>
<td>Strategic Early Deployment Plan</td>
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<td>SEOC</td>
<td>State Emergency Operations Center</td>
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<tr>
<td>STIP</td>
<td>Statewide Transportation Improvement Plan</td>
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<tr>
<td>TCI</td>
<td>Transportation Coordination Initiative</td>
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<tr>
<td>TIMS</td>
<td>Traffic and Incident Management System (Illinois Tollway), Train Information Management System (Metra)</td>
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<tr>
<td>TIP</td>
<td>Transportation Improvement Plan</td>
</tr>
<tr>
<td>TMC</td>
<td>Traffic Management Center</td>
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<tr>
<td>TSC</td>
<td>Traffic Systems Center</td>
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<td>USDOT</td>
<td>United States Department of Transportation</td>
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1. EXECUTIVE SUMMARY

1.1 Introduction

The DuPage County Transportation Coordination Initiative (TCI) Strategic Plan consists of the following documentation:

- **Concept of Operations technical memorandum** (which includes the stakeholder Needs Assessment technical memorandum)
- DuPage County Subregional ITS Architecture document
- Integration Strategies and Technologies technical memorandum
- Implementation Plan

This Concept of Operations document provides a review of existing conditions, a needs assessment, and an operational analysis of the four TCI focus areas:

- Arterial Operations
- Transit Management
- Traffic Incident Management
- Traveler Information

The DuPage County Transportation Coordination Initiative represents the efforts of numerous transportation stakeholders over a number of years to improve the operation and management of the transportation system in the County.

Intelligent transportation systems can be defined as “the integrated application of sensor, computer, electronics, and communications technologies and management strategies to provide traveler information to increase the safety and efficiency of the surface transportation system.” Or, simply put,

**People using technology in transportation to save time, lives, and money**

Before intelligent transportation systems can be effectively deployed, ITS stakeholders should come together to develop a common vision for ITS. This vision statement is a key component of the TCI Strategic Plan because it provides overall direction for the identification of stakeholder needs, operational concepts, potential ITS strategies and technologies, and ultimately the final recommendations. The TCI vision is:

*“Build a resilient, sustainable, technologically advanced, multi-modal transportation system that provides practical, safe, accessible and coordinated movement of people and goods throughout DuPage County and the region”*

As such, the Transportation Coordination Initiative is intended to provide recommendations for the deployment of ITS technologies and operational strategies in DuPage County that can maximize the capacity of the network. These deployments should:
• Improve traffic system performance and transit services
• Reduce travel times
• Enhance incident management and coordination
• Improve traveler information services throughout the County

1.2 Review of Existing Conditions

The transportation network in DuPage County consists of the roadway system (expressways/Tollways, arterials, collectors) and transit services such as Pace, paratransit, and Metra commuter rail.

Most of the local roads are owned by local townships and municipal highway departments. Sub-regional roads are owned and maintained by DuPage County, IDOT, and some of the larger municipalities. The Interstates that cross through the County fall under IDOT and Illinois State Toll Highway Authority (ISTHA) jurisdiction. In general, the County roadway network has a number of high capacity continuous east-west corridors, but few north-south corridors that traverse the entire County. While east-west travel demand has historically been higher, as DuPage County continues to serve as a regional employment hub workers will need to reach all areas of the County quickly and efficiently.

ITS elements are in place or planned for deployment across the County. Regional agencies like IDOT, ISTHA, and RTA are pioneers in the deployment of intelligent transportation systems. Even within DuPage County, partner agencies have deployed progressive examples of ITS in recent years, such as the 75th Street multi-jurisdictional traffic corridor and the City of Naperville’s Automated Rail Crossing Enforcement System (ARCES). The DuPage County Office of Homeland Security and Emergency Management (OHSEM) has also led the way, both regionally and nationally, in developing an integrated emergency communications system, EMnet.

1.3 Needs Assessment

To help develop TCI recommendations, extensive stakeholder outreach and research into past studies and related efforts was conducted to identify transportation issues in DuPage County.

Stakeholder outreach consisted of a stakeholder workshop and one-on-one stakeholder interviews. The following key agencies were interviewed as part of this process:

• City of Naperville Transportation, Engineering & Development (TED) Business Group
• Du-Comm
• DuPage County Division of Transportation
• DuPage County Office of Homeland Security and Emergency Management (OHSEM)
• DuPage County Sheriff
• DuPage Mayors and Managers Conference (DMMC)
• Glen Ellyn and Oak Brook Fire Departments (DuPage Fire Chiefs Association)
• IDOT District 1 Bureau of Traffic
• Illinois State Toll Highway Authority
• Naperville Police Department (DuPage Police Chiefs Association)
• Pace/Metra
• Regional Transportation Authority (RTA)
• Village of Lombard
• Village of Oak Brook

Findings from recent studies related to the TCI identify system deficiencies that will be addressed in the TCI recommendations. These include highway-rail intersections (HRI) with high crash rates, high collision potential, and the worst delay; corridors with the highest travel times; intersections with the lowest levels of service; high crash intersections, and transit shortcomings.

Overall, the following needs categories are defined for further consideration:

• Arterial Operational Efficiency
• Communications Infrastructure
• Data Management
• Integration of Systems
• Interagency Data Sharing
• Operational Coordination
• System Monitoring
• Transit Operations
• Traveler Information Sources

1.4 Arterial Operations

Arterial management systems manage traffic along arterial roadways, employing traffic detectors, traffic signals, emergency preemption devices, highway-rail intersection equipment, surveillance systems, and various means of communicating information to travelers and traffic managers. These systems ultimately make use of traffic surveillance information to smooth the flow of traffic along travel corridors and it is this traffic signal progression that prevents unnecessary delays for motorists. Dissemination of information about travel conditions via technologies such as dynamic message signs is yet another means to inform the users of the surface roadway of current conditions.

In order to manage arterial roadways, data collection and management systems are needed, so that signal timing plans can be developed. These timing plans typically coordinate signals at intersections within a traffic management subsystem. In a more advanced implementation, this same system can integrate traffic flow information to predict future traffic conditions, and assist in route planning.

Recommendations for arterial operations include the expansion of multi-jurisdictional traffic signal control, implementation of automated enforcement systems, improvements in system monitoring capabilities, formalization of individual centralized arterial operations, deployment of HRI monitoring systems, development of preplanned dynamic alternate routes, and expansion of Metra’s Parking Management Guidance System (PMGS) in DuPage County.
1.5 Traffic Incident Management

Traffic incident management (TIM) is the practice of mitigating the effects of conditions that are outside of the usual operations of the transportation system. These events can include crashes on highways, construction work zones, planned special events, or disaster response. These types of events all put strains on available capacity and transportation resources, whether for an hour’s duration or three months. TIM involves methods to help ease the impacts of congestion and safety concerns arising from these events. TIM emphasizes the need for improved incident management tools and techniques and better coordination between incident managers, to speed emergency detection, assessment, response, and clearance.

Recommendations for traffic incident management include development of preplanned dynamic alternate routes, development of communication flow diagrams, utilization of advanced crash site data collection tools, implementation of a Countywide standardized electronic crash reporting system, consideration of co-locating emergency operations and traffic operations, review of emergency and evacuation plans, deployment of HRI monitoring systems, entering into agreements with media outlets, installation of automated vehicle location (AVL) devices in fire engines, involving traffic and maintenance personnel in incident site traffic control, and expansion of the functionality available to emergency responders at traffic signal cabinet police panels.

1.6 Transit Management

Transit related ITS systems represent the next step in the evolution of the nation's fixed fleet and paratransit systems. Transit related ITS goals differ slightly from traditional highway and arterial systems. While highway ITS projects are focused on the safe and efficient movement of vehicles, transit initiatives extend a step further to consider transit rider accessibility, safety, and convenience.

Recommendations for transit management include expansion of deployment of transit signal priority, deployment of queue jumping, consideration of co-locating transit operations with traffic operations, bus rapid transit, using transit vehicles as probes, and implementation of guidelines for incorporating transit considerations into geometric roadway design.

1.7 Traveler Information and Data Management

Traveler information systems manage the dissemination of travel related information to the traveling public along the arterial roadways, freeways, transit routes, and elsewhere. This service group spans a host of operations from providing pre-trip planning information to disseminating traffic related information. This information dissemination can be in a variety of forms: from user-specific information provided on handheld devices to generic travel information broadcasts on dynamic message signs (DMS) and highway advisory radio (HAR).

Data management systems collect, process, archive, and distribute travel and traffic related data that supports traveler information systems. These operations can involve data covering a single transportation mode to broader, multimodal data from disparate data sources. These data sources
either disseminate the travel related information or distribute it to various agencies for their own operations.

Recommendations for traveler information and data management include establishing traffic data sharing and collection protocols, expansion of the DuPage County Web-based Traffic Accident System, building a central data clearinghouse of DuPage County transportation information, linking this central data clearinghouse with the GCM Gateway Hub and the Illinois Transit Hub, combining local infrastructure mapping data, entering into agreements with media outlets, publicizing traveler information, and expansion of Metra’s PGMS in DuPage County.

1.8 Integrating Management and Operations

For these improvements to be made, individual transportation management agencies need to develop interface points between their agencies and other partner agencies. This can be done by formalizing centralized management functionality for each partner agency. Each of these agencies then becomes a portal through which information can be exchanged, effectively creating a regional network built from local systems. The end results are operational improvements such as cross border traffic signal timing, coordinated incident response, and comprehensive traveler information systems.

This functionality may take many forms, depending on the individual requirements of the partner agency, such as a “bricks and mortar” traffic management center, a traffic manager workstation with full traffic management control for a given jurisdiction, or a “virtual” management center that provides distributed management functionality.

The DuPage County Sub-regional ITS Architecture document will further define these central management functions for partner agencies. The TCI Technology and Strategy Assessment document will then identify how this functionality might be implemented.
2. INTRODUCTION

The DuPage County Transportation Coordination Initiative (TCI) Strategic Plan consists of the following documentation:

- **Concept of Operations technical memorandum** (which includes the stakeholder Needs Assessment technical memorandum)
- DuPage County Subregional ITS Architecture document
- Integration Strategies and Technologies technical memorandum
- Implementation Plan

This Concept of Operations technical memorandum describes the manner in which transportation stakeholders in DuPage County interact to provide transportation services, and how intelligent transportation systems (ITS) tools can be applied to improve these services. This document represents the first steps in the systems engineering process, depicted below in Figure 1.

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2.1 The Transportation Coordination Initiative (TCI)

The DuPage County Transportation Coordination Initiative represents the efforts of numerous transportation stakeholders over a number of years to improve the operation and management of the transportation system in the County. The TCI builds upon work that began in the late 1990s with the development of the “Multi-Jurisdictional Signal Coordination and Monitoring Demonstration Project” and corresponding “Guidelines for the Implementation of Multi-Jurisdictional Signal Coordination and Monitoring.”

The TCI is led by a Steering Committee that consists of the following organizations/agencies:

- DuPage County Division of Transportation (DCDOT)
- DuPage Mayors and Managers Conference (DMMC)
- DuPage County Office of Homeland Security and Emergency Management (OHSEM)
- Illinois Department of Transportation (IDOT)
- Illinois State Toll Highway Authority (ISTHA)
- Regional Transportation Authority (RTA)
- Chicago Metropolitan Agency for Planning (CMAP)
- City of Naperville
- Village of Lombard
- Village of Oak Brook
- Village of Downers Grove

These agencies and many others have key roles in the development of the TCI Strategic Plan, including meeting participation, document review, and funding support.

The TCI is directed at four focus areas:

- **Arterial Operations** – improvements to local and regional traffic signal control and coordination, highway-rail intersection operations, and arterial-freeway link coordination
- **Transit Management** – improvements to transit efficiency and coordination with other transportation modes
- **Traffic Incident Management** – improvements to the detection, response, and resolution of planned and unplanned incidents on the transportation system
- **Traveler Information** – improvements to the collection, processing, and dissemination of timely, useful, and accurate traveler information

It is these four focus areas that serve as the basis for operational improvements as part of this document. Each focus area is discussed in greater detail in subsequent sections.

2.2 Definition of Intelligent Transportation Systems (ITS)

Intelligent transportation systems can be defined as “the integrated application of sensor, computer, electronics, and communications technologies and management strategies to...”
provide traveler information to increase the **safety and efficiency** of the surface transportation system.” Or, simply put,

*People using technology in transportation to save time, lives, and money*

The most visible ITS components are the physical infrastructure that interface with the traveling public. This “intelligent infrastructure” includes the following components:

- Arterial Management Systems
- Freeway Management Systems
- Transit Management Systems
- Incident Management Systems
- Emergency Management Systems
- Electronic Payment Systems
- Traveler Information
- Information Management
- Crash Prevention and Safety
- Roadway Operations and Maintenance
- Road Weather Management
- Commercial Vehicle Operations
- Intermodal Freight

In addition, emerging in-vehicle technologies are creating an “intelligent vehicle” initiative that includes the following components:

- Collision Avoidance Systems
- Collision Notification Systems
- Driver Assistance Systems

In order for these intelligent transportation systems to be most effective, they must work together in an integrated manner. This less visible integration component requires various wireline and wireless communications systems to support the exchange of data between management centers, personnel, vehicles, field devices, and the traveling public.

Before this level of integration can be realized and ITS can be deployed, transportation managers must identify a framework upon which ITS should be built. This framework should:

- Identify ITS goals and objectives – a concept of how ITS will be operated;
- The various stakeholders and systems that are involved;
- The transportation services that partner agencies perform or plan to perform;
- Individual functional requirements for deployment of ITS;
- Functional links between partner agencies and the data exchanged over those links;
- Applicable standards that apply to the exchange of information; and

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3–4 USDOT ITS Joint Program Office website – Technology Overview
• Any applicable or necessary agreements between partner agencies.

Acknowledging the need for this framework before deploying ITS, in 2001 the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) developed a rule/policy that requires regions that plan to deploy ITS to develop a regional ITS architecture in order to receive Federal funding for such projects. As a result, various ITS architectures have been developed across the state and the region to provide a framework for the planning, deployment, and operation of ITS in Illinois.

There are several proven benefits to the implementation of ITS systems. These benefits are typically measured by an increase in system capacity/throughput, cost savings, increased customer satisfaction, reductions in delay/travel time, reduced energy usage/environmental impacts, and improved safety. ITS projects often provide a high return on investment, some with cost-to-benefit ratios of 20:1 or more, partly because they leverage existing infrastructure, instead of creating more infrastructure that must then be maintained.

2.3 TCI Vision

Before intelligent transportation systems can be effectively deployed, ITS stakeholders should come together to develop a common vision for ITS. This vision statement is a key component of the TCI Strategic Plan because it provides overall direction for the identification of stakeholder needs, operational concepts, potential ITS strategies and technologies, and ultimately the final recommendations.

During the project kickoff meeting held on March 23, 2006, key transportation and public safety representatives worked together to develop a vision for ITS in DuPage County. During the visioning exercise, a number of key words and phrases were considered for inclusion in the vision statement. These are:

- Coordination
- Communication
- Cooperation
- Promote true intermodal choices
- Resilient systems
- Efficient
- Safety
- Integrated
- Maintain a broader perspective
- Reliable
- Secured system
- Multi-jurisdictional integration
- Effective
- Dynamic
- Responsive
- Maintainable/sustainable
- User friendly
- Include public awareness
- National Incident Management System (NIMS)-compliant
- Simple/affordable in structure
- State of the art
- Keep it simple
- Building institutional and technological bridges

The resulting vision statement is:
“Build a resilient, sustainable, technologically advanced, multi-modal transportation system that provides practical, safe, accessible and coordinated movement of people and goods throughout DuPage County and the region”

The vision statement is intended to serve as guidance for the planning and deployment of ITS in DuPage County for the next 10 years, and should be continually reevaluated to ensure that it accurately captures the needs and goals of travelers and transportation stakeholders in the region.

2.4 TCI Goals and Objectives

As traffic volumes and congestion grow, it has become evident that the physical infrastructure of the roadway system in DuPage County has a practical limit. As such, the Transportation Coordination Initiative is intended to provide recommendations for the deployment of ITS technologies and operational strategies in DuPage County that can maximize the capacity of the network. These deployments should:

- Improve traffic system performance and transit services – past studies in DuPage County have demonstrated that signal timing optimization and signal coordination can improve travel speeds and reduce delays.
- Reduce travel times – improvements to signal control systems in the last decade have kept average arterial travel times in DuPage County in check; these improvements will need to continue to keep pace with ever increasing traffic volumes.
- Enhance incident management and coordination – incidents account for at least half of non-recurring travel delay in urban areas\(^5\); improvements in traffic incident management (TIM) coordination between transportation agencies and emergency responders can result in reduced response times and thus reduced driver delay.
- Improve traveler information services throughout the county – through improved data collection, storage, processing, sharing, and dissemination, travelers in DuPage County can make better, more informed decisions.

