PENNSYLVANIA

ROP

REGIONAL OPERATIONS PLAN

2007

DVRPC Region District 6

EXECUTIVE SUMMARY

Introduction

The District 6-0 Regional Operations Plan (ROP) has been developed for PennDOT to address the Transportation operation needs of the communities throughout the Philadelphia Metropolitan Area. PennDOT is responsible for transportation operations planning at the statewide level, and the statewide operational direction is defined in the Transportation Systems Operation Plan (TSOP, adopted September 2005). This document is a centrally-led and coordinated statewide approach to transportation operations. TSOP builds on national definitions of "operations", such as that promulgated by the American Association of State Highway and Transportation Officials (AASHTO).

The direction established through the Delaware Valley Regional ITS Architecture and the TSOP have defined PennDOT's approach to Operations in the District 6-0 Region. The Regional ITS Architecture is one of nine regional documents that was designed to support the preparation and refinement of ITS across Pennsylvania. These preceding documents are resource tools to help assist engineers, planners, designers, developers, managers, and decision-makers in defining a regionally-integrated surface transportation infrastructure.

The TSOP was driven by statewide direction and regional needs which are used to enhance the operational efficiencies, improve public safety and security, and reduce traveler delay. **The ROP is being developed for PennDOT and its planning partners in each region to adapt or "rightsize" the statewide directions established in the TSOP and Regional ITS Architecture to their own specialized needs.**

After completion of the ROP, the programs delineated in it are to be implemented and mainstreamed in transportation planning documents and day-to-day activities. Outputs of the ROP will be used in future updates of the statewide TSOP and Regional ITS Architectures. The ROP is to be updated every two years to be kept current with the most recent needs and projects slated for deployment in the district and keep in line with Transportation Improvement Program (TIP) updates.

District 6-0 Region

The District 6-0 Region includes the following five (5) counties:

- Bucks County
- Chester County
- Delaware County
- Montgomery County
- Philadelphia County

Included in District 6-0 is the Philadelphia Metropolitan Area, one of the largest in the United States, which provides major commercial and tourist attractions. Outside of the

City, the region contains mostly suburban areas. The region's central location along the I-95 North Eastern Corridor ensures that it is one of the most heavily traveled areas of the country.

Recognizing that the District 6-0 Region is mostly urban/suburban, the ITS strategies and projects that were recommended out of the Regional Operations Plan (ROP) adhere to ITS/Operations direction already established in the region. The ITS strategies and projects recommended were designed to address the District 6-0 Region's transportation related issues, needs and challenges. Significant effort was put forth to identify these challenges through relevant documents and Stakeholder participation throughout the ROP process.

Project Development

The development of the District 6-0 ROP followed a process that was outlined in the PennDOT Regional Guidance Document (RGD, May 2006). The process established a Regional Operations Forum (ROF) Committee that developed the general vision for the region. The committee was comprised of knowledgeable planning and transportation agencies in the region that helped to identify the ITS/Operations. Many of these members were also responsible for governing the development of the Delaware Valley Regional ITS Architecture document.

The TSOP and Regional ITS Architecture documents laid the ground work for the integration of planning and operations in the ROP. The projects defined in these documents were used as a foundation for recommended project deployments in the ROP. In order to bring focus to the ITS planning process for District 6-0, it was important to address the needs of the region.

Regional Needs Identification

District 6-0 has one of the most broad and advanced ITS/Operations programs in the Commonwealth. The systems already implemented, as well as those proposed in this plan, can be used as a model for other districts. During the ROP process, the existing ITS/Operations systems currently in place were examined in order to identify the current operational needs of the region. The ROP stakeholders were utilized to identify the four regional needs areas. These needs areas were to serve as the foundation of the four regional task force groups

The four (4) Needs Areas include:

1. Incident and Event Management
2. Traveler Information
3. Corridor and Congestion Management
4. Institutional Coordination

Project Deployments

A list of potential projects was formulated and presented at the second Stakeholder Workshop Meeting. This meeting brought together all the stakeholders of the District 6-0 Region for their input on prioritizing the recommended project deployments. The recommended deployments were categorized as short- and long-term projects. Short-Term projects were identified by a time frame for implementation/deployment of 0 to 2 years and Long-Term projects by a 3 to 4 year time frame.