Above all, recommendations resulting from the TCI should provide discrete objectives and actionable projects that will support these goals.

\(^5\) Traffic Incident Management on Highways, Rutgers University
3. REVIEW OF EXISTING CONDITIONS

DuPage County has an extensive transportation network that consists of different roadway types and modal options. Several agencies are responsible for the operation and maintenance of this network to help travelers reach their destinations safely and efficiently. However, high population growth and the expansion of employment opportunities in DuPage County have put a stress on the transportation system, resulting in significant traffic congestion – especially during peak periods. The following subsections provide a review of these existing conditions, as well as some of the projects that regional transportation agencies have deployed or are planning to deploy to address congestion.

3.1 The DuPage Transportation Network

The transportation network in DuPage County consists of the roadway system (Table 1) and transit services such as Pace, paratransit, and Metra commuter rail. Figure 2 depicts the DuPage County road network functional classifications in graphical format.

<table>
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<th>%</th>
<th>Lane-Miles by Class</th>
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<td>60.67</td>
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<td>64.12</td>
<td>6.93%</td>
<td>296.04</td>
<td>9.05%</td>
</tr>
<tr>
<td>II - Minor Arterials - Class B</td>
<td>272.49</td>
<td>29.44%</td>
<td>991.72</td>
<td>30.31%</td>
</tr>
<tr>
<td>III - Collector Streets</td>
<td>344.89</td>
<td>37.27%</td>
<td>755.76</td>
<td>23.10%</td>
</tr>
<tr>
<td>Total</td>
<td>925.50</td>
<td></td>
<td>3272.08</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 – DuPage County Roadway System Mileage by Functional Classification

In general, the County has a number of high capacity continuous east-west corridors (e.g., Army Trail Road, North Avenue/IL 64, Roosevelt Road/IL 38, Butterfield Road/IL 56, Warrenville Road, Interstate 88, Ogden Avenue/US 34, 75th Street), but few north-south corridors that traverse the entire County (e.g., IL 59, IL 53, Interstate 290/355, IL 83). While east-west travel demand has historically been higher, as DuPage County continues to serve as a regional employment hub workers will need to reach all areas of the County quickly and efficiently.

Over 40 agencies own and maintain roadways in DuPage County. Most of the local roads are owned by local townships and municipal highway departments. Sub-regional roads are owned and maintained by DuPage County, IDOT, and some of the larger municipalities. The Interstates that cross through the County fall under IDOT (I-55, and I-290) and Illinois State Toll Highway Authority (ISTHA) jurisdiction (I-88, I-355, and I-294). Table 2 provides a breakdown of the roadway jurisdictions and class.

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6 DuPage County Preliminary 2005 Comprehensive Road Improvement Plan

FINAL Concept of Operations
DuPage County Transportation Coordination Initiative (TCI)
Figure 2 – Functional Classifications of the DuPage County Road Network\textsuperscript{7}

\textsuperscript{7} DuPage County Preliminary 2005 Comprehensive Road Improvement Plan
Table 2 – Mileage of DuPage County Roads by Jurisdiction and Road Class

<table>
<thead>
<tr>
<th>JURIS</th>
<th>Principal Art or SRA</th>
<th>Minor Art-A</th>
<th>Minor Art-B</th>
<th>Collector</th>
<th>Expressway/ Tollway</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCDOT</td>
<td>36.60</td>
<td>42.29</td>
<td>132.70</td>
<td>8.00</td>
<td></td>
<td>219.60</td>
</tr>
<tr>
<td>IDOT</td>
<td>144.72</td>
<td>11.64</td>
<td>7.95</td>
<td>2.95</td>
<td>18.47</td>
<td>185.73</td>
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<tr>
<td>ISTHA</td>
<td>8.46</td>
<td>10.19</td>
<td>33.48</td>
<td>4.20</td>
<td></td>
<td>42.66</td>
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<tr>
<td>MUNI</td>
<td>2.00</td>
<td>64.12</td>
<td>272.49</td>
<td>34.69</td>
<td>60.67</td>
<td>925.50</td>
</tr>
<tr>
<td>Grand Total</td>
<td>193.31</td>
<td>64.12</td>
<td>272.49</td>
<td>34.69</td>
<td>60.67</td>
<td>925.50</td>
</tr>
</tbody>
</table>

*Does not include ramps; is the centerline of the highway.

3.1.1 TOLLWAY SYSTEM
As shown in Table 2, the Illinois State Toll Highway Authority operates and maintains the larger portion of limited access highways in DuPage County. To fulfill its mission of “providing and promoting a safe and efficient system of toll supported highways while ensuring the highest possible level of service to our customers,” the Illinois Tollway applies the following tools:

- **IPASS** – automatic vehicle identification/electronic toll collection (AVI/ETC) system at all mainline and ramp toll plazas, including new “Open Road Tolling” (ORT) locations
- **Highway Emergency Lane Patrol (H.E.L.P.) Trucks** – motorist assistance patrol vehicles that provide emergency assistance to disabled vehicles throughout the Tollway network
- **Traffic and Incident Management System (TIMS)** – ISTHA’s advanced traffic management system that coordinates operations at the Tollway’s Traffic Operations Center (TOC); linked to the Tollway’s GIS database; may be integrated with regional county/municipal traffic management systems in the future
- **Optical fiber network** – to link the TOC with field devices
- **Dynamic message signs** – to provide drivers with location-specific traveler information
- **CCTV cameras** – for traffic surveillance and incident management
- **Non-intrusive vehicle detectors** – Tollway and privately-owned detectors used to provide travel time estimates derived from spot speed measurements
- **Road weather information system (RWIS) stations** – to measure, collect, and distribute environmental condition information
- **Queue detection systems** – to adjust arterial signal timing and to warn drivers about roadway back-ups through the use of vehicle detectors, static signs, and flashing beacons

3.1.2 EXPRESSWAY SYSTEM
The remaining portion of limited access highways in DuPage County are under the jurisdiction of the Illinois Department of Transportation (IDOT). IDOT employs the following ITS technologies on its expressway system:

- **Emergency Traffic Patrol (ETP) Vehicles** – like the Tollway’s HELP Trucks, provide motorist assistance
- **District One ComCenter** – regional traffic operations center for IDOT expressways
• Traffic Systems Center (TSC) – regional traffic monitoring center for IDOT expressways
• Optical fiber network – to link the ComCenter and TSC with field devices
• Expressway vehicle detectors – intrusive and non-intrusive detectors used to collect count data and provide travel times from spot speed measurement
• Ramp meters/ramp gates – designed to regulate the flow of traffic entering the expressway system
• Dynamic message signs – to provide drivers with location-specific traveler information
• CCTV cameras – for traffic surveillance and incident management
• Road weather information system (RWIS) stations – to measure, collect, and distribute environmental condition information
• Highway Advisory Radio – dedicated radio frequencies that transmit location-specific traveler information, such as travel times, special event impacts, and parking information

3.1.3 Arterial System
As shown in Table 2, arterial and collector roads in DuPage County fall under the jurisdiction of numerous transportation agencies. From residential streets to multi-lane Strategic Regional Arterials (SRA), these routes make up 88% of roadways in DuPage County. These routes also are exhibiting ever-increasing levels of traffic congestion. To combat this congestion, arterial traffic management agencies utilize both traditional and non-traditional technologies, both of which are described in the subsections that follow.

Traffic Signal Systems
Traffic signals in DuPage County are owned and operated by various traffic agencies (e.g., IDOT, DCDOT, City of Naperville), depending on the jurisdiction of the particular roadway. When roads under two jurisdictions cross, maintenance and operational responsibility varies and is sometimes addressed through intergovernmental agreements. Many of these agencies also have agreements with private electrical contractors for the maintenance of traffic signals.

While many signals in DuPage County are isolated and operate on local control, others are interconnected, providing coordinated signal timings that promote improved traffic progression and reductions in travel times. DCDOT and the City of Naperville are able to monitor the operation of their traffic signals, create and implement signal timing plans, and perform system troubleshooting from a central computer on each system. Building on this capability, along the 75th Street corridor from Hill Drive to Wehrli Road, DCDOT and the City of Naperville have deployed a fiber optic communications link between adjacent closed loop signal systems, creating a multi-jurisdictional traffic signal system that could readily serve as a prototype for future deployments in DuPage County. Another prototype for cooperation was created when IDOT and Lake County forged an agreement to develop multi-agency traffic signal control from a central location. IDOT and Cook County are considering a similar type of agreement.

The Chicago Metropolitan Agency for Planning (CMAP) is currently leading a multi-agency effort to compile a regional GIS database of traffic signals that would include extensive information about each signal. CMAP is also developing an inventory of interconnected signals throughout the region.
Most traffic signals in DuPage County are equipped with emergency vehicle pre-emption (EVP) detectors. Emergency first responders across the County use this technology to arrive at incident scenes more quickly. EVP equipment at the intersection is maintained by the agency that maintains the signal, while the EVP transmitters in emergency vehicles are owned and maintained by local emergency management agencies (e.g., fire, EMS, and – in some instances – police).

Several traffic management agencies in DuPage County use video detection systems at actuated traffic signals. However, none of these agencies collect this data at a central management center.

**HIGHWAY-RAIL CROSSINGS**
DuPage County maintains a detailed database to house relevant information about highway-rail intersections (HRIs). This database catalogues HRI roadway information, railway information, crossing equipment, pedestrian crossing inventory, and land use information for use in planning HRI improvements. Many rail lines intersect high-volume arterials, as depicted in Figure 3, leading to safety issues and significant driver delay.

IDOT has jurisdiction over a number of HRI locations in DuPage County, and has developed guidelines and procedures for signal control at these intersections to preserve both safety and operational efficiency. IDOT is also talking with the Interstate Commerce Commission (ICC) and railroad companies to develop a “master brain” for HRIs that would join the operational logic of the railroad and highway control devices.

To improve safety at HRIs within its jurisdiction, the City of Naperville has implemented the Automated Railroad Crossing Enforcement System (ARCES). ARCES is an automated railroad crossing enforcement system located at the intersection of River Road and the Burlington Northern Santa Fe Railway. Cameras installed at the intersection record vehicles who are in violation of the warning signals of an approaching train. Citations for these traffic violations are processed via computer and sent to the violator. The program has been successful in reducing the number of crossing violations and in meeting federal railroad safety standards. Similar systems installed in the City of Wood Dale (Irving Park Road and Wood Dale Road) and the Village of Downers Grove (Fairview Avenue and the BNSF) have experienced similar success.

**ADDITIONAL TOOLS**
The following are additional tools that DuPage County agencies currently use, or are considering using, to monitor and manage traffic in DuPage County:

- **DuPage County Web-based Traffic Accident Record System** – DuPage County is sponsoring an initiative to bring traffic accident data from constituent municipalities, the DuPage Sheriff’s Office, and the DCDOT into one central traffic accident database
- **Dynamic Message Signs** – portable electronic message boards are used by DuPage agencies to provide information to the public regarding construction, special events, and traffic incidents (IDOT plans to deploy permanent arterial DMS in the near future)
- **Speed Signs** – fixed signs located in the Village of Downers Grove that use radar speed detection to post measured travel speeds to motorists.
- **Red Light-Running Enforcement** – similar to ARCES, this system would build on deployments in the City of Chicago to reduce red light-running associated crashes (Naperville plans to deploy such systems)
- **County and Regional Construction Advisories** – DuPage County, IDOT, the Village of Lombard, and other TCI partners actively post construction information on the Internet for regional motorists.
- **Parking Data Monitoring** – the Village of Downers Grove monitors parking levels at one Village-owned parking structure.

![Figure 3 - At-Grade Crossings in DuPage County with High Traffic Volumes](image)

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**DuPage County Highway Rail Crossing Internal Staff Report**

*FINAL Concept of Operations*

DuPage County Transportation Coordination Initiative (TCI)
3.1.4 Transit Infrastructure

At present there are three primary transit services in the region: general public bus service, paratransit service, and commuter rail. Each is discussed in detail below.

Suburban Bus Service

Pace Suburban Bus provides fixed route bus service on 65 routes in DuPage County. Most of these routes act as feeder service to Metra stations and are operated only during peak hours, with some connecting major employment centers with nearby Metra stations for the reverse commute. In addition, Pace has worked with Metra Commuter Rail to establish remote park-and-ride facilities within the City of Naperville that provide express bus service between the park & ride lots and a Metra train station.

To complement its existing route network, Pace is also looking at bus rapid transit (BRT) as a way to provide enhanced service to their ridership. Two corridors have been designated as potential BRT candidates: the “J Line” and Cermak Road (it should be noted that there are no immediate plans for BRT in DuPage County). The J Line consists of improvements along a corridor from Schaumburg to Aurora that would support high-speed transit movement. The transit corridor would include nine stops between the corridor termini that would coincide with retail centers, Metra rail stops, and transit hubs along the Connector Routes.

Similar to the J Line, a study is now underway to identify traffic management and operations (TM&O) improvements (including transit initiatives) for the Cook DuPage Corridor. This corridor is bounded by the Milwaukee District West rail line on the north, the BNSF rail line on the south, the western DuPage border on the west, and Cicero Avenue on the east. An example of these TM&O improvements could be bus shoulder running on highways (IL 83 is a potential test site). Under this approach, a transit vehicle is allowed to use the expressway shoulder and must maintain an agreed-upon speed until traffic clears and it can rejoin the main flow of traffic. Another TM&O example would be queue jumping, whereby a transit vehicle could bypass the queue at a signalized intersection to improve arrival time.

Over the years, Pace has made a significant investment in a variety of transit-related ITS infrastructure projects, such as the Siemens-based Automated Vehicle Locator (AVL) system, the Intelligent Bus System (IBS), and the Automated Passenger Counter (APC) System (25% of the fleet). Specific planned transit ITS improvements include the following:

- **Integration of fareboxes with mobile data terminals**: Data from fareboxes would be linked to provide load estimates for planning purposes.
- **Transit signal priority (TSP)**: There are six potential corridors for TSP in the County, including IL 59, IL 19, Cermak Road, the J Line route, and IL 83. Pace is currently conducting a feasibility and technology demonstration study of TSP on the Harvey corridor (in Cook County) to provide the basis for development of a regional specification for TSP that is IDOT approved and accepted. The project will instrument buses serving the corridor as well as upgrade and modify signal controllers along the corridor to enable priority. An evaluation with recommendations for other deployments will conclude the study’s efforts. It is anticipated that the technology to be used will be the 3M Opticom® system.
• **BusInfo:** This is part of the Regional Transportation Authority’s (RTA) initiative for better traveler information. This regional system networks CTA and Pace bus systems at the Illinois Transit Hub for dissemination on mobile devices, the Internet, and information displays such as kiosks and electronic signs. Some BusInfo displays show a countdown for the next vehicle of each route/direction serving that stop or station.

• **Intelligent Bus System (IBS) Upgrade:** Pace is planning a centralized dispatch computer system which will support physically distributed dispatchers. The IBS will include not only the dispatch system, but also AVL, on-board processors, audio and visual information display, and passenger counting. This system will provide bus schedule adherence data for driving Bus Info Signs. This includes the Pace Hub that will feed the Illinois Transit Hub (see ‘Regional Transportation Authority’ below).

• **Transit Management Center:** Pace has long-term plans for a new dispatching and transit management center and would like to co-locate their new facility with a surrounding county traffic management center.

In addition to Pace’s operations, the DuPage-Grove Shuttle provides fixed-route transit service for patrons in Downers Grove.

**Paratransit Services**

Pace, DuPage County, and other municipalities provide a subsidized dial-a-ride service for elderly residents, people with disabilities, and low-income persons. For a reduced fee, registered patrons can use these paratransit programs for travel anywhere in DuPage County; most trips are for medical appointments to government offices. Some low-income commuter paratransit services are funded through Job Access Reverse Commute (JARC) programs.

Pace ADA Paratransit Service operates in Addison, Bensenville, Bloomingdale Township, Downers Grove Township, Milton Township, and Wayne Township. Remaining areas are serviced by the “Ride DuPage” subsidized taxi and lift-equipped bus transportation program. Ride DuPage is provided by DuPage County and by the Naperville/Lisle Area Transportation Partners (in the Naperville/Lisle area) for income-eligible DuPage County residents. The program hopes to expand Countywide in the long term.

The Pace paratransit service fleet has GPS-enabled mobile data terminals and the same 800 MHz communications system as Pace buses.

**Metra Commuter Rail**

Metra operates three main railway lines which pass through DuPage County: the Burlington Northern/Santa Fe (BNSF), the Union Pacific West (UP-W) and the Milwaukee District West (MD-W). A fourth line, the Heritage Corridor (HC), passes through the southeastern periphery of the County. Current scheduling primarily serves the inbound Chicago market of suburban workers during peak hours, but trains operate in both directions throughout the day on a reduced schedule.