Once a list of recommended projects was assembled, stakeholders were asked to rank the importance of each project in relation to the needs of the District 6-0 Region. This ranking process was used to determine the regional priorities. When ranking the projects, it was important to factor in the importance of the project, the complexity of the project and whether the project would require significant regional coordination. Projects were ranked based on a numbering system of *1 (low priority) to 5 (high priority).*

The Recommended Short-Term Projects were ranked as follows:

1. I-95 ITS Deployment (Delaware State Line to Philadelphia International Airport)
2. Service Patrol Coverage Phase I
3. Philadelphia Last Mile Fiber Connections
4. Completion and Implementation of RIMIS System
5. Develop Regional “Strategic Corridor Investment Plan”
6. Strategic Arterial Corridor Signal System Upgrade Program
7. Strategic Arterial Signal Inspection and Revision Program
8. Establish Incident Management Task Forces
9. Fiber Connection to Delaware Department of Transportation (DelDOT)
10. Continue to Update and Provide PennDOT Detour Routes via the Internet
11. Limited Access Highway Ramp Closures
12. Signal Priority for Transit Vehicles
13. Develop Recommendations for NHS Connectors
14. Develop and Distribute Traffic Information Pamphlet to Goods Movement Community

The Recommended Long-Term Projects were ranked as follows:

1. I-476 ITS Deployment (I-95 to PA Turnpike)
2. I-95 ITS Deployment (Island Avenue to Vine Street)
3. I-95 ITS Deployment (Business Route 1 to New Jersey State Line)
4. Service Patrol Coverage Phase II
5. Fiber Connection to Select Pennsylvania State Police Barracks
6. Construction of Operations Center for City of Philadelphia
7. Fiber Connection to New Jersey Department of Transportation (NJDOT)
8. Construction of Operations Center for Delaware River Port Authority (DRPA)
9. Parking Management System for Select SEPTA Facilities
10. Parking Management System for Philadelphia International Airport
11. Deployment of Future I-76 TSM Component Projects
12. Traveler Information System Deployment to Regional Tourist/Intermodal Centers
13. Parking Management System for Philadelphia Sports Complex

The projects prioritized as part of the ROP are intended to help determine where ITS/Operations funding should be focused in the coming years. The recommended relevant project deployments programmed in the ROP are intended to be included in the FY 2009-2012 Transportation Improvement Program (TIP) update.

Program Management

The projects recommended in the ROP are to be adopted by the planning partners of the District 6-0 Region and considered for the 2009-2012 TIP. The ROP is scheduled to be updated every two (2) years so that project priority and deployment can be amended as the ROP document is revised. The ROP will be implemented and mainstreamed in transportation planning documents and day-to-day activities. The ROP program will be included in the updates of the TSOP and Regional ITS Architecture.

It is recommended that individual agencies will step forward to lead or "champion" individual operations projects based on their level of interest and need. Each project programmed in the ROP is defined by a lead agency, and these lead agencies will need to take the initiative to move operations projects forward by identifying funding, developing a design, and taking them through procurement.

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ACKNOWLEDGEMENTS

Major contributions from PennDOT District 6-0 and the Bureau of Highway Safety and Traffic Engineering, Center for Program Development and Management, as well as the Delaware Valley Regional Planning Commission (DVRPC) made the Regional Operations Plan for the District 6-0 Region possible. The ROP was developed with input from multiple regional stakeholders.

Project Management Team

The ROP was guided by the Project Management Team consisting of the following individuals:

- Manny Anastasiadis — PennDOT District 6-0
- Lou Belmonte — PennDOT District 6-0
- Ed Burns — PennDOT District 6-0
- Mike Pack — PennDOT BHSTE
- John Ward — Delaware Valley Regional Planning Commission
- Stan Platt — Delaware Valley Regional Planning Commission
- Carmine Fiscina — Federal Highway Administration

Consultant Team

Jacobs Edwards and Kelcey (JEK) facilitated the ROP process, documented the outcomes, and prepared the plan document.