Metra has several ITS programs which could impact the DuPage Transportation Coordination Initiative:
• **Metra Consolidated Control Facility:** This is the focal point for management of Metra operated trains. It includes a computer-aided dispatch system for train operations, as well as facilities for contract provider representatives who coordinate with Metra dispatchers.

• **Metra Train Information Management System (TIMS):** The Metra TIMS system collects location and schedule adherence information from trains, primarily for passenger use. It uses GPS devices to monitor all trains. The TIMS also includes the Metra Hub that will feed the Illinois Transit Hub (see ‘Regional Transportation Authority’ below).

• **Metra Visual Paging System:** The Metra Visual Paging System currently displays service advisories and other information at Metra stations. In the future, it will be used to display real-time arrival and departure information.

• **Regional Rideshare Program:** This real-time, Internet-based system matches individuals with potential carpooling or vanpooling opportunities based on similar commutes to work. It is operated in conjunction with Artificial Intelligence Laboratory at University of Illinois at Chicago and can be accessed through [www.sharethedrive.org](http://www.sharethedrive.org).

**Regional Transportation Authority (RTA)**

As the umbrella organization for transit agencies in the region, the RTA has been heavily involved in ITS in the region for a number of years and has long been considered a national leader in transit ITS. Since the RTA serves as a research and funding mechanism for its service board members (CTA, Pace, and Metra), it primarily initiates ITS programs as pilot projects which its service boards then elect to adopt and put into action if the pilot is successful. The following is a brief overview of some of the more significant RTA ITS-related projects that could affect the DuPage TCI:

• **Transit Hub** – the signature ITS element for the RTA, the Transit Hub complements the Illinois Gateway in providing a clearinghouse for all transit-related traveler information. Continually upgraded, the Transit Hub is the engine that runs many of the transit related ITS applications in the region.

• **Interactive Kiosks** – combines destination information (“where people want to go”) provided by the Chicago Convention and Tourism Bureau with trip planning and transit information (“how to get there” on transit). Demonstration kiosks are available to the public at prime locations in the Chicago region. Currently, none are deployed in DuPage County, although the RTA, in conjunction with local businesses, have plans to deploy eight more in the suburbs (Harvey, Elgin, and Schaumburg have been selected to-date).

• **Trip Planner** – a web-based multi-modal trip planner. Extensive upgrades are underway and expected to be on-line by 2008.

• **Active Train Station Signs (ATSS)** – dynamic message signs (DMS) designed to provide next train information. This project is still in pilot phase, with demonstration sites in Cook County and at O’Hare and Midway Airports. The project is under evaluation for expansion into the remaining O’Hare terminals and is currently being integrated with the new CTA train tracking and public address systems. (BusInfo is the complimentary bus component of the ATSS project to provide next bus/train arrival information to the public.)

• **Parking Management Guidance System** – a demonstration project with Metra to provide real-time information about parking availability at the Hickory Creek and
Mokena train stations. Signs indicate parking availability and are placed on major arterials and Interstate highways to inform motorists of spaces available.

- **Regional Transportation Authority Travel Information Center (TIC)** – collects static route, schedule, and fare information from the three RTA service boards and uses it to provide information over the phone to travelers in the RTA six-county region. The TIC uses its Itinerary Planning System (IPS) to provide information to callers in the form of specific origin to destination trip plans. In the future, this may be enhanced by real-time data.

- **Regional Transportation Asset Management System (RTAMS)** – web-based tool that provides planning and financial information on the transportation system in Northeastern Illinois. RTAMS allows registered users to access transportation infrastructure data through an interactive map. This system extends beyond transit assets to include all transportation infrastructure in the region.

- **Miscellaneous ITS Projects** – Other projects include a supervisor wireless PDA project, TSP (see ‘Pace Suburban Bus’ above), and the Transit Operations Decision Support System (TODSS), a Pace demonstration project with the Federal Transit Administration to provide a decision support system to transit providers during incidents. The system is meant to be a catalyst for coordinated incident management.

### 3.1.5 Traffic Incident Management

Many agencies in DuPage County already coordinate and communicate with each other when responding to incidents, but more coordination and communication could be accomplished. There are a number of systems currently in place in the County to provide communications and facilitate coordinated action during traffic incidents and emergencies. These systems include both agency-specific and interoperable communications systems, operations and management centers, hazardous emergency simulation software, emergency vehicle preemption for vehicles (see Section 3.1.3 above), and incident and disaster response vehicles. Systems include:

**Incident/Emergency Communications**

- **STARCOM21 Satellite Radio System** – 800 MHz trunk system available to any emergency agency in DuPage County (and the State of Illinois)

- **Interagency Fire Emergency Radio Network (IFERN)** – a mutual aid dispatch and response frequency for all fire agencies in Illinois (including DuPage County)

- **Illinois Radio Emergency Assistance Channel (IREACH)** – radio system used for interagency communication

- **Illinois State Police Emergency Radio Network (ISPERN)** – radio system used for local agencies to coordinate with the State Police

- **EMnet** – a satellite-based system being deployed across Illinois and administered by the DuPage County Office of Homeland Security and Emergency Management. This is the primary emergency management network in DuPage County. It will also be expanded to selected private entities which may be involved in major emergency response.

- **DuPage County Emergency Radio Net (DCERN)** – a scrambled radio communication system, now secondary to EMnet

- **DuPage Interoperable Radio System (DIRS)** – common emergency frequency provided through fixed radios and repeaters. This system is managed by the DuPage County Sheriff.
- **MERCI** – ambulance-to-hospital radio communication frequencies
- **Chicago Transit Alert Network (CTAN)** - allows for the simultaneous transmission of major emergency information to transit agencies and hospitals

**CENTERS**
- **DuPage Emergency Operations Center (EOC)** – monitors fire radio across the County and contacts local police during incidents. Acts as a regional EOC for 15 counties in northeastern Illinois. Responds to any 3-alarm or higher events. Operated 24/7 by OHSEM.
- **Mobile Operating Center (MOC)** – DuPage County OHSEM operates one mobile command center and one public information center
- **Crisis Management Center (CMC)** – located at the OHSEM office, the CMC provides a control point for critical agencies to coordinate their actions during a major incident
- **Du-Comm** – the consolidated dispatch center for 12 municipal police departments and 15 fire departments/fire protection districts in eastern DuPage County
- **Municipal Public Safety Answering Points (PSAPs)** – perform emergency call-taking and dispatch for municipalities that are not part of Du-Comm
- **DuPage County Sheriff Communications Center** – performs emergency call-taking and dispatch for areas under County jurisdiction, including all cellular 911 calls in the County

**IN-VEHICLE SYSTEMS**
- **Emergency Vehicle Preemption (EVP)** – most signals in DuPage County currently have EVP detectors, and there are plans to have EVP at all signalized intersections. All fire and EMS vehicles have EVP transmitters; some police vehicles have EVP transmitters as well.
- **EVAC System** – certain municipal police departments (e.g., Oak Brook, Naperville) are beginning to use a system that allows officers in police vehicles to view interior video feeds from participating buildings (e.g., schools, hotels) during emergencies
- **Mobile Data Terminals (MDT)** – certain municipal emergency responders have in-vehicle devices to transmit and receive data from the dispatch center
- **Illinois Transportable Emergency Communications Systems (ITECS)** – portable, low power, tactical radio translators link disparate radio systems together during an emergency. DuPage OHSEM has one ITECS unit with a 50 foot tower and one with a 100 foot tower.
- **OHSEM Response Vehicles** – Trucks with field devices (DMS, arrow board signage, cones, barricades) for traffic control/diversion during emergencies

**OTHER SYSTEMS**
- **Mutual Aid Box Alarm System (MABAS) Agreements** – all fire departments in DuPage County and surrounding areas agree to assist other participants as needed
- **Computer-Aided Management of Emergency Operations (CAMEO)** – database for HAZMAT incident management at EOC and MOC
- **ALOHA** – plume modeling module used by EOC
- **Hazard Prediction and Assessment Capability (HPAC)** – software used by OHSEM to predict the effects of hazardous material releases
- **Critical Infrastructure Location Manager (CILM)** – GIS database of critical infrastructure in the county used by OHSEM
- **Critical Analysis Module (CAM)** – Internet tool used by OHSEM that uses CILM database to model areas affected by an incident to assist on-site incident management
- **Incident Tracking System/Disaster Management Information System (DMIS)** – MS Access database used by OHSEM for event and evacuee tracking

In addition to these systems, there are a number of miscellaneous existing and planned conditions relating to traffic incident management in DuPage County:

- The DuPage OHSEM has submitted a proposal to obtain more portable DMS, emergency detour signs, and a highway alert transmitter for use during incidents. This request also includes resources for more field personnel and incident management plans.
- Many first response agencies’ (such as fire and police) budgets have been reduced and are operating with fewer staff than several years ago.
- The DuPage OHSEM will be updating the DuPage County Evacuation Plan in 2006/2007 and will integrate it with the Chicago Evacuation Plan.
- DuPage OHSEM offers an on-site assistance program for emergency management training in the County. Four training projects are offered a year.
- DuPage OHSEM is considering deploying a new EOC, possibly at or near the DuPage Airport in coordination with the airport and the West Chicago Police Department.
- DuPage OHSEM has also had preliminary discussions with Argonne National Laboratory about the possibility of using a new transportation research facility developed by Argonne as an emergency management test bed.
- The Village of Downers Grove is developing an incident management plan and related resources to document incident management procedures for police, fire, and DPW personnel.

### 3.1.6 Traveler Information Systems

In addition to the numerous traveler information systems mentioned in previous sections (e.g., dynamic message signs, the Transit Hub, active transit station signs, parking management guidance system), traveler information is stored and distributed using systems described in the following subsections.

**Gary-Chicago-Milwaukee (GCM) Gateway Traveler Information System**

This is the primary data collection, storage, and distribution hub for the GCM ITS Priority Corridor (Figure 5). It provides a web-based and CORBA-based data distribution interface to authorized entities and the general public. It provides information about events (e.g., construction, special events, and incidents) and traffic (travel time and congestion level on freeways and tollways) though devices like DMS, detectors and HAR messages.
**511 TRAVELER INFORMATION**

511 is the designated telephone number for traveler information across the country. As of the writing of this document, there are 28 separate active applications of 511, both statewide systems and 511 for metropolitan areas. Illinois has received federal funding to design and deploy 511 traveler information across the state, and has recently issued a Request for Proposals (RFP) for a consultant to implement and operate the state’s 511 traveler information service. This system will be fed data by the GCM Gateway and the Illinois Statewide Hub.

**Figure 5 – GCM "Spider Diagram"**

### 3.2 TCI Stakeholders

A TCI stakeholder can be defined as any agency or organization in or around DuPage County that has resources on or linked to the transportation network. This fairly broad definition is applied to highlight interagency linkages, or interconnects, that make up the DuPage County Sub-regional ITS Architecture.

#### 3.2.1 TRANSPORTATION AGENCIES

These agencies provide various transportation related services like traffic control, traffic information collection and dissemination, toll collection, network surveillance, etc.

- City of Naperville Transportation Engineering and Development (TED) Business Group
- DuPage County Division of Transportation
- Other County Highway Departments (Cook, Kane, Will)
- Illinois Department of Transportation District 1 Bureau of Local Roads
- Illinois Department of Transportation District 1 Bureau of Electrical Operations
- Illinois Department of Transportation District 1 Bureau of Traffic
• Illinois Department of Transportation District 1 Bureau of Operations
• Illinois State Toll Highway Authority
• Municipal Divisions of Transportation/DPWs

3.2.2 TRANSIT AGENCIES
These agencies are responsible for providing various public transportation services like transit operation, transit vehicle maintenance, public travel security, multimodal coordination, traveler information, etc.

• AMTRAK
• DuPage County Division of Human Services
• Metra
• Pace
• Private Bus Agencies
• Private Taxi Companies
• Regional Transportation Authority
• Ride DuPage

3.2.3 PLANNING ORGANIZATIONS
These organizations are responsible for planning and development of transportation systems for the region. They also provide funding for various transportation-related projects in their regions.

• Chicago Metropolitan Agency for Planning (CMAP)
• DuPage County Division of Economic Development and Planning
• DuPage Mayors and Managers Conference
• Illinois Department of Transportation, ITS Program Office
• Regional Transportation Authority (RTA)

3.2.4 PUBLIC SAFETY AGENCIES
These agencies are responsible for providing emergency operations like traffic incident management, disaster response and evacuation, emergency notification and personal security, fire safety, and roadway patrols, etc., within their jurisdictions.

• DuPage County ETSB 9-1-1
• DuPage County Office of Homeland Security and Emergency Management
• DuPage County Sheriff’s Department
• Other County Sheriffs Departments (Cook, Kane, Will)
• Other County Emergency Services (Cook, Kane, Will)
• Illinois Emergency Management Agency
• Illinois Environmental Protection Agency
• Illinois State Police (Districts 2, 15)
• Municipal Police Departments
• Municipal Fire Agencies/Fire Protection Districts
• Private HazMat Agencies
• Private Towing Companies and Incident Clearance Contractors
3.2.5 **Emergency Medical Services**
These agencies respond to emergency calls and provide emergency medical services.

- DuPage County Hospitals/Medical Centers
- Municipal Fire Agencies/Fire Protection Districts
- Emergency Medical Services

3.2.6 **Construction and Maintenance Agencies**
These agencies are responsible for the construction and maintenance of the transportation infrastructure and other related activities in their regions.

- DuPage County Division of Transportation
- Other County Highway Departments
- Illinois Dept of Transportation District 1 Bureau of Construction
- Illinois Dept of Transportation District 1 Bureau of Maintenance
- Illinois State Toll Highway Authority
- Municipal Division of Transportation/DPW
- Private Sector Maintenance Contractor
- Private Towing Companies

3.2.7 **Other Agencies**
These agencies are responsible for various services like information dissemination, special events, research, etc.

- Argonne National Laboratory
- Chicago Airports
- DuPage County Department of Geographical Information Systems
- Illinois GIS Transportation Coalition
- Independent School Districts
- Media Outlets
- Private ISPs
- Private Parking Operators
- Private Weather Information Providers
- Rail Freight Operators
- Regional Event Organizations
- Utility Companies

3.3 **Related Efforts and Past Studies**
The following is a summary of related studies conducted by various regional transportation agencies that pertain to the DuPage County TCI.

3.3.1 **Chicago Metropolitan Agency for Planning (CMAP)**
The Chicago Metropolitan Agency for Planning (CMAP) is the metropolitan planning organization (MPO) for Northeastern Illinois. As such, CMAP is responsible for conducting the
urban transportation planning process in the region. The following are some CMAP project feasibility studies that pertain to DuPage County:

- **Transportation Management and Operations Planning and Implementation, 2006** – a study of multi-modal corridors and service areas, environmental activities, arterial management and security planning.\(^{11}\)
- **Travel Data Monitoring, 2006** – supporting and integrating travel data from various sources to identify trends.\(^{12}\)
- **Regional Traffic Signal Interconnect Inventory Update, 2006** – CMAP is leading an effort to document all linked traffic signals across the region. As part of a separate effort, CMAP is coordinating between different traffic management agencies in Northeastern Illinois to create an inventory of all regional traffic signals.
- **Northeastern Illinois ITS Deployment Plan Update, 2005** – completed in 2005, this document provides an inventory of planned ITS projects across the region, many of which are located in DuPage County.\(^{13}\)

### 3.3.2 Illinois Department of Transportation

In recent years, IDOT has conducted a series of transportation planning studies, of which the following relate to transportation management and operations:

- **Illinois Statewide ITS Architecture and Strategic Plan, 2006** – developed for use in transportation planning and project implementation for the entire state. This study, completed in 2006, also provides a starting point for the development of other regional and local ITS architectures.
- **Illinois Comprehensive Highway Safety Plan, 2005** – developed by the IDOT Division of Traffic Safety, this plan documents key safety challenges across the state and provides strategies to make the state’s highways safer.

### 3.3.3 Pace

As discussed above in Section 3.1.4, Pace has a number of planned ITS projects, some of which are described in the following documents:

- **Arterial Rapid Transit Concept Evaluation, 2005** – for the planning of transit systems management/operations for demand management.\(^{13}\)
- **Transit Signal Priority, 2006** – RTA along with its service board Pace are coordinating a TSP integration plan for deployment in the region. At present, various corridors are being identified for priority transit routes and assessment of operational impacts.

### 3.3.4 DuPage County (Division of Transportation, Economic Development and Planning Department)

The DuPage County Division of Transportation is responsible for construction and maintenance of county roads while the Economic Development and Planning Department is responsible for

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\(^{11}\) FY 2007 UWP Tier II Project Proposals  
\(^{12}\) FY 2007 UWP Tier II Project Proposals  
\(^{13}\) Northern Illinois ITS Deployment Plan Update, 2005
planning and financing various transportation related projects. Some of the important projects in the region are:

- **2005 Comprehensive Road Improvement Plan for Impact Fees** – an initiative to evaluate the DuPage County transportation infrastructure and to develop a program for distribution of road improvement impact fees within the County.
- **DuPage County Information Technology Assessment and Strategic Technology Plan Report, 2006** – developed to steer the long-term direction of technology in the region.
- **DuPage County Highway Rail Crossing Internal Staff Report, 2003** – identifies high crash HRI locations.
- **Regional Rail-Highway Grade Separation Implementation Plan** – develops a deployment plan for construction of highway-rail grade separations in order to enhance safety and mitigate congestion.
- **Staff Report on Travel Times on Major Arterials in DuPage County, 2004** – documents average travel times along primary arterial routes for comparison with historical values.
- **Countywide Synchro® Model** – analysis of intersection capacity across DuPage County

### 3.3.5 DuPage Mayors and Managers Conference (DMMC)

The DMMC Transportation Committee identifies and prioritizes transportation projects across the County to determine the most effective application of federal funds. Below are DMMC studies that have bearing on the TCI:

- **Feasibility Study for Multi-Jurisdictional Signal Timing and Monitoring in DuPage County, Illinois, 2001** – a feasibility study to analyze the effective application of inter-jurisdictional traffic signal coordination for the reduction of traffic congestion.
- **DuPage Area Transit Plan**\(^{14}\) – this study involves a transit needs assessment for DuPage County and recommends alternatives for meeting these requirements.

### 3.3.6 Regional Transportation Authority (RTA)

The RTA is the financial oversight and regional planning body for three public transit operators in northeastern Illinois: the CTA, Metra and Pace suburban bus.

- **Regional Transit ITS Plan (RTIP), 2002** – provides a vision and strategic plan for the deployment of various ITS transit initiatives.
- **Cook-DuPage Corridor Alternatives Analysis, 2006** – an initiative to explore and develop future transportation investments in this corridor for alleviating mobility problems.
- **Regional Transit Signal Priority Location Study, 2000** – study under development to implement a demonstration project to evaluate transit signal priority technologies and strategies. The Phase I and Phase II location studies have been completed and are available at [www.rtams.org](http://www.rtams.org). The RTA program is in the technology study phase with field demonstration projects under development by CTA and Pace.

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\(^{14}\)“DuPage Area Transit Plan 2020”. DuPage Mayors and Managers Conference in cooperation with DuPage County, October 2002
3.3.7 **CITY OF NAPERVILLE**

City of Naperville agencies, such as the Transportation Engineering and Development (TED) Business Group and the Police Department, have employed the use of ITS technologies for a number of years.

- **Naperville Intelligent Transportation Systems Plan, 2002** – an assessment of the current/planned ITS related projects in the City of Naperville along with their implementation status.
4. NEEDS ASSESSMENT

Before TCI recommendations can be developed, a needs assessment must be conducted to determine deficiencies and problem areas on the DuPage transportation network. This section details the results of the stakeholder outreach process and issues raised in the past studies and related efforts mentioned above in Section 2.3. These critical stakeholder needs will serve as the basis for the TCI recommendations.

4.1 Stakeholder Outreach

Input from project stakeholders is critical to the success of the TCI. To fully engage the different agencies and organizations that have a stake in the TCI, the Project Team conducted a project kickoff meeting, stakeholder workshop, and a series of one-on-one interviews with key stakeholders. The results of these outreach activities are described in Section 2.3 (TCI Vision), the appendices, and in the subsections below. In addition, a Traffic Incident Management (TIM) Work Group has been formed to bring together representatives from the transportation and emergency management areas to tackle problems related to traffic incidents in a coordinated manner. These outreach activities, as well as other tools like a project website and newsletter, have also provided a chance to keep stakeholders updated on the progress of the TCI project.

4.1.1 Stakeholder Workshops

TCI outreach activities began with a stakeholder workshop on April 27, 2006. During this workshop, the stakeholders were given an introduction to the key concepts of ITS followed by the goals and purpose of the TCI project. The stakeholders were then separated into breakout groups to discuss the key transportation challenges facing their agencies. These findings were aggregated and prioritized by the stakeholders in a group exercise. The issues that emerged from the stakeholder workshop have been listed below in Table 3 in order of their relative importance (grouped according to focus areas). These needs will be addressed further in Section 4.3.

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Identified Needs</th>
<th>Total Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Operations</td>
<td>Improve interagency coordination</td>
<td>28</td>
</tr>
<tr>
<td>Traveler Information</td>
<td>Better real-time traffic conditions</td>
<td>26</td>
</tr>
<tr>
<td>Arterial Operations</td>
<td>Reduce congestion (recurring, incidents)</td>
<td>23</td>
</tr>
<tr>
<td>Traffic Incident Management</td>
<td>Coordination between emergency and transportation agencies</td>
<td>18</td>
</tr>
<tr>
<td>Arterial Operations</td>
<td>Improve operations support</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>Provide interoperability between agencies</td>
<td>8</td>
</tr>
<tr>
<td>Traveler Information</td>
<td>Improve sharing of construction data (locations, durations)</td>
<td>7</td>
</tr>
<tr>
<td>Transit</td>
<td>Design for transit</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>Communications infrastructure</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>Increase public awareness</td>
<td>5</td>
</tr>
<tr>
<td>Transit</td>
<td>Improve transit access (station lots, park &amp; ride lots)</td>
<td>4</td>
</tr>
<tr>
<td>Traveler Information</td>
<td>Improved media coordination</td>
<td>2</td>
</tr>
<tr>
<td>Transit</td>
<td>Improve transit performance (on-time arrival, multi-modal transfers)</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 3 – Summary of Needs from DuPage TCI Stakeholder Workshop I
4.1.2 Stakeholder Interviews
Interviews were conducted with the representatives of various agencies in order to collect information about their inventory status, operations, and needs. In addition to the interview synopses below, notes from these interviews are found in Appendix A.

The following agencies were interviewed as part of the project outreach:

**City of Naperville Transportation, Engineering & Development (TED) Business Group**
The City of Naperville is focused on the implementation of ITS initiatives that will improve traffic flow on arterials, increase mobility through the use of transit, increase the collection of traffic data, and provide increased traveler information. Naperville recommended that the TCI consider leveraging existing and planned ITS deployments in its recommendations. The City of Naperville also noted the successes (and challenges) of developing multi-jurisdictional traffic signal systems like 75th Street.

**Du-Comm**
Du-Comm is concerned with the improvement of interagency communications (center-to-center and field-to-field) and how such improvements would support faster incident detection, response, and recovery. Table 4 below demonstrates the different emergency communications systems in place in DuPage, and how/when they are used.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Communications Type</th>
<th>Data Exchanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal Fire</td>
<td>Fireground, IFERN, MABAS, DIRS</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Municipal Police</td>
<td>Police channels, DIRS</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Illinois State Police</td>
<td>ISPERN, STARCOM21</td>
<td>Emergency info</td>
</tr>
<tr>
<td>DuPage County Sheriff</td>
<td>EMnet, DCERN, DIRS</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Other PSAPs</td>
<td>EMnet, DCERN</td>
<td>Emergency coordination</td>
</tr>
<tr>
<td>IDOT, ISTHA</td>
<td>Telephone line, IREACH</td>
<td>Traffic incident coordination</td>
</tr>
<tr>
<td>Hospitals</td>
<td>Telephone line (speed dial)</td>
<td>Emergency medical info</td>
</tr>
<tr>
<td>Municipal DPWs</td>
<td>Telephone line</td>
<td>Traffic incident coordination</td>
</tr>
<tr>
<td>DuPage Airport</td>
<td>Direct line</td>
<td>Emergency info</td>
</tr>
<tr>
<td>O’Hare, other airports</td>
<td>Telephone line (speed dial)</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Rail agencies</td>
<td>Telephone line (speed dial)</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Utilities</td>
<td>Telephone line (speed dial)</td>
<td>Emergency info</td>
</tr>
<tr>
<td>Towing companies</td>
<td>Telephone line (speed dial)</td>
<td>Traffic incident coordination</td>
</tr>
</tbody>
</table>

*Table 4 – DuPage County Emergency Communications Systems*
Du-Comm noted that interoperable radio systems will help responders communicate during an incident and incident command and control is critical to successful traffic incident management. While Unified Command techniques and directives have helped police and fire agencies to make strides in coordination and cooperation in the past five years, much still needs to be done.

Du-Comm would welcome additional data that might be provided by ITS technologies, but not if that data requires monitoring duties (e.g., watching traffic cameras). Du-Comm would prefer a scenario where Du-Comm is directed to data that is available to them that might help with emergency response.

**DuPage County Division of Transportation**

The DuPage County DOT identified a need for more system monitoring capabilities, traveler information distribution (construction data in particular), and traffic management resources. This will require improvements to the communications infrastructure, increased staffing levels, and increased coordination between agencies, at the planning level, deployment level, and operations level.

The County would like the TCI to help identify problem areas on the transportation network and determine recommended solutions to these problems. The County would like to get the “biggest bang for its buck” when implementing ITS (i.e., do not overbuild). This should be demonstrated through the use of performance measures defined before implementation and evaluated afterward. DuPage County DOT also acknowledges the need for different transportation agencies to coordinate their efforts, leverage funding, and share in the cost of implementing ITS elements.

**DuPage County Office of Homeland Security and Emergency Management**

The Office of Homeland Security and Emergency Management identified system monitoring enhancements as a critical issue. This includes video images of arterials and expressways in the County, road and lane closure status, highway-rail crossing blockages, and environmental monitoring. The OHSEM also acknowledged the potential for emergency and transportation agencies to co-locate management facilities to integrate operations and reduce costs. Above all, they see a need to improve communications between and within agencies in the County (emergency management, transportation, and beyond). Agencies need to know who to contact for a given scenario. GIS and traffic management tools need to be leveraged to give responders a ‘picture’ of the situation.

**DuPage County Sheriff**

The DuPage County Sheriff identified a series of issues that arise at incident sites. For instance, police and County Sheriff personnel are responsible for traffic control at incident sites. However, Sheriff personnel are currently unable to manually control traffic signals to preserve traffic flow. Also, like other emergency responders, the County Sheriff would like to have access to arterial video imaging for incident management.

**DuPage Mayors and Managers Conference (DMMC)**

The DMMC works with regional transportation agencies to identify, prioritize, develop, fund, and deploy transportation projects across the County. These projects, such as the J Line express
bus line and the Cook DuPage Corridor Study, are intended to address many of the goals of the TCI project.

**GLEN ELLYN AND OAK BROOK FIRE DEPARTMENTS (DUPAGE FIRE CHIEFS ASSOCIATION)**
Representing the DuPage Fire Chiefs Association, the Glen Ellyn Volunteer Fire Company and the Oak Brook Fire Department cited the need for better cooperation between police and fire agencies when planning for and responding to incidents. The fire chiefs also cited a need for more sophisticated tools for incident response, such as automatic vehicle location (AVL) and in-vehicle guidance systems.

**IDOT DISTRICT 1 BUREAU OF TRAFFIC**
The IDOT District 1 Bureau of Traffic is in a unique position to link expressway and arterial traffic management functions. As more and more real-time arterial system data becomes available and as interagency communication is improved (e.g., Lake County PASSAGE and the Schaumburg corridor in Cook County), IDOT and partner agencies will have the capability to significantly improve arterial operations, traffic incident management, transit operations, and traveler information. For instance, IDOT is considering deployment of centralized traffic signal control, which it is now using in Lake County as part of the PASSAGE program. Also in place as part of PASSAGE, pan-tilt-zoom (PTZ) cameras are installed along state routes to provide video images to IDOT, Bureau of Traffic (plans are in place to share this video with the IDOT ComCenter and Traffic Systems Center). This video could be shared with other local traffic management agencies to improve coordination of arterial and expressway traffic operations.

**ILLINOIS STATE TOLL HIGHWAY AUTHORITY**
As with the DuPage County DOT and IDOT, the Illinois Tollway is interested in improving the flow of traffic between arterials and expressways. In particular, Tollway ramps experience significant queues, with ramp traffic often backing up onto the mainline. Video image sharing was also cited as a way to improve traffic flow near expressways.

The Tollway noted that, because the agency does not have limited liability, it is apprehensive to lead any effort to develop expressway alternate routes. However, the Tollway noted the importance of alternate routes during incidents, and agreed to participate in the development of alternate routes if led by another agency.

The Tollway noted that communication and coordination are the keys to interagency operations. When lines of communication are in place, information sharing and coordinated operations can commence. This should be considered before implementing any technology-based systems.

**NAPERVILLE POLICE DEPARTMENT (DUPAGE POLICE CHIEFS ASSOCIATION)**
The Naperville Police (representing the DuPage County Police Chiefs Association) mentioned a number of issues related to incident detection and on-site incident management. Like the Fire Chiefs, the Naperville Police acknowledged the need for improved cooperation between police and fire agencies at incident sites. Faster crash data collection and more effective crash reporting were also cited as needs by the police chiefs.
PACE/METRA
Pace and Metra are concerned with transit rider mobility, and are currently deploying, testing, or developing a number of initiatives to address this need. Metra parking information systems, transit signal priority, bus rapid transit routes, and queue jumping are examples of Pace projects that will overlap the TCI effort. In addition, Pace would like to centralize its transit management functions, which could involve co-location with a county or municipal management center.

REGIONAL TRANSPORTATION AUTHORITY (RTA)
The RTA is focused on providing useful, timely, and accurate traveler information to its ridership. While the RTA service boards (Metra and Pace) are able to track their vehicles in real-time, there is a shortfall in the availability of arterial traffic conditions that have direct impact on transit operations.

VILLAGE OF DOWNERS GROVE
The Village of Downers Grove noted the general lack of funding for transportation projects and the importance of contact with the appropriate governmental agencies responsible for supporting transportation projects.

VILLAGE OF LOMBARD
The Village of Lombard expressed concern with the lack of capacity on north-south routes in the Village. For all routes, Lombard noted the adverse effects of incidents, uncoordinated traffic signals (especially inter-jurisdictional signal systems), and highway-rail crossings. The Village also identified the lack of a central repository for traffic and traveler information (e.g., construction schedules and locations) as a key issue for the TCI to address.

VILLAGE OF OAK BROOK
Like Lombard, the Village of Oak Brook noted a general lack of traffic information, especially construction information, in DuPage County. Oak Brook also stressed the importance of access for pedestrians, transit, and commercial activities.

In addition, Oak Brook also raised the issue of interagency coordination, in particular between IDOT and local municipalities, in the transportation planning process.

4.1.3 TRAFFIC INCIDENT MANAGEMENT (TIM) WORK GROUP
A Traffic Incident Management (TIM) Work Group is an informal group of emergency responder and transportation agency personnel who regularly collaborate in an effort to apply ITS solutions to problems created during highway incidents. ITS offers some new approaches to solving or at least mitigating some of the safety and efficiency challenges presented by highway incidents.