ACRONYMS AND ABBREVIATIONS

AVL	Automatic Vehicle Location
BHSTE	Bureau of Highway Safety and Traffic Engineering
CCTV	Closed-Circuit Television
CMP	Congestion Management Process
CVO	Commercial Vehicle Operation
DMS	Dynamic Message Sign
DelDOT	Delaware Department of Transportation
DRPA	Delaware River Port Authority
DVMT	Daily Vehicle Miles of Travel
DVRPC	Delaware Valley Regional Planning Commission
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
GIS	Geographic Information Systems
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
IEM	Incident and Emergency Management
IM	Interstate Maintenance
ISP	Information Service Providers
ITS	Intelligent Transportation System
LRP	Long Range Plan (or Long Range Transportation Plan)
MPO	Metropolitan Planning Organization
NHS	National Highway System
NJDOT	New Jersey Department of Transportation
O&M	Operations and Maintenance
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PSP	Pennsylvania State Police
PTC	Pennsylvania Turnpike Commission
RAP	Regional Advisory Panel
RCRS	Road Closure Reporting System
RIMIS	Regional Integrated Multimodal Information Sharing
ROP	Regional Operations Plan
RPO	Regional Planning Organization
RTC	Regional Transportation Committee
RTMS	Remote Traffic Microwave Sensor
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users
SEPTA	Southeastern Pennsylvania Transportation Authority
STMC	Statewide Transportation Management Center
TAC	Transportation Advisory Committee
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TMC	Transportation Management Center
TSAMS	Traffic Signal Asset Management System
TSM	Transportation Systems Management
TSOP	Transportation Systems Operation Plan
TTF	Technical Task Force

1. BACKGROUND

Transportation agencies today do not always have the luxury of undertaking massive new capacity expansion projects. Instead, more innovative approaches are often required to optimize the use of transportation infrastructure and achieve heightened operational efficiencies. Those activities, approaches, and procedures that help to maximize efficiencies are part of the transportation operations program. Operations planning is the process used to define and prepare for operations programming.

The Pennsylvania Department of Transportation (PennDOT) is responsible for operations planning at the statewide level. The statewide plan is spelled out in the Transportation Systems Operations Plan (TSOP), which defines PennDOT's operational direction over the next several years.

To complement the statewide operations planning effort, each of the nine transportation operations regions across the Commonwealth have undertaken preparation of a Regional Operations Plan (ROP), which documents each region's approach to operational activities. The plans were prepared through joint consultations between PennDOT District offices, transportation planning partners, and other key regional stakeholders. The plans all use TSOP as a starting point, but adapt the statewide directions to each region's transportation conditions, values, and priorities.

1.1 Statewide TSOP Initiative

The TSOP, adopted in September 2005, defines PennDOT's general framework for managing capacity along the Commonwealth's roadways. Its development was a response to PennDOT Executive Goal No. 6, to "effectively and efficiently operate the transportation system." Toward this end, TSOP has four overarching goals:

1. Build and maintain a transportation operations foundation.
2. Improve highway operational performance.
3. Improve safety.
4. Improve security.

Associated with these goals are a series of tangible objectives. Key objectives include:

- Support transportation operations uniformly in all PennDOT engineering districts.
- Furnish consistent incident response on all segments of the interstate system, regardless of location.
- Share timely, reliable information about incidents among federal, state, and regional/local emergency management agencies.
- Improve mobility on arterials through consolidated, inter-municipal management of traffic signals.
- Provide practical, reliable traveler information to transportation consumers using no-cost or low-cost media.

- Define and implement performance metrics for effectively managing operations and guiding planning and funding.

An electronic version of the TSOP document is available at http://www.paits.org.

TSOP, first and foremost, is an action plan of statewide projects. There are 19 projects that encompass four priority areas:

- Incident and Emergency Management
- Traffic Signals
- Traveler Information
- Standardization

Standardization includes the uniformity of hardware, software, communications procedures and protocols.