Preliminary findings from TIM Work Group meetings held on June 7th and September 13th, 2006 have been incorporated into the recommendations in the following sections.
4.2 Findings from Related Efforts and Past Studies

4.2.1 HIGHWAY RAIL INTERSECTIONS

A primary concern with highway rail crossings involves driver safety. Referenced in the DuPage County Highway Rail Crossing Internal Staff Report, the Federal Railroad Administration (FRA) hosts a website that offers safety history, collision records and collision prediction services and statistics. The FRA WBAPS (Web Accident Prediction System) ranks the likelihood of collisions at each of the crossings throughout DuPage County. As of October, 2003, based on the FRA predictive model (which uses total trains, average daily traffic, tracks, train speed and other ‘risk’ factors), the five highway-rail intersections with the highest collision probability in the County are:\footnote{DuPage County Highway Rail Crossing Internal Staff Report}

- Grace Street @ UP RR (Lombard)
- North Avenue @ CN RR (Villa Park)
- Belmont Road @ BNSF RR (Downers Grove)
- Fairview Ave @ BNSF RR (Downers Grove)
- River Road @ BNSF RR (Naperville)

These locations were predicted to have a crash rate of between 0.15 to 0.25 collisions per year. According to the study, DuPage County has 6 of the 50 most potentially hazardous locations in the state. Other crossings where collision rates exceed the predicted amount are:

- Haven Avenue @ UP RR (Elmhurst)
- Foster Avenue @ SOO RR (Bensenville)
- 18 other locations having one accident

In addition to safety, HRIs can cause significant driver delay (which, in turn, can lead to higher HRI crash rates). DuPage County experiences the fifth highest level of HRI delays in the state and exceeds most other counties in the number of motor vehicles delayed per day (only Cook County, with more than 300,000 vehicles delayed per day exceeds the 70,000 vehicles delayed in DuPage County\footnote{DuPage County Highway Rail Crossing Internal Staff Report}. However, while a large number of drivers encounter blocked rail crossings, they are not delayed as long at those crossings as compared to other counties. Using cumulative daily delay/average annual daily traffic (AADT) as a metric, the following HRIs experience the worst delay in DuPage County (minimum ADT of 10,000 vehicles):

- Cass Avenue @ BNSF (Westmont)
- Fairview Avenue @ BNSF (Downers Grove)
- Park Boulevard @ UP (Glen Ellyn)
- Belmont Avenue @ BNSF (Downers Grove)
- Main Street @ BNSF (Downers Grove)
- President Street @ UP (Wheaton)
- Winfield Road @ UP (Winfield)
- IL 38 @ UP (West Chicago)
4.2.2 **TRAVEL DEMAND MANAGEMENT**

**ROADWAY TRAVEL TIMES**
For monitoring the performance of the arterial street network in DuPage County, the DuPage County Economic Development and Planning Department conducts periodic analyses of travel times over high-volume corridors to determine deficiencies and makes recommendations for improvements. The most recent travel time study\(^\text{17}\), conducted in 2003-04, has found that overall travel times in the County had actually decreased slightly during peak periods between 1993 and 2003. This result is partly due to roadway widening projects, traffic signal optimization, and improved driver performance. However, the ability to add lanes and make significant signal timing improvements is lessening. Other tactics will be necessary to deal with the ever increasing traffic volumes in DuPage County. Corridors that showed poor performance during the 2003 travel time study are:

- 75\(^\text{th}\) Street (EB, WB) between Olympus Drive and Wherli Road, and between Lemont Road and Plainfield Road
- Army Trail Road (WB) between Glen Ellyn Road and County Farm Road
- IL 19 (Irving Park Road) (EB, WB) between IL 83 and Taft Avenue
- IL 38 West (Roosevelt Road) (EB) between Naperville Road and Summit Avenue
- IL 56 East (Butterfield Road) (EB) from Finley Road to Summit Avenue
- US 20 West (Lake Street) (WB) from County Farm Road to Green Brook Blvd (East, West) and from Mill Road to Villa Avenue
- US 34 (Ogden Avenue) (EB, WB) between Naper Boulevard and IL 59
- Roselle/Bloomingdale (SB) between N Brandon Drive and Army Trail Road
- Summit/Cass Avenue (NB, SB) between Plainfield Road and Ogden Avenue
- Finley/Belmont Road (NB) between 63\(^\text{rd}\) St. and Roosevelt Road
- IL 59 (SB) between 75\(^\text{th}\) Street and I-88
- Highland/Lemont Avenue (NB/SB) between 75\(^\text{th}\) St. and Roosevelt Road
- Naperville/Naper Road (NB) between Ogden Avenue and Roosevelt Road

In addition to the travel time studies, DuPage County has developed a countywide Synchro\(^\text{®}\) model to analyze the capacity and average amount of delay at intersections in the County. Table 5 shows the intersections that have been identified as having serious delays of more than 80 seconds per vehicle, equating to level of service (LOS) F (2005 conditions):

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Total Delay/Veh (sec)</th>
<th>LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora Avenue &amp; IL 59</td>
<td>117</td>
<td>F</td>
</tr>
<tr>
<td>IL 64 (North Avenue) &amp; Swift Road</td>
<td>107</td>
<td>F</td>
</tr>
<tr>
<td>US 20 (Lake Street) &amp; Addison Road</td>
<td>104</td>
<td>F</td>
</tr>
<tr>
<td>I-88 WB Ramp &amp; IL 59</td>
<td>104</td>
<td>F</td>
</tr>
<tr>
<td>Army Trail Road &amp; County Farm Road</td>
<td>98</td>
<td>F</td>
</tr>
</tbody>
</table>

\(^\text{17}\) Staff Report on Travel Times on Major Arterials in DuPage County
4.2.3 **CRASH HISTORY**
DuPage County is currently in the process of collecting crash data from agencies throughout the county for years 2004 and 2005. Based on the unofficial results of this crash inventory, the following intersections have exhibited the highest crash rates in the measured timeframe:\(^{19}\):

- IL 64/North Avenue and IL 59 (West Chicago)
- Highland Avenue and 31\(^{st}\) Street (Downers Grove)
- Bartlett Road and Schick Road (Bartlett)
- Army Trail Road and Bloomingdale Road (Glendale Heights)
- IL 59 and N. Aurora Road (Naperville)
- Swift Road and IL 64/North Avenue (Naperville)
- Winfield Road and IL 56/Butterfield Road (Warrenville)
- Stearns Road and IL 59 (Bartlett)
- 75\(^{th}\) Street and IL 83 (Willowbrook)

4.2.4 **PUBLIC TRANSPORTATION MANAGEMENT**
Some of the key findings for transit service in the region are:\(^{20}\):

- Limited transit service (both location and frequency)
- Pedestrian environment is inhospitable, especially for seniors
- More integrated service between buses and trains
- Demand for local circulators and regional connector service
- Accessible transit-station/bus-stops
- Need of Metra Lines for east-west travel in the County. This should be integrated with north-south transit service
- Increase coordinated transit information through the RTA
- More aggressive marketing of transit services in the region
- Transfer protection between buses and trains, and demand-responsive transit vehicles
- Scheduling improvements

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\(^{18}\) DuPage County Preliminary 2005 Comprehensive Road Improvement Plan
\(^{19}\) Interim Crash Data Results, DuPage County, 2007.
\(^{20}\)“DuPage Area Transit Plan 2020”. DuPage Mayors and Managers Conference in cooperation with DuPage County, October 2002
4.3 Conclusions

Needs identified by TCI stakeholders through project outreach and investigation of past efforts can be classified into the following nine needs categories:

- **Arterial Operational Efficiency** – provide methods to reduce the traffic congestion and travel time delay at key intersections
- **Communications Infrastructure** – improve communications links between different agencies, both center-to-center and center-to-field
- **Data Management** – develop resources for effective data collection and storage
- **Integration of Systems** – support interoperability and consolidation of management functions between different agencies
- **Interagency Data Sharing** – create methods and protocols for agencies to exchange pertinent, useful data across jurisdictional boundaries
- **Operational Coordination** – improve coordination between various agencies for effective utilization of resources – especially between transportation agencies, emergency services, and construction and maintenance agencies
- **System Monitoring** – enhance the surveillance capabilities of traffic and incident management agencies to reduce incident response times
- **Transit Operations** – improve the viability of transit use through the application of ITS technologies and arterial traffic management strategies
- **Traveler Information Sources** – increase the prevalence, attractiveness, and awareness of traveler information in DuPage County

Specific issues identified through this needs assessment are contained in Table 6. The table also includes notes about each need and the affected stakeholder(s) that would provide resources to address each listed issue. This list will serve as the basis for the technology and strategy assessment, as well as the final TCI recommendations.
Table 6 – Summary of Identified TCI Needs

<table>
<thead>
<tr>
<th>Needs Category</th>
<th>Identified Needs</th>
<th>Affected Stakeholder(s)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Operational Efficiency</td>
<td>Improve traffic progression along arterial routes, especially along north-south routes</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td>Transit signal priority (TSP) bus queue jumping, and express bus routes (bus rapid transit or BRT) projects under development</td>
</tr>
<tr>
<td></td>
<td>Improve transit operational efficiency</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW, Pace/Metra</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide method for emergency services to operate traffic control devices</td>
<td>Municipal Police Departments, DuPage County Sheriff</td>
<td>DuPage County project in planning stages</td>
</tr>
<tr>
<td></td>
<td>Reduce congestion caused by incidents</td>
<td>All transportation and emergency management agencies</td>
<td></td>
</tr>
<tr>
<td>Communications Infrastructure</td>
<td>Improve communications links between dispatch centers (e.g., emergency dispatch centers, traffic management centers, hospitals)</td>
<td>Du-Comm, Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, ISTHA, hospitals</td>
<td>Provide direct links between centers</td>
</tr>
<tr>
<td></td>
<td>Improve the communications infrastructure</td>
<td>All transportation and emergency management agencies</td>
<td></td>
</tr>
<tr>
<td>Data Management</td>
<td>Improve maintenance logging capabilities</td>
<td>DuPage County DOT, Municipal DOT/DPW</td>
<td>Real-time maintenance log linked to GIS database</td>
</tr>
<tr>
<td></td>
<td>Increase environmental road condition monitoring</td>
<td>DuPage County DOT, IDOT</td>
<td>Augment weather service data; help prepare for weather incidents and response</td>
</tr>
<tr>
<td></td>
<td>Enhance infrastructure inventory information (e.g., fire hydrant locations)</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td>Link inventory with GIS database</td>
</tr>
<tr>
<td></td>
<td>Improve response vehicle routing information</td>
<td>Du-Comm and other PSAPs, Municipal Police and Fire Departments, DuPage County Sheriff</td>
<td>In-vehicle computer mapping</td>
</tr>
<tr>
<td></td>
<td>Improve crash reporting, data storage</td>
<td>Municipal Police Departments, DuPage County Sheriff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhance crash site data collection capabilities</td>
<td>Municipal Police Departments, DuPage County Sheriff</td>
<td></td>
</tr>
<tr>
<td>Needs Category</td>
<td>Identified Needs</td>
<td>Affected Stakeholder(s)</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Data Management</td>
<td>Improve emergency dispatching information</td>
<td>Du-Comm and other PSAPs, Municipal Police and Fire Departments, DuPage County Sheriff</td>
<td>Address problems with the County coordinate system</td>
</tr>
<tr>
<td>(cont.)</td>
<td>Provide a central repository for Countywide traffic data</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide a central repository for Countywide construction data</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrate operations between different management centers</td>
<td>Du-Comm and other PSAPs, Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, ISTHA</td>
<td>Potential for co-location/consolidation of management functions across different agencies (e.g., traffic, transit, emergency management)</td>
</tr>
<tr>
<td></td>
<td>Provide interoperability between agencies</td>
<td>Du-Comm and other PSAPs, Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, ISTHA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide interagency video data sharing</td>
<td>Du-Comm, Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, ISTHA</td>
<td>Exchange of arterial and expressway video imaging to support traffic management, incident detection, incident response, disaster response and recovery, and maintenance operations</td>
</tr>
<tr>
<td></td>
<td>Improve lane closure data sharing</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop interagency data sharing protocols</td>
<td>All transportation and emergency management agencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improve on-scene coordination between emergency responders</td>
<td>Municipal Police and Fire Departments, DuPage County Sheriff</td>
<td></td>
</tr>
<tr>
<td>Operational Coordonation</td>
<td>Improve regional incident response coordination</td>
<td>Du-Comm and other PSAPs, Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, ISTHA</td>
<td>DuPage County evacuation plan to be revised</td>
</tr>
</tbody>
</table>

*FINAL* Concept of Operations  
DuPage County Transportation Coordination Initiative (TCI)
<table>
<thead>
<tr>
<th>Needs Category</th>
<th>Identified Needs</th>
<th>Affected Stakeholder(s)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Coordination</strong></td>
<td>Improve operational support between agencies at incident sites</td>
<td>Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td>Participation of transportation agencies at incidents for traffic control</td>
</tr>
<tr>
<td>(cont.)</td>
<td>Improve coordination between agencies, especially between emergency and transportation agencies</td>
<td>Municipal Police and Fire Departments, DuPage County Sheriff, DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improve operational coordination between arterials and expressways</td>
<td>DuPage Co. OHSEM, DuPage County DOT, IDOT - Traffic, ISTHA</td>
<td></td>
</tr>
<tr>
<td><strong>System Monitoring</strong></td>
<td>Provide real-time satellite imagery of incident sites</td>
<td>DuPage Co. OHSEM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhance traffic data collection, including video images of incident sites</td>
<td>DuPage County DOT, IDOT, ISTHA, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide notification of highway-rail intersection status</td>
<td>DuPage County DOT, Municipal DOT/DPW</td>
<td>For use in traffic management and emergency routing</td>
</tr>
<tr>
<td><strong>Transit Operations</strong></td>
<td>Improve bus routes to increase mobility</td>
<td>Municipal DOT/DPW, Pace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorporate transit requirements into geometric design</td>
<td>Municipal DOT/DPW, IDOT, Pace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improve transit access (e.g., park &amp; ride lots)</td>
<td>Municipal DOT/DPW, IDOT, Pace</td>
<td></td>
</tr>
<tr>
<td><strong>Traveler Information Sources</strong></td>
<td>Enhance the availability of real-time traveler information</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhance the availability of real-time transit information</td>
<td>RTA, DuPage County DOT, IDOT, Municipal DOT/DPW</td>
<td>Current RTA traveler information kiosk project underway</td>
</tr>
<tr>
<td></td>
<td>Improve coordination with media outlets</td>
<td>All transportation and emergency management agencies, media</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase public awareness of traveler information sources</td>
<td>All transportation and emergency management agencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhance parking information</td>
<td>DuPage County DOT, IDOT, Municipal DOT/DPW, Pace/Metra</td>
<td>Current Metra park &amp; ride parking guidance project project underway</td>
</tr>
</tbody>
</table>

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5. **ARTERIAL OPERATIONS**

5.1 **Description and Examples**

Arterial management systems manage traffic along arterial roadways, employing traffic detectors, traffic signals, emergency preemption devices, highway-rail intersection equipment, surveillance systems, and various means of communicating information to travelers and traffic managers. These systems ultimately make use of traffic surveillance information to smooth the flow of traffic along travel corridors and it is this traffic signal progression that prevents unnecessary delays for motorists. Dissemination of information about travel conditions via technologies such as dynamic message signs is yet another means to inform the users of the surface roadway about current conditions.

In order to manage arterial roadways, data collection and management systems are needed, so that signal timing plans can be developed. These timing plans typically coordinate signals at intersections within a traffic management subsystem. In a more advanced implementation, this same system can integrate traffic flow information to predict future traffic conditions, and assist in route planning.

Below is an example of an ITS application for arterial operations:

**Regional Traffic Control** – In suburban areas where jurisdictional boundaries often overlap, coordination between arterial traffic management agencies is critical. Since the flow of traffic does not end at these borders, arterial operations are a regional issue that must be addressed at the regional level. Along these lines, another important factor in the efficient movement of arterial traffic is coordination between arterial traffic managers and those agencies that operate freeways and transit services. Through the use of centralized advanced traffic management system (ATMS) software and communications infrastructure, multiple agencies can share control of each other’s traffic control devices to promote improved traffic flow. Coordination between these agencies enables faster and uninterrupted flow of traffic across multi-jurisdictions, thereby increasing the capacity and efficiency of the transportation network at a regional level.

5.2 **Relationship to TCI Vision**

The vision for the TCI is to “build a resilient, sustainable, technologically advanced, multi-modal transportation system that provides practical, safe, accessible and coordinated movement of people and goods throughout DuPage County and the region.” Improved arterial operations can support this vision by:

- Building a robust network that is more responsive to real-time traffic conditions
- Implementing advanced technologies to increase traveler safety
- Implementing a secure communications infrastructure that will support data collection and transfer
- Improving operational coordination between different transportation and emergency management partners
- Enhancing the quantity and effectiveness of system monitoring devices
- Integrating multimodal transportation operations
- Making optimal usage of the available resources to provide enhanced and cost efficient traveler services

5.3 Identification of Operational Issues

Northeastern Illinois is one of the five largest urban areas in the U.S., and it faces significant transportation challenges, including: worsening congestion, transportation delays, increased impacts from incidents, lack of arterial traveler information, and limited funding and resources.

To summarize the findings from Section 4, specific areas in which challenges have been identified for arterial management include:

- Poor traffic progression along arterial routes, especially north-south routes
- High crash rates at key intersections
- High congestion caused by incidents
- Poor communications links between dispatch centers
- Inadequate communications infrastructure
- Lack of operational integration between different management centers
- Lack of interoperability between agencies
- Lack of interagency video data sharing
- Poor operational coordination between arterials and expressways
- Limited traffic data collection, e.g., video images of incident sites
- Lack of highway-rail intersection status notification

As evident from this list, an underlying issue for arterial management is integration and communication. Integration is one of the factors in successful ITS deployment. An integrated system is often more effective than one in which all components function separately. This is particularly challenging in an environment where numerous agencies are responsible for portions of the roadway network in DuPage County. A communications infrastructure allowing multiple agencies to share real-time traffic operations information (and update signal plans accordingly) allows regional integration goals to be achieved.