TSOP will be undergoing and update throughout calendar year 2007.

1.2 ROP Scope and Objectives

The Regional Operations Plan for the District 6-0 Region specifies the intended approach to transportation operations. It identifies, defines, and prioritizes operationally-focused projects for the region, consistent with regional and statewide operations objectives. The ROP sets the stage for regional implementation of pertinent elements of TSOP. It may also identify other initiatives reflective of the specialized needs of the region.

Development of the ROP is intended to:

- Define a strategic transportation operations plan for the region.
- Extend TSOP to the regional level.
- Tailor statewide directions to regional needs.
- Specify and prioritize regional operations projects.
- Achieve uniformity and compatibility across operations regions.
- Expand cooperative relationships between regional transportation operators and planning partners.

Regarding the last item, the ROP process is intended to link planning and operations. It emphasizes collaboration and coordination among regional planners and operators and a structured assessment of the planning and operational implications of expanded management procedures, technology systems, and investments. The ROP will feed into the Long-Range Plans (LRP) in each region and the corresponding Transportation Improvement Programs (TIP). Each ROP will also supply important inputs to future updates of TSOP, Regional Intelligent Transportation System (ITS) Architectures, and PennDOT's Long-Range Statewide Transportation Plan (Mobility Plan).

ROP stakeholders in every region are presenting the ROP document to their respective metropolitan planning organizations (MPOs) and regional planning organizations (RPOs), encouraging these planning partners to adopt or endorse the plans.

It is expected that all ROPs will be updated at two-year intervals in advance of biannual TIP update cycles.

1.3 ROP Development Process

The 9-month District 6-0 ROP development process involved conducting outreach workshops and smaller group meetings as well as researching and developing regional operations projects. The ROP involved the following key activities shown in ***Figure 1*** and further described below:

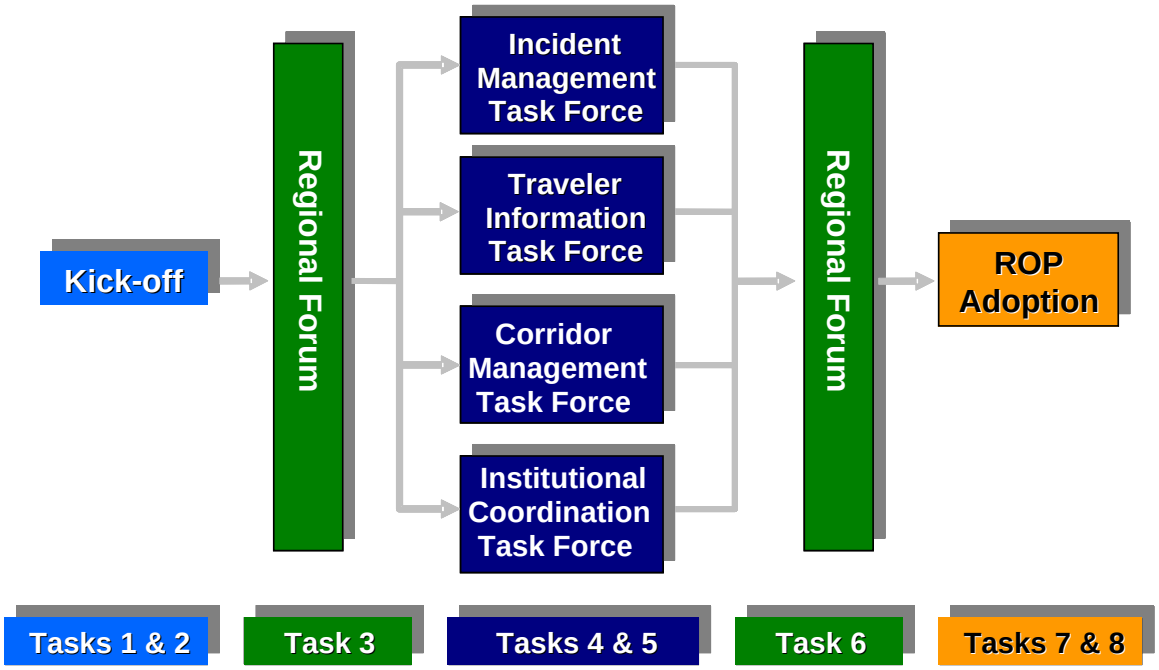

Figure 1: *District 6-0 ROP Development Process*

Task 1. Establish a Regional Operations Forum (ROF). The ROF is a group of knowledgeable planning and transportation partners who are involved in operations and transportation for the region. They are a decision-making body who cover a diverse range of transportation stakeholders from across the region. The committee can be an extension of the Regional Advisory Panel (RAP) Committees that govern the development of the Regional ITS Architectures or it can be a completely new group of members. The ROF committee for the District 6-0 Region was a new committee with representation from the following:

- PennDOT District 6-0
- PennDOT BHSTE
- Federal Highway Administration
- Delaware Valley Regional Planning Commission
- County Planning Commissions
- City of Philadelphia Streets Department

Task 2. Review/Update Plans and Document Projects. The documents reviewed in preparing the project inventory included the following:

i. PennDOT Regional Guidance Document

The Regional Guidance Document was prepared in May 2006 to outline an approach for developing the ROP. This document is being used by each PennDOT District completing a ROP.

ii. 2005 Transportation Systems Operations Plan (TSOP)

The TSOP was prepared in September 2005 and defines the statewide plan for operations. The TSOP will be updated on a bi-annual basis and its purpose is to set statewide direction for projects in ITS and to formalize and extend PennDOT's business focus to include operations. TSOP is predicated on four goals, which include building and maintaining a transportation operations foundation; improving highway operational performance; improving safety; and improving security.

In order to achieve these goals, the TSOP outlines 19 distinct statewide projects that include both planning efforts as well as deployments. These projects cover areas of priority such as operations mainstreaming, ITS maintenance, standards and procedures, resource management, information technology, and intermodal support. Coordination of these priorities will be carried out both through statewide initiatives and regional deployments dependant on localized needs. Like the ROP, the TSOP is positioned to be linked to the two-year Transportation Improvement Program (TIP) updates.

In development of the ROP, the TSOP is to be used as the primary guideline to follow, with the ROP covering the more specific regional needs of District 6-0.

iii. Delaware Valley Regional ITS Architecture

The Delaware Valley Regional ITS Architecture was adopted by the DVRPC in November, 2000. The Regional Architecture builds upon National Architecture and ITS standards to provide a structure for the design of regional ITS deployments. The Architecture's identification of key regional stakeholders was used as the guide for the development of the Regional Operations Forum and workshop stakeholder group. The Architecture also identifies each stakeholder organization's current and future regional ITS deployments, which was used as one of the primary inputs into the District 6-0 ITS inventory. Both short and long-term implementation strategies are identified via the ITS Deployment Plan covered within the document.

iv. ITS Master Plan for Delaware Valley

The ITS Master Plan was prepared by the DVRPC Technical Task Force (TTF) and presents the long-term vision for ITS in the Delaware Valley. The plan contains three components: ITS Vision, which discusses how regional ITS should operate; ITS Initiatives of Regional Significance gives an overview of

projects proposed to integrate agency efforts; and ITS Implementation, which presents a capital program of long range ITS projects and maps of current/future ITS infrastructure, emergency service coverage, incident management task forces, and integrated management corridors. All implementation strategies are serviceable as an input into the ROP.

v. PennDOT District 6-0 Interstate ITS Deployment Plan

The Interstate ITS Deployment Plan contains a GIS database which gives an inclusive overview of the current and future individual ITS devices deployed or to-be-deployed on the network of Interstates running through District 6-0. The plan is a valuable asset for locating the individual devices included in projects overviewed by the TIP and ITS Architecture. The plan is accompanied by a series of spreadsheets which include rough cost estimates for future Interstate ITS Construction Projects.