5.4 Potential Benefits and Performance Measures

ITS strategies for improved arterial operations have a proven track record of success. The USDOT ITS Joint Program Office\(^{21}\) has published the following sample benefits for arterial management ITS deployments across the country:

- Field studies in several cities have shown that **adaptive signal control systems** can reduce delay 5-42%
- Model estimates showed **advanced traffic signal control systems** can reduce fuel consumption 2-13%
- **Automated enforcement of traffic signals** has reduced red-light violations 20-75%

\(^{21}\) [http://www.its.dot.gov/index.htm](http://www.its.dot.gov/index.htm)
• **Emergency vehicle preemption systems** reduced average emergency vehicle travel time by 16-23%.

A number of performance measurements can be used to evaluate the effectiveness of ITS arterial operations strategies that are deployed\(^\text{22}\):

- Average peak hour delay per vehicle at an intersection
- Average travel time variability
- Average peak hour travel speed
- Traffic accident frequency
- Traffic accident severity
- Response time for emergency vehicles traveling through a region
- Traffic capacity at an intersection (i.e., number of vehicles per hour crossing an intersection)

5.5 **ITS Services, Stakeholder Roles and Responsibilities**

5.5.1 **ITS SERVICES**

The National ITS Architecture defines a number of ITS services, or *market packages*, that support arterial operations. These 85 market packages describe how ITS systems work together to provide transportation services to the traveling public. The following subsections describe twenty market packages that relate to arterial operations in DuPage County:

**Network Surveillance (ATMS01)** - This market package includes traffic detectors and other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to a traffic management center. In DuPage County, this market package can be applied for monitoring road conditions, detecting incidents, and collecting other traffic related data for strategic planning. The collected data can also be used by information service providers for distribution to drivers. Many municipal agencies as well as the DuPage County DOT, ISTHA, and IDOT already use roadside equipment to monitor existing conditions.

**Probe Surveillance (ATMS02)** - This market package provides an alternative approach for surveillance of the roadway network using wide-area wireless or dedicated short range communications between the vehicle and the traffic management center. In DuPage County, this market package is used by the ISTHA for monitoring travel conditions on the tollways. It uses the vehicles that pass through successive toll-booths on the tollways to detect the traffic speed. Like the Network Surveillance market package, this market package can be used in DuPage County to monitor road conditions and identify incidents.

**Surface Street Control (ATMS03)** - This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. Some stakeholders in DuPage County currently have centralized traffic signal control, while others are considering this technology.

\(^{22}\) USDOT, ITS Evaluation Guidelines – ITS Evaluation Resource Guide
**Freeway Control (ATMS04)** This market package provides central monitoring and control, communications, and field equipment that support freeway management. It supports a range of freeway management control strategies including ramp metering, interchange metering, mainline lane controls, mainline metering, and other strategies including variable speed controls. IDOT and ISTHA have the technological capability for centralized monitoring and control of the freeways.

**Regional Traffic Control (ATMS07)** This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This market package advances the Surface Street Control and Freeway Control Market Packages by adding the communications links and integrated control strategies that enable integrated inter-jurisdictional traffic control. In DuPage County, the 75th Street corridor represents the only true example of regional traffic control using centralized systems. Other partner agencies use coordinated fixed timing plans to promote better traffic progression across jurisdictional boundaries.

**Traffic Forecast and Demand Management (ATMS09)** This market package includes advanced algorithms, processing and storage capabilities to assess and forecast the traffic demand over the roadways. The Argonne National Lab in DuPage County is actively involved in developing these algorithms which can be used for forecasting dynamic routing and road network performance.

**Electronic Toll Collection (ATMS10)** This market package provides toll operators with the ability to collect tolls electronically and detect and process violations. Dedicated short range communication between the roadway equipment and the vehicle is required as well as fixed-point to fixed-point interfaces between the toll collection equipment and transportation authorities and the financial infrastructure that supports fee collection. ISTHA employs I-Pass for electronic payment of the tolls. Cameras are deployed on tollbooths to detect and process violations.

**Emissions Monitoring and Management (ATMS11)** This market package monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The collected information is transmitted to the emissions management subsystem for processing. In DuPage County, this market package can be used to measure air quality, identify sectors as well as individual vehicles that do not comply with air quality standards.

**Standard Rail Grade Crossing (ATMS13)** This market package manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the cross-buck sign) and active warning systems (e.g., flashing lights and gates) are supported. This market package is applied across DuPage County for alleviating the high crash accident problem at many intersections.

**Advanced Railroad Grade Crossing (ATMS14)** This market package manages highway traffic at HRIs where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). This market package includes all capabilities from the Standard Railroad Grade Crossing market package and augments these with additional safety
features to mitigate the risks associated with higher rail speeds. This market package can be deployed in DuPage County at intersections with high crash rates and high operational speeds.

**Railroad Operations Coordination (ATMS15)** This market package provides an additional level of strategic coordination between freight rail operations and traffic management centers. This market package can be useful in alleviating the high delay and traffic disruption that is caused at HRI locations. Train arrival time and speed information could help to develop strategies for traffic control and traveler information.

**Parking Facility Management (ATMS16)** This market package provides enhanced monitoring and management of parking facilities. It assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees. This market package would support the collection of parking availability data to help motorists find parking in the municipal areas of DuPage County.

**Maintenance and Construction Vehicle and Equipment Tracking (MC01)** This market package will track the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. This market package can be used to improve maintenance and construction dispatching operations in DuPage County.

**Maintenance and Construction Vehicle Maintenance (MC02)** This market package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. In DuPage County, only IDOT has the capability of remotely monitoring the maintenance vehicles.

**Road Weather Data Collection (MC03)** This market package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. This information could be useful to transportation, transit, emergency, and maintenance management agencies in DuPage County.

**Weather Information Processing and Distribution (MC04)** This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package.

**Winter Maintenance (MC06)** This market package supports winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities. All maintenance agencies in DuPage County perform these activities during the winter months.

**Roadway Maintenance and Construction (MC07)** This market package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. DuPage County and all its municipal maintenance and construction agencies provide this service for efficient performance of their roadways.

**Work Zone Management (MC08)** This market package manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are
underway. Traffic conditions are monitored using CCTV cameras and controlled using dynamic message signs (DMS), highway advisory radio (HAR), gates, and barriers. In DuPage County, this market package can be applied for controlling traffic at work zone sites and avoiding the traffic disruption due to these activities. Some of the municipal maintenance and construction agencies currently deploy this equipment for managing the work zones.

**Maintenance and Construction Coordination (MC09)** This market package comprises of sharing of construction and maintenance activity information among different centers and utilizing it as part of their operations. Information can also be disseminated to Information Service Providers in order to provide information to travelers. Although this market package is not utilized in DuPage County, it has potential to significantly reduce traffic congestion in work-zone areas.

### 5.5.2 Stakeholder Roles and Responsibilities

In order to provide the ITS services listed above, a number of agencies will need to work together. For example, successful multi-jurisdictional traffic signal coordination projects involve individual traffic management centers that share information and traffic control strategies. Implementation of other ITS services, like alternate route operation, video sharing, and arterial-expressway traffic coordination will require the definition of roles and responsibilities for each participating agency. Table 7 lists some of these roles and responsibilities for current and planned arterial operations initiatives in DuPage County. For each role/responsibility, a status value is provided. Items described as ‘Existing’ are currently in place, those listed as ‘Planned’ are under development by the associated agency, and those shown as ‘Potential’ are under consideration as part of the Transportation Coordination Initiative.

**Table 7 – Stakeholders’ Roles and Responsibilities for Arterial Operations**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuPage County Division of Transportation</td>
<td>Install and operate traffic signals (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Install and operate ITS surface street devices to collect and disseminate data (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Monitor surface street system (local routes)</td>
<td>Planned</td>
</tr>
<tr>
<td></td>
<td>Coordinate resources for regional traffic control</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Maintain local routes including snow and ice control, pavement maintenance, and ITS devices.</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Construction</td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Traffic</td>
<td>Install and operate traffic signals (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Install and operate ITS surface street devices to collect and disseminate data (State routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Monitor surface street system (State routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Determine alternate routes for surface streets (state routes)</td>
<td>Existing</td>
</tr>
</tbody>
</table>

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### Stakeholder Roles and Responsibilities Status

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illinois Department of Transportation District 1 Bureau of Maintenance</strong></td>
<td>Maintain local routes including snow and ice control, pavement maintenance, and ITS devices.</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Illinois State Toll Highway Authority</strong></td>
<td>Maintain local routes including snow and ice control, pavement maintenance, and ITS devices.</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate resources for regional traffic control</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Municipalities</strong></td>
<td>Install and operate traffic signals (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Monitor surface street system (local routes)</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Maintain local routes including snow and ice control, pavement maintenance, and ITS devices.</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Maintain inventory of parking garages and surface lots</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide parking related information to assist drivers</td>
<td>Planned</td>
</tr>
<tr>
<td></td>
<td>Process parking transactions</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Private Parking Operators</strong></td>
<td>Maintain inventory of parking garages and surface lots</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Process parking transactions</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Private Sector Maintenance Contractor</strong></td>
<td>Maintain traffic signals and ITS devices.</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Private Weather Information Providers</strong></td>
<td>Provide road weather information to maintenance agencies</td>
<td>Existing</td>
</tr>
<tr>
<td><strong>Utility Companies</strong></td>
<td>Coordinate construction activities with other maintenance and construction agencies</td>
<td>Existing</td>
</tr>
</tbody>
</table>

### 5.6 Findings and Recommendations

In order to improve arterial operations in DuPage County, the following recommendations should be considered:

- Expand multi-jurisdictional traffic signal control on high-congestion routes (especially north-south routes) to provide an efficient means of achieving area-wide traffic coordination. This may require the implementation of centralized traffic signal control for certain partner agencies.
- Implement red-light running systems and highway-rail enforcement systems (e.g., Naperville’s ARCES) to reduce the frequency and severity of intersection crashes.
- Improve system monitoring capabilities on high-volume arterial routes (e.g., CCTV cameras, road-weather information systems). This may require enhancements to the
existing communications infrastructure and the development of centralized traffic management functionality.

- Formalize individual centralized arterial operations for each key traffic agency and provide linkages between agencies that share borders – both physical and operational (e.g., Naperville TED and DuPage County DOT, DuPage County DOT and ISTHA, Pace and DuPage County DOT). These interconnections will support interagency operations and data sharing.
- Deploy a highway-rail monitoring system to provide crossing status updates to traffic and emergency management agencies in the County that have HRI locations in their jurisdictions.
- Develop preplanned dynamic alternate routes for expressways and high incident locations on the arterial network.
- Expand Metra’s Parking Guidance System to include high-volume park & ride lots in DuPage County.
6. TRAFFIC INCIDENT MANAGEMENT

6.1 Description and Examples

Traffic incident management (TIM) is the practice of mitigating effects of conditions that are outside of the usual operations of the transportation system. These events can include crashes on highways, construction work zones, planned special events, or disaster response. These types of events all put strains on available capacity and transportation resources, whether for an hour’s duration or months at a time. TIM involves methods to help ease the impacts of congestion and safety concerns arising from these events. TIM emphasizes the need for improved incident management tools and techniques and better coordination between incident managers, to speed emergency detection, assessment, response, and clearance.

Below are some examples of ITS being used in Traffic Incident Management:

**Planned Special Events** – Special events that draw a large number of travelers to an area that usually does not handle that number of vehicles can cause congestion similar to an accident on a roadway. For example, after available resources are inventoried and staff are given training on the traffic management plan for the county fair, traffic signal timing on key routes near the event site can be modified in anticipation of the increased traffic flow. Portable DMS can be deployed to direct travelers to parking lots. CCTV cameras can be used to view traffic on highways with turnoffs to the fair and alert observers when there is an incident that can stop traffic.

**Vehicle Crash** – When a crash occurs on a roadway, law enforcement and sometimes fire department personnel are dispatched. At the scene of the crash they protect the safety of those involved first, closing lanes off so that vehicles do not interfere with the response and scene investigation. These closures can cause significant congestion and secondary accidents by drivers in unfamiliar conditions. ITS tools such as CCTV cameras, incident patrols, emergency vehicle preemption, and photogrammetry accident reconstruction equipment can help responders get to a crash site faster and more safely enabling them to clear the area faster.

**Construction Work Zones** – Work zones on roadways can close travel lanes or cause traffic detours for a limited time just as roadway accidents can. Portable DMS can be used in an area before construction to let drivers know of the planned construction and can be used during construction to give drivers information on the conditions and closures ahead. They can also be used in coordination with detectors to let drivers know when to merge based on queue length or warn them to stop because of slowed traffic ahead. CCTV cameras near the work zone provide data to nearby traffic management centers enabling them to monitor traffic near the work zones. Those images can be sent to the transportation agency website where travelers can view the traffic conditions helping them to determine their best route choices.

6.2 Relationship to TCI Vision

Traffic incident management enhancements facilitate safety and accessibility in DuPage County’s transportation network. By decreasing the response time to accident sites and increasing the effectiveness of response by providing responders with more timely information and coordinated actions, injury severity from traffic accidents and the number of secondary...
accidents can be reduced. By providing information to motorists, they can be routed around a problem area with minimal delay to their travel time.

6.3 Identification of Operational Issues

Most traffic incident management issues identified by stakeholders relate to communications and coordination between agencies. The major issues identified through stakeholder outreach were:

- Lack of methods for emergency services to operate traffic control devices
- Lack of environmental road condition monitoring
- Lack of infrastructure information (e.g., fire hydrant locations)
- Poor crash site data collection capabilities
- Ambiguous emergency dispatching information
- Lack of operational integration between different management centers
- Lack of interoperability between agencies
- Lack of interagency video data sharing
- Lack of road closure data sharing
- Limited on-scene coordination between emergency responders
- Limited regional incident response coordination
- Lack of operational support between agencies at incident sites
- Poor coordination between agencies, especially between emergency and transportation agencies
- Lack of real-time satellite imagery of incident sites

6.4 Potential Benefits and Performance Measures

Benefits of using ITS to enhance Traffic Incident Management in DuPage County include:

- Faster and more efficient response to incidents
- Reduction in the number of secondary accidents
- Reduction in number of fatalities from traffic accidents
- Reduction in travel delays from accidents and special events

There are a number of performance measures that can be used to measure how effective traffic incident management ITS strategies are and what level of benefit is being provided. These measures should be carefully defined so that both those gathering the information and reading the results are aware of what is being measured. TIM performance measures include:

- Number of incidents (by category, e.g., crash, construction, planned event)
- Incident response time
- Incident clearance time
- Number of secondary accidents
- Queue length (for work zones)
6.5 ITS Services, Stakeholder Roles and Responsibilities

6.5.1 ITS SERVICES

Based on the traffic incident management issues discussed above, the following ITS market packages have been identified as applicable to TIM in DuPage County:

**Traffic Incident Management System (ATMS08)** – This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market package includes incident detection capabilities through roadside surveillance devices and through regional coordination with other traffic management, maintenance and construction management, and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this market package to detect and verify incidents and implement an appropriate response. This service is provided in DuPage County by municipal police departments, municipal fire departments/emergency medical services, the DuPage County Sheriff, the DuPage County Office of Homeland Security and Emergency Management, public safety answering points (PSAPs) including consolidated PSAPs such as Du-Comm, towing agencies, hospitals, IDOT and ISTHA, and County and municipal traffic and maintenance management agencies.

**Emergency Call-Taking and Dispatch (EM01)** – This market package enhances basic public safety call-taking and dispatch services. It supports coordination between agencies through shared emergency notification. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Wide area wireless communications support dispatch and provision of information to responding personnel. The primary participants of this market package are the different PSAPs in DuPage County, as well as the emergency services that they dispatch. Increased data sharing and integration between agencies that respond to incidents and emergencies, including those stakeholders that act in support roles, can enhance this market package. Sharing of images and weather data from IDOT expressway and ISTHA toll routes with fire and police agencies during incidents would also help them to determine the resources appropriate for response.

**Emergency Routing (EM02)** – This market package supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). Emergency management agencies provide the routing for the emergency fleet based on real-time conditions and have the option of requesting a route from traffic management agencies. The emergency vehicle may also be equipped with dedicated short range communications for local signal preemption. The service provides for information exchange between care facilities and both the emergency management centers and emergency vehicles. Already in place in the County, this market package could be enhanced by supporting installation of AVL systems by fire departments and districts in the County. These AVL systems would help dispatchers route response vehicles more efficiently and track resources during incidents and disasters. Another application is installing in-vehicle data terminals in fire and police vehicles to assist with routing and also to provide responders with data they need to help make the response more effective.
Mayday and Alarms Support (EM03) - This market package allows the users to request emergency assistance and enables the Emergency Management agencies to locate the incident site and dispatch appropriate assistance. Within DuPage County, several traffic and transit management agencies monitor the roadway and public areas (e.g. parking lots) to improve the security within these areas.

Roadway Service Patrol (EM04) - This market package supports roadway service patrol vehicles that monitor roads and aid travelers, assist in accidents and relay the information to the dispatch centers. Incident information collected by roadway patrol vehicles is shared with traffic, maintenance and construction and traveler information systems. ISTHA actively utilizes this market package for enhancing their operations.

Wide-Area Alert (EM06) - This market package supports dissemination of emergency/disaster information to the traveling public through traveler information systems (e.g. DMS, HAR etc.) The designated emergency service agencies broadcast the emergency information to various traffic agencies, transit agencies and information service providers for disseminating the relevant information along with suggestive course of action. Various agencies in DuPage County utilize this market package for broadcasting information to the traveling public through their existing infrastructure.

Disaster Response and Recovery (EM08) – The market package builds off basic traffic incident response services and addresses disaster situations with additional complexity. It identifies the key points of integration between transportation systems and the public safety, emergency management, and other organizations that respond to disasters. This market package supports coordination of emergency response plans and activities, including general plans as well as specific tactical plans. It provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself, and supports the tracking and coordination of transportation resources that support disaster response. The DuPage County OHSEM is leading a multi-agency effort to update the DuPage County Evacuation Plan, which supports this market package. Annual training exercises will reinforce the components of the Evacuation Plan.

Evacuation and Reentry Management (EM09) - This market package supports evacuation of the public from disaster areas and manages their reentry to the disaster areas. This involves coordination of evacuation plans and resource sharing among various agencies (e.g. law enforcement, emergency, transportation, transit etc.) within the affected jurisdictions. Although this market package is not yet employed at the municipal level, it would be recommended as a future option within DuPage County.

6.5.2 Stakeholder Roles and Responsibilities
Traffic incident management involves a number of transportation, maintenance, and emergency management partners. Clearly defined roles and responsibilities, such as those contained in Table 8, will help to improve incident detection, reduce response time, increase safety and traffic flow at incident sites, and speed incident clearance.
<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Media Outlets</td>
<td>Distribute incident notification to public</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Division of Transportation</td>
<td>Monitor traffic to detect incidents</td>
<td>Potential</td>
</tr>
<tr>
<td>DuPage County Hospitals/Medical Centers</td>
<td>Provide emergency medical services</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Sheriff</td>
<td>Receive and process emergency calls</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Establish incident command (County routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Create incident reports</td>
<td>Existing</td>
</tr>
<tr>
<td>Emergency Traffic Management Group</td>
<td>Distribute incident notification to other system users</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate emergency response activities between agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Other County Highway Departments</td>
<td>Respond to incidents</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate resources for incident response</td>
<td>Existing</td>
</tr>
<tr>
<td>Other County Sheriff Departments</td>
<td>Receive and process emergency calls</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Electrical Operations</td>
<td>Monitor traffic to detect incidents</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Maintenance</td>
<td>Coordinate incident site cleanup (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Traffic</td>
<td>Monitor traffic to detect incidents (State routes)</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Implement signal timing modifications during incidents</td>
<td>Potential</td>
</tr>
<tr>
<td>Illinois Department of Transportation ITS Program Office</td>
<td>Collect regional incident information</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois State Police District 15</td>
<td>Receive and process emergency calls</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Establish incident command (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Create incident reports</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois State Police District 2</td>
<td>Receive and process emergency calls</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents (state routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Establish incident command (state)</td>
<td>Existing</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Roles and Responsibilities</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Illinois State Toll Highway Authority</td>
<td>Create incident reports (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Monitor traffic to detect incidents (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic control at incident sites (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate incident site cleanup (Tollway routes)</td>
<td>Existing</td>
</tr>
<tr>
<td>Media Outlets</td>
<td>Distribute incident notification to public</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Receive and process emergency calls</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Respond to incidents</td>
<td>Existing</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Provide traffic control at incident sites (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate incident site cleanup (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Create incident reports (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide emergency medical services at incidents (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Establish incident command (local routes)</td>
<td>Existing</td>
</tr>
<tr>
<td>Private Towing Companies</td>
<td>Respond to incidents</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate incident site cleanup</td>
<td>Existing</td>
</tr>
<tr>
<td>Regional Event Organizations</td>
<td>Provide event information to emergency service agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Regional Transportation Authority</td>
<td>Detect incidents</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide incident information to emergency services</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Distribute incident information to travelers</td>
<td>Existing</td>
</tr>
</tbody>
</table>

### 6.6 Findings and Recommendations

The most pressing issue for traffic incident management is increasing the communications and cooperation between agencies responding to incidents and agencies providing assistance to them. There are already a number of communication systems used by agencies and new systems are being implemented to enable communication between agencies. More effort must be made to facilitate incident response and support agencies to work together in the field. This can be accomplished by involving more agencies in the DuPage County OHSEM training exercises so representatives from different agencies are aware of what other agencies will do during an incident, see how they operate, and what they need to perform their tasks. By meeting in training scenarios, agency representatives are able to communicate outside of emergency situations, and form more effective working relationships.
The county should also hold a multi-agency training of the National Incident Management System (NIMS) by the Illinois Emergency Management Agency (IEMA). This course should have a transportation focus in order to attract transportation operations staff and explore how they fit into the incident command structure.

Additional activities to enhance coordination between stakeholders for traffic incident management are:

- Promote interagency and inter-disciplinary training for incident management. Involve traffic and maintenance personnel in incident site traffic control.
- Develop preplanned dynamic alternate routes for expressways and high incident locations on the arterial network.
- Provide notification systems between expressway and arterial management centers.
- Develop and annually review communication flow diagrams to determine if the appropriate personnel are being contacted with incident information or data. These diagrams would also help agencies to review whether they can improve coordination of operational activities.
- Utilize advanced crash site data collection tools to speed crash investigation and cleanup.
- Implement a Countywide standardized electronic crash reporting system that will leverage the existing DuPage County Web-based Traffic Accident System.
- Consider co-locating emergency operations with traffic operations. This could be done by implementing a joint management center with DuPage County DOT and OHSEM staff. In the interim, establish communications links between emergency and traffic agencies to support data sharing (e.g., CCTV video).
- Deploy a highway-rail monitoring system to provide crossing status updates to traffic and emergency management agencies in the County that have HRI locations in their jurisdictions.
- Review emergency and evacuation plans to analyze opportunities for streamlined emergency communications.
- Enter into agreements with media outlets to allow them to collect incident information while not inhibiting incident response, e.g., media helicopter operation at an incident site.
- Install automated vehicle location (AVL) devices in fire engines to assist dispatchers in guiding vehicles to an incident in the most efficient manner. This also assists dispatchers in keeping track of resources during an emergency.
- Expand the functionality available to emergency responders at traffic signal cabinet police panels.
7. TRANSIT MANAGEMENT

7.1 Description and Examples

Transit related ITS systems represent the next step in the evolution of the nation's fixed fleet and paratransit systems. Transit related ITS goals differ slightly from traditional highway and arterial system and include:

- Increase productivity
- Optimize schedules
- Increase communication
- Reduce costs
- Enhance the experience of the customers by making it easier, faster and more convenient to use transit

Some of the most common examples of transit ITS related projects include:

**Computer Aided Dispatch/Advanced Vehicle Location** – CAD/AVL systems equip a dispatcher with a computer system that presents graphical representations of all vehicle locations and schedule performance – all associated with service area street maps. Through the use of on-board computers and text based messaging, the vehicle operators can more efficiently communicate their status while still having an option to switch over to voice communications.

**Web Based Itinerary Planner** – Web based itinerary planners provide a tool for transit travelers to access route, schedule and transit information from any internet connection. The feature allows customers to customize their itinerary and print any trip related information. It is important to note that web based itinerary planners are many times a key element of larger scale Advanced Traveler Information Systems (ATIS)deployments.

**Fare Management** – A wide variety of electronic based fare technologies all designed to make fare payment more convenient for the transit user and financial management of fare revenues more secure and efficient for the transit agency. Electronic fare media, which includes smart cards, stored value cards, and credit cards, utilizes an embedded chip on a card to store and process information.

**Transit Signal Priority** – This ITS technology initiative centers on the simple idea of giving special treatment to transit vehicles at signalized intersections. In essence, vehicles and signal controllers are equipped with technology that forces a traffic signal to be held green (or made green earlier than scheduled) so that a bus may pass through an intersection more quickly.

7.2 Relationship to TCI Vision

The vision for the TCI is to “build a resilient, sustainable, technologically advanced, multi-modal transportation system that provides practical, safe, accessible and coordinated movement of people and goods throughout DuPage County and the region.” Improved transit operations can support this vision by leveraging advanced systems and telecommunications technology to achieve three primary goals:
• Improving enterprise productivity of its current operations,
• Distributing the transportation demand across different modes, and
• Providing enhanced service to the customer.

Although potential transit ITS applications are not as numerous as highway- and arterial-centric systems, they provide a critical component to achieving the TCI’s goal of the coordinated movement of people throughout DuPage and the region.

7.3 Identification of Operational Issues

Within DuPage County, population growth, urban sprawl, and an aging infrastructure are taking a toll on the surface transportation system. These and a host of other factors are reducing mobility, inhibiting improvements in safety and security, contributing significantly to environmental damage and energy waste, and eroding the operational efficiency of both public and commercial carriers. Bringing these global problems into finer focus, one sees the human dimension, in particular, the frustrations of transit customers in communities across the country who must contend with service that is unreliable, inflexible, difficult to access, or without accommodations for riders with various disabilities.

These challenges present transit authorities around the nation with new hurdles to providing a wide range of both fixed route and paratransit modal alternatives to the automobile, while operating under more constrained fiscal environments. The demand for paratransit services also are projected to increase significantly as the majority of the US population ages.

Specific areas in which challenges have been identified for the TCI in terms of transit management operations include:

• Lack of operational integration between different management centers
• Lack of interoperability between agencies
• Limited transit operational efficiency
• Lack of bus routes
• Lack of accommodations for transit requirements in geometric design
• Lack of transit access (e.g., park & ride lots)

7.4 Potential Benefits and Performance Measures

The most common transit ITS projects involve the deployment of advanced vehicle tracking, dispatching, and scheduling systems which are currently deployed in DuPage County by Pace. Revolutionary advances in vehicle dispatching/tracking and telecommunications translate into real public benefits: safer, more reliable, more responsive and more accessible service. These improvements are only part of a much larger technology deployment picture, which ultimately will encompass a variety of subsystems designed to:

• Make bus travel easier for all passengers, including those with hearing and vision disabilities;
• Reduce traffic congestion and increase on-time performance;
• Provide timely and comprehensive transit information through kiosks and variable-message signs installed not only in transit centers and park & ride locations but at the convention centers, hotels, arenas, shopping malls and office buildings throughout the region;
• Make complete schedules and a host of itinerary-planning features available through websites and other Internet-enabled mobile devices; and
• Facilitate integration of a transit agency’s operations into a regional transportation network covering all modes of surface travel across all jurisdictions.

Some benefits of these transit related ITS technologies are already being realized around the nation. These benefits can be measured using the following metrics:

- Ridership totals
- On-time performance rating
- Transit connection frequency
- Number of transit rider injuries
- Customer satisfaction

Such projects leverage ITS technologies to enhance operational capabilities to meet ever-increasing demands on the transit system, while at the same time maximizing a transit authority’s technology investment, to assure that this investment is measurably enhancing its core business—transit ridership.

### 7.5 ITS Services, Stakeholder Roles and Responsibilities

#### 7.5.1 ITS Services

Of the 85 market packages defined in the National ITS Architecture, the following seven market packages are related to transit management operations in DuPage County:

**Transit Vehicle Tracking (APTS1)** - This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the transit management center is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The transit management center processes this information, updates the transit schedule and makes real-time schedule information available to an Information Service Provider. In DuPage County, this market package is performed by Pace and their Siemens AVL system, described in Section 3.1.4, which provides real-time location of their fixed fleet.

**Transit Fixed-Route Operations (APTS2)** - This market package performs vehicle routing and scheduling, as well as automatic operator assignment and system monitoring for fixed-route and flexible-route transit services. This service determines current schedule performance using AVL
data and provides information displays at the transit management center. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g., rail, air) to provide the public with integrated and personalized dynamic schedules. In DuPage County this market package is performed by Pace and their Siemens AVL system described above.

**Demand Response Transit Operations (APTS3)** - This market package performs vehicle routing and scheduling as well as automatic operator assignment and monitoring for demand responsive transit services. In addition, this market package performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The transit management center provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider. The ISP may either be operated by a transit management center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler. In DuPage County, this market package is performed by Pace and their Mentors AVL system described in Section 3.1.4, which provides real-time location of their fixed fleet.

**Transit Passenger and Fare Management (APTS4)** - This market package supports electronic fare payments and passenger loading using on-board electronic equipment and payment devices (e.g., traveler card etc.). The information collected by the on-board systems is also communicated with transit management centers for monitoring their operations. Pace actively uses this market package on its’ intelligent bus systems.

**Transit Security (APTS5)** - This market package facilitates physical security of transit vehicles and passengers with the help of on-board surveillance equipment (e.g., CCTV cameras) and event recorders. Public areas (e.g. transit stops, stations etc.) are also monitored using similar equipment and are activated by security alarms. In DuPage County, Metra, Pace and municipal transit agencies deploy this market package to enhance transit security (with a future option of sharing the surveillance data with municipal TMCs to enhance their operations).

**Multi-modal Coordination (APTS7)** - This market package establishes two-way communications between multiple transit and traffic agencies to improve service coordination. Multimodal coordination between transit agencies can increase traveler convenience at transit transfer points and clusters (a collection of stops, stations, or terminals where transfers can be made conveniently) and also improve operating efficiency. Transit transfer information is shared between multimodal transportation service providers, transit agencies, and ISPs. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network. More limited local coordination between the transit vehicle and the individual intersection for signal priority is also supported by this package. In DuPage County.
County this market package is represented by Pace’s efforts to implement transit signal priority along the key corridors mentioned in Section 3.1.4.

**Transit Traveler Information (APTS8)** - This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package. In DuPage County, this market package is represented by RTA’s the web-based transit trip planner (available via handheld devices on www.RTAmobile.com) and by RTA’s interactive kiosks. Although there are no current plans for locating any kiosks in DuPage County, the RTA is working with various site managers/developers for the next round of kiosk deployments and locations in DuPage County could become candidates. This market package also includes the RTA’s parking variable message sign demonstration project with Metra’s and Pace’s plans to provide bus tracking services online.

### 7.5.2 Stakeholder Roles and Responsibilities

Transit ITS initiatives require coordinated actions from transit and traffic management agencies. For TSP projects, various agencies must work together with Pace to ensure that TSP can be implemented within DuPage County across multiple jurisdictions. For multi-modal traveler and transit traveler information, the RTA and DuPage County must work together to develop kiosk locations and content. Potential parking management systems will involve Metra, Pace, and local municipalities to be successful. Table 9 describes some of the roles and responsibilities of DuPage County agencies in regard to transit operations.

#### Table 9 – Stakeholders’ Roles and Responsibilities for Transit Operations

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amtrak</td>
<td>Provide passenger rail service for the region</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Division of Human Services</td>
<td>Provide paratransit service for DuPage County</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Division of Transportation</td>
<td>Support transit signal priority</td>
<td>Potential</td>
</tr>
<tr>
<td>Independent School Districts</td>
<td>Provide fixed route bus services for school districts in DuPage County</td>
<td>Existing</td>
</tr>
<tr>
<td>Metra</td>
<td>Provide commuter rail service for the region</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Install and operate ITS transit devices</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect and disseminate transit data</td>
<td>Existing</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Support fixed route bus services for DuPage County</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Support transit signal priority</td>
<td>Planned</td>
</tr>
<tr>
<td>Pace</td>
<td>Provide fixed route bus service for the region</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Install and operate ITS transit devices</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect and disseminate transit data</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Coordinate Transit Ride Matching Program</td>
<td>Existing</td>
</tr>
<tr>
<td>Private Bus Agencies</td>
<td>Provide fixed route bus services for the region</td>
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</tr>
<tr>
<td>Private Taxi Companies</td>
<td>Provide taxi services for the region</td>
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</tr>
<tr>
<td>Regional Transportation</td>
<td>Provide itinerary planning facilities to users</td>
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</table>
### Stakeholder Roles and Responsibilities Status

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Authority</td>
<td>Collect and disseminate transit data</td>
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</tr>
<tr>
<td></td>
<td>Provide regional transit traveler information</td>
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</tr>
<tr>
<td></td>
<td>Support deployment of transit ITS technologies</td>
<td>Existing</td>
</tr>
</tbody>
</table>

#### 7.6 Findings and Recommendations

Clearly transit signal priority is the greatest opportunity for ITS coordination between traffic agencies in DuPage County and Pace, the primary transit agency in the County. Some issues to consider include existing signal system functionality and current emergency signal preemption technology.