Task 3. Define Regional Needs and Priorities. A workshop was held with transportation and planning stakeholders of the region to define and discuss operational needs for the region. The starting point for identifying critical needs was TSOP, followed by region-specific operational requirements addressed at the first forum workshop. Following this discussion, four operational areas were identified that captured these needs into defined groups (incident and emergency management, traveler information, corridor and congestion management, and institutional cordination).

Task 4. Identify Regional Operations Concepts. Each of the operations areas was then assigned a task force that reviewed the list of needs associated with its respective operations area and identified solutions to those needs in the form of potential "projects" (i.e., policies, planning studies or physical deployments). These projects reflected the specialized conditions and circumstances of the region consistent with statewide guidance.

Task 5. Define Operations Projects. Project concepts were developed based on the TSOP projects and in support of the needs that were discussed at the Task Force Meetings. Projects were defined based on the operations concept(s) that Stakeholders wanted to see implemented. The recommended projects were regional in scope or demonstrated proof-of-concept in one part of the region. Projects identified were realistic, manageable, and achievable within the short-term and long-term timeframe. Projects that did not meet this timeframe were recommended to be considered as a future implementation.

Task 6. Develop a Regional Program. The recommended projects were prioritized based on a short-term and long-term timeframe. Stakeholders ranked the recommended projects based on funding, complexity and need. The recommended projects will be programmed in Long-Range Plans (LRPs), the 2009 TIP, and other pertinent venues. The stakeholders participated in the project prioritization at the final workshop to help identify a regional program to best fit their regions' needs.

Task 7. Prepare and Adopt a Regional Operations Plan. The results of the entire ROP planning effort were documented as the ROP Plan. At a minimum, the plan

encompasses: background, short- and long-term projects, and program implementation. The ROP is to be reviewed and adopted by the planning partners in the region.

1.4 ROP Oversight and Management

The development of the ROP required several meetings to be conducted throughout the process. The meetings helped to identify the needs of the region and assemble project deployments to be programmed in the ROP. The schedule of meetings held for the District 6-0 ROP was as follows:

Meeting	Date
District 6-0 ROP Kick-off Meeting	November 20, 2006
ROF Committee Meeting #1	January 11, 2007
Stakeholder Workshop #1	February 16, 2007
Task Force Meeting #1	March 14 & 15, 2007
Task Force Meeting #2	April 12 & 13, 2007
Stakeholder Workshop #2	June 11, 2007
ROF Committee Meeting #2	July 17, 2007

1.4.1 Regional Operations Forum

As part of the effort to develop the ROP, a Regional Operations Forum (ROF) was established. The ROF committee represents a decision-making body of knowledgeable planning partners and practitioners across the region who plan and oversee transportation operations. Their effort in developing the ROP follows the principles behind the TSOP and all projects that are ongoing and/or planned already for deployment in District 6-0. The ROF committee is made up of an extended group of stakeholders from the Region that include:

Stakeholder	Member Contact
PennDOT District 6-0	Ed Burns
	Lou Belmonte
	Manny Anastasiadis
PennDOT BHSTE	Mike Pack
DVRPC	John Ward
	Stan Platt
Federal Highway Administration	Carmine Fiscina
Bucks County Planning Commission	Rich Brahler
Delaware County Planning Department	Justin Dula

Montgomery County Planning Commission	Leo Bagley
Philadelphia Department of Streets	Richard Montanez

The organizations involved in the development of the ROP are the knowledgeable authorities on their own conditions and have a reasonable degree of autonomy to adapt statewide directions to their particular needs.

Common strategies have emerged across the state for building institutional arrangements that can better link planning and operations. Changing institutional relationships and behavior is challenging and requires sustained efforts. Across the state, development of Regional Architectures and the TSOP has provided the foundation for such changes to begin.

1.4.2 Stakeholders

Two workshop meetings were held and attended by a large group of stakeholders from throughout the District 6-0 region. The stakeholders have a similar interest in the regional operations and deployments that currently exist and are planned for the District. They bring a diverse range of knowledge and experience to the operational direction of the region. The purpose of the workshop meetings was to identify and prioritize the needs of the region using the input of this large group of stakeholders.