In summary, the following are a list of recommendations to improve transit operations in DuPage County:

- Expand deployment of transit signal priority to high transit volume corridors to improve traveler throughput.
- Deploy queue jumping components at high congestion intersections.
- Expand transit traveler information sources and awareness.
- Consider co-locating transit operations with traffic operations. This could be done by implementing a joint management center with DuPage County DOT and Pace.
- Implement guidelines for incorporating transit considerations into geometric roadway design (e.g., far-side stops, pull-out areas, queue jumping features).
8. TRAVELER INFORMATION AND DATA MANAGEMENT

8.1 Description and Examples

Traveler information systems manage the dissemination of travel related information to the traveling public along the arterial roadways, freeways, transit routes, and elsewhere. This service group spans a host of operations from providing pre-trip planning information to disseminating traffic related information. This information dissemination can be in a variety of forms: from user-specific information provided on handheld devices to generic travel information broadcasts on dynamic message signs (DMS) and highway advisory radio (HAR).

Data management systems collect, process, archive, and distribute travel and traffic related data that supports traveler information systems. These operations can involve data covering a single transportation mode to broader, multimodal data from disparate data sources. These data sources either disseminate the travel related information or distribute it to various agencies for their own operations.

Below are examples of ITS being deployed to manage data and provide traveler information:

**Gary-Chicago-Milwaukee Gateway** – Using system monitoring tools like vehicle detectors, CCTV cameras, and ISTHA toll tag readers, as well as incident and construction reports, the various regional transportation management agencies collect and transfer expressway travel data to the GCM Gateway Hub for aggregation and formatting. This data is then used to populate traveler information outlets like the GCM Travel website (www.gcmtravel.com).

**Iltrafficalert.com** – A free service through the Illinois Department of Transportation, Iltrafficalert.com allows users to register for customized alerts via email, cell phone text messaging, or other mobile devices. As with the GCM Travel website, this service is supported by traffic data collected on the IDOT and Illinois Tollway expressway systems.

**Illinois Transit Hub** – Mirroring the GCM Gateway Hub, the Illinois Transit Hub acts as a central clearinghouse for transit-related data across the Chicago region. Data obtained from Metra/AMTRAK, the Chicago Transit Authority, the RTA, and Pace is then aggregated and formatted for different transit information sources, such as the RTA transit kiosks.

**www.RTAmobile.com** – Transit riders can access this mobile trip planner service using web-enabled cell phones and personal digital assistants.

8.2 Relationship to TCI Vision

Traveler information systems facilitate the sharing of traveler information among agencies and the traveling public. It can support the TCI vision by:

- Improving the methods for collecting traffic data and reporting incidents
- Developing centralized data stores where partner agencies can exchange information and fuel traveler information sources
- Increasing the availability and public awareness of traveler information sources
8.3 Identification of Issues

As described in Section 4, a number of stakeholder needs have been identified that relate to data management and traveler information:

- Limited maintenance logging capabilities
- Lack of environmental road condition monitoring
- Lack of infrastructure information (e.g., fire hydrant locations)
- Limited response vehicle routing information
- Poor crash reporting and crash data storage methods
- Lack of a central repository for Countywide traffic data
- Lack of a central repository for Countywide construction data
- Lack of road closure data sharing
- Lack of interagency data sharing protocols
- Limited availability of real-time traveler information
- Limited availability of real-time transit information
- Poor coordination with media outlets
- Poor public awareness of traveler information sources
- Lack of parking information

8.4 Potential Benefits and Performance Measures

In many ways, providing traveler information to motorists and transit riders is the greatest benefit of ITS. The following are examples of the many potential benefits to using ITS to enhance the traveler information system in DuPage County:

- Greater information access to travelers which can aid in decision-making
- Improved traveler safety due to a reduction in secondary crashes
- Improved traveler mobility
- Reduction of traffic congestion and pollution
- Increased travel speed
- Increased capacity of highways/arterial roadways
- Greater traveler satisfaction

8.5 ITS Services, Stakeholder Roles and Responsibilities

8.5.1 ITS SERVICES

Of the various services, or market packages defined in the National ITS Architecture, the following are related to traveler information in DuPage County:

**Broadcast Traveler Information (ATISI)** - This market package collects the various travel related information (e.g. travel time speed, toll and parking information, incident information etc.) and broadly disseminates it to the traveling public. IDOT, ISTHA, Metra, Pace, and the media are the primary participants in this market package.
**Interactive Traveler Information (ATIS2)** This market package supports real time and tailored user specific travel related information. Various devices may be used to provide this information to the travelers prior to their trip or en-route including phone (e.g., IDOT’s forthcoming 511 Traveler Information System), kiosks (e.g., RTA Transit Information Kiosks), and mobile device alerts (e.g., IDOT’s [www.iltrafficalert.com](http://www.iltrafficalert.com) service).

**ISP Based Trip Planning and Route Guidance (ATIS5)** - This market package generates a multimodal route, trip plan and associated service information (e.g. parking information) based on traveler constraints and provides this information for trip planning and en-route guidance. Routes may be based on static or real-time travel conditions. This service also supports additional functionalities of reserving and processing the financial transactions for the trip plans that are confirmed by the travelers. The RTA’s Trip Planner service is an example of this market package.

**Dynamic Ridesharing (ATIS8)** – This market package provides ridesharing/ride-matching services to travelers on a near real-time basis. It also includes connecting the ridesharing reservations with other multimodal services. While not real-time, IDOT’s “Share the Drive” campaign relates to this market package.

**Traffic Information Dissemination (ATMS06)** - This market package provides driver related information (e.g. traffic and road conditions, incident information and driver advisories) at specific locations on the road network through roadside equipments like DMS or advisory radio. This service also includes the link between traffic management centers and media for providing traffic information. A link to a maintenance and construction center can provide real-time road closure status information due to maintenance and construction activities. IDOT, ISTHA, DuPage County, and municipal traffic and maintenance agencies that have DMS participate in this market package.

**Transit Traveler Information (APTS8)** – See Section 7.5.1 above.

**ITS Data Mart (AD1)** - This market package provides a focused archive of data collected and owned by a single organization. The data is usually related to a single mode of transportation and jurisdictional boundary. Basic data quality, data privacy and meta-data standards are kept. This also provides general query and report access to the archive data. DuPage County and most municipal traffic agencies in DuPage County collect and store historical traffic data, while IDOT and the Illinois Tollway collect and store real-time data.

**ITS Data Warehouse (AD2)** – This market package build upon the ITS Data Mart services and adds enhanced capabilities of collecting and archiving data from different agencies and multi-jurisdictional boundaries. It also provides capabilities of meta-data transformation and management which are required for storing the data from varied sources in a single repository with consistent formats. It also supports additional on-line analysis and data mining features. The RTA’s Regional Transportation Asset Management System (RTAMS) website ([www.rtams.com](http://www.rtams.com)) is an example of an application of this market package.
**ITS Virtual Data Warehouse (AD3)** - This market package builds upon ITS Data Warehouse service and provides additional features of interoperability between physically distributed data archives which are each locally managed. IDOT’s GCM Gateway Hub and the RTA’s Illinois Transit Hub are examples of ITS virtual data warehouses.

### 8.5.2 Stakeholder Roles and Responsibilities

In order to provide traveler information services and manage archived data, various agencies at both the local and regional level will have to coordinate their activities. Any agencies that collect, or plan to collect, traffic data will need to coordinate with partner agencies and the media in sharing that information with travelers. For data management, in addition to developing data sharing protocols and providing data archive maintenance, partner agencies will be responsible for continually providing data to traveler information clearinghouses so that they remain useful. Table 10 and Table 11 describe agency roles and responsibilities for traveler information and data management in DuPage County.

**Table 10 – Stakeholders’ Roles and Responsibilities for Traveler Information**

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Media Outlets</td>
<td>Disseminate traffic information provided by others</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Division of Transportation</td>
<td>Disseminate traffic, incident, and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information with the GCM Gateway Hub</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information to emergency management agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Electrical Operations</td>
<td>Disseminate traffic, incident, and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information to emergency management agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation ITS Program Office</td>
<td>Disseminate traffic, incident, and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information to emergency management agencies</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information with the GCM Gateway Hub</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Disseminate traffic, incident, and maintenance information via 511 system</td>
<td>Planned</td>
</tr>
<tr>
<td>Illinois State Toll Highway Authority</td>
<td>Disseminate traffic, incident, and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide traffic, incident, and maintenance information with the GCM Gateway Hub</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Disseminate traffic, incident, and maintenance information to emergency management agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Disseminate traffic, incident, and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Roles and Responsibilities</td>
<td>Status</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Private ISPs</td>
<td>Disseminate traffic information provided by others</td>
<td>Existing</td>
</tr>
<tr>
<td>Private Weather Information Providers</td>
<td>Provide weather information</td>
<td>Existing</td>
</tr>
<tr>
<td>Regional Transportation Authority</td>
<td>Disseminate transit incident, schedules, routes, fare and maintenance information to travelers and the media</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Provide transit incident, maintenance information to emergency agencies</td>
<td>Existing</td>
</tr>
<tr>
<td>Travelers</td>
<td>Report traffic and incident information to emergency services</td>
<td>Existing</td>
</tr>
</tbody>
</table>

**Table 11 – Stakeholders’ Roles and Responsibilities for Data Management**

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argonne National Laboratory</td>
<td>Analyze traffic data for travel demand planning</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect and archive traffic and transportation related information</td>
<td>Planned</td>
</tr>
<tr>
<td></td>
<td>Coordinate data between other archive management agencies.</td>
<td>Planned</td>
</tr>
<tr>
<td>Chicago Metropolitan Agency for Planning (CMAP)</td>
<td>Collect, store, and maintain regional traffic and ITS inventory data</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Analyze traffic data for transportation planning</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect and archive traffic and transportation related information</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect information about ITS plans, projects, traffic counts information</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage Division of Transportation</td>
<td>Collect, store and maintain traffic signal inventory data in the region</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect, archive, and distribute construction information (i.e., lane closures)</td>
<td>Planned</td>
</tr>
<tr>
<td></td>
<td>Collect and provide information about ITS plans, projects, traffic counts information</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Analyze traffic data for transportation planning</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect, store and maintain traffic accident database for DuPage County</td>
<td>Planned</td>
</tr>
<tr>
<td>DuPage County Office of Homeland Security and</td>
<td>Collect, archive and distribute construction information (i.e., lane closures)</td>
<td>Existing</td>
</tr>
</tbody>
</table>
### Stakeholders

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Roles and Responsibilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Management</td>
<td>Collect, store, and maintain critical infrastructure inventory data for DuPage County</td>
<td>Existing</td>
</tr>
<tr>
<td>DuPage County Sheriff</td>
<td>Collect and provide crash records</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation District 1 Bureau of Traffic</td>
<td>Collect, store, and maintain traffic signal inventory data in the region</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Department of Transportation ITS Program Office</td>
<td>Maintain the GCM Gateway Hub</td>
<td>Existing</td>
</tr>
<tr>
<td>Illinois Dept of Transportation Bureau of Information Processing</td>
<td>Collect, archive, analyze, and distribute various transportation related information</td>
<td>Planned</td>
</tr>
<tr>
<td></td>
<td>Collect, archive, analyze, and distribute various emergency management related information</td>
<td>Planned</td>
</tr>
<tr>
<td>Regional Transportation Authority</td>
<td>Collect, maintain, and coordinate traffic and transit infrastructure database (RTAMS)</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Collect, store, and maintain transit data for transit planning</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Maintain the Illinois Transit Hub</td>
<td>Existing</td>
</tr>
</tbody>
</table>

### 8.6 Findings and Recommendations

Traveler information and data management functions cross all jurisdictional boundaries. In order to improve these services in DuPage County, the following recommendations should be considered:

- Establish common traffic data collection and sharing protocols at both the regional and local levels.
- Expand the DuPage County Web-based Traffic Accident Reporting System.
- Identify institutional strategies for improving the reporting of lane restrictions due to roadway construction, maintenance utility work, and rail crossing repairs.
- Build a central data clearinghouse of DuPage County transportation information (e.g., traffic data, construction/lane closure data, weather data, and crash data). This must start with individual partner agencies and their collection of transportation data. This would aid in transportation planning, travel demand management and emergency management strategies for the region.
- Link this central data clearinghouse with the GCM Gateway Hub and Illinois Transit Hub to enhance data availability in regional traveler information outlets.
- Combine local infrastructure mapping data (e.g., Village of Lombard, DuPage County DOT) to create a Countywide infrastructure database.
- Enter into agreements with media outlets for traffic data sharing.
- Publicize traveler information sources available to the public through publications, agency correspondence, and media outlets.
• Expand Metra’s Parking Guidance System to include high-volume park & ride lots in DuPage County.
9. INTEGRATED MANAGEMENT AND OPERATIONS

Throughout this document, a common theme has been communication and integration. In order for traffic management agencies to provide optimum traffic flow, they need to be aware of current conditions on the roadway network. This introduces the use of surveillance equipment, and the communications infrastructure that transfers the field data to a location where it can be collected, stored, and processed. This data can then be used to retime traffic signals, dispatch maintenance personnel to repair field elements, or transmit information to the traveling public.

For isolated operations, the model may end at that point. However, for regional network optimization, jurisdictional boundaries are not the end of the line, but rather a transfer point for management functions. By linking the management functions of two or more transportation agencies, data collected at the local level can lead to operational improvements at the regional level. Congestion measured in a given jurisdiction can lead to traffic signal timing modifications across a multi-jurisdictional corridor, incidents on expressways can activate arterial alternate routes, delayed transit vehicles can make up time on their routes through the use of prioritization measures at signalized intersections.

For such improvements to be made, individual transportation management agencies need to develop interface points between their agencies and other partner agencies. This can be done by formalizing centralized management functionality for each partner agency. Each of these agencies then becomes a portal through which information can be exchanged, effectively creating a regional network built from local systems. The end results are operational improvements such as cross border traffic signal timing, coordinated incident response, and comprehensive traveler information systems.

Table 12 identifies the 43 market packages, or ITS services, identified for application in this Concept of Operations document. Of these services, most relate to central management functionality. This functionality may take many forms, depending on the individual requirements of the partner agency. For instance, central management may mean a “bricks and mortar” traffic management center, such as the IDOT District One ComCenter or the ISTHA Traffic Management Center. Under this approach, traffic data and system monitoring occur in a facility specifically designed for traffic management. The facility may have multiple operator consoles, video walls, etc. This facility could be co-located with emergency or transit management agency personnel to lower costs and improve “cross-pollination” of information.

A second alternative would be a traffic manager workstation with full traffic management control for a given jurisdiction. Such a workstation could have a monitor for system monitoring or outside data displays.

Yet another scenario would be a “virtual” management center. This approach would utilize networked servers to distribute centralized management functionality to any computer (with assigned privileges) connected to the network. This virtual management center is particularly effective for large, dispersed systems.

The DuPage County Sub-regional ITS Architecture document will further define these central management functions for partner agencies. The TCI Technology and Strategy Assessment
document will then identify how this functionality might be implemented.

<table>
<thead>
<tr>
<th>Service Area</th>
<th>Market Package</th>
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<tbody>
<tr>
<td>Traffic Management</td>
<td>Network Surveillance (ATMS01)</td>
</tr>
<tr>
<td></td>
<td>Probe Surveillance (ATMS02)</td>
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<tr>
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<td>Surface Street Control (ATMS03)</td>
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<td>Freeway Control (ATMS04)</td>
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<td>Regional Traffic Control (ATMS07)</td>
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<td></td>
<td>Traffic Forecast and Demand Management (ATMS09)</td>
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<td>Electronic Toll Collection (ATMS10)</td>
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<td>Emissions Monitoring and Management (ATMS11)</td>
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<td>Standard Rail Grade Crossing (ATMS13)</td>
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<td>Railroad Operations Coordination (ATMS15)</td>
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<td>Parking Facility Management (ATMS16)</td>
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<td>Maintenance &amp; Construction Management</td>
<td>Maintenance and Construction Vehicle and Equipment Tracking (MC01)</td>
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<td>Maintenance and Construction Vehicle Maintenance (MC02)</td>
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<td>Weather Information Processing and Distribution (MC04)</td>
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<td>Roadway Maintenance and Construction (MC07)</td>
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<td>Wide-Area Alert (EM06)</td>
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<td>Disaster Response and Recovery (EM08)</td>
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<td>Evacuation and Reentry Management (EM09)</td>
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<td>Interactive Traveler Information (ATIS2)</td>
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<td>ITS Data Warehouse (AD2)</td>
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<td>ITS Virtual Data Warehouse (AD3)</td>
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</table>

**Table 12 – Identified TCI Market Packages (ITS Services)**