The stakeholders involved the in workshop meetings and development of the ROP include:

- PennDOT District 6-0
- PennDOT BHSTE
- Federal Highway Administration
- DVRPC
- Pennsylvania State Senate
- Chester County GIS
- Bucks County Planning Commission
- Delaware County Planning Department
- Montgomery County Planning Commission
- Philadelphia Department of Streets
- Delaware River Port Authority
- Pennsylvania Turnpike Commission
- Pennsylvania Center for Port Development
- Delaware River Joint Toll Bridge Commission
- Upper Merion Township
- Lower Merion Township
- Pennsylvania Motor Truck Association
- SEPTA
- PEMA
- Pennsylvania State Police
- City of Philadelphia Police
- Upper Merion Police
- Radnor Township Police
- Whitemarsh Police
- Chester County Department of Emergency Services
- Philadelphia Emergency Operations
- Pennsylvania Towing Association
- EVB Towing
- Bucks County TMA
- Chester County TMA
- Delaware County TMA
- Greater Valley Forge TMA
- Partnership TMA
- Center City District
- Maritime Exchange for Delaware River and Bay
- Delaware River Maritime Enterprise Council
- Traffic.com
- Chester County Department of Emergency Services

2. DISTRICT 6-0 REGIONAL ACTIVITIES AND INITIATIVES

2.1 Description of the District 6-0 Region

The District 6-0 Region is located in the southeast corner of Pennsylvania and borders New Jersey, Delaware, and Maryland. Included in District 6-0 is the Philadelphia Metropolitan Area, one of the largest in the United States, which provides major commercial and tourist attractions. Outside of the city, the region contains mostly suburban areas.

The District 6-0 Region includes the following five counties:

- Bucks County
- Chester County
- Delaware County
- Montgomery County
- Philadelphia County

District 6-0 is unique in that the entire district is overseen by a single planning partner, the Delaware Valley Regional Planning Commission (DVRPC). The DVRPC serves as the Metropolitan Planning Organization (MPO) to District 6-0 in Pennsylvania, as well as southern New Jersey. The planning partner's role in the ROP process is crucial to plan implementation. The ROP gives PennDOT engineering districts, MPO, and rural planning organizations (RPO) discretion to custom-tailor statewide priorities for their region. Following the same purpose, the ROP will prepare the way for operational activity and interaction by the PennDOT district office and planning partners in the region.

Population and Commuter Pattern

For Pennsylvania, an estimate of population statistics is available for the counties in the District 6-0 Region as of the 2000 US Census. At 3,846,082 people, District 6-0 contains 31% of the states population in just 5% of the land area. **TABLE 1** includes all the counties representing the District 6-0 Region including their Population and Land Area in square miles.

TABLE 1: District 6-0 Population by County

County	Population	Land Area (sq. miles)
Bucks	597,635	607
Chester	433,501	756
Delaware	550,864	184
Montgomery	775,688	483
Philadelphia	1,488,394	135

(*Source: US Census Bureau 2000 United States Census)*

TABLE 2 compares commuting patterns in the region to the state and national commuting conditions. The 2005 American Communities Survey tabulated these data elements by State, County, and the US as a whole. Nearly seven-out-of-ten regional workers drive to work alone, which is a bit lower than the statewide and national "drive-alone" rates. 9% of workers in the region carpool to work, a little bit lower than the statewide average. As a whole, approximately 11.4% of regional commuters use public transportation, which is more than double the state and national averages. It should be noted though that 26% of commuters in Philadelphia use public transit compared to only 4.7% throughout the rest of the region. The average one-way commute time for regional workers is roughly 29 minutes, which is significantly greater than the 25 minute statewide and national average. This, though, can be attributed to District 6-0's significantly higher population density compared to the rest of the nation and state.

TABLE 2: Comparison of Commuting Patterns among Workers 16 and Over District 6-0 Region, Pennsylvania, and the United States, 2000

Commuting Pattern	6-0 Region	Pennsylvania	United States
Total Workers 16 and Over	1,905,715	6,101,500	147,299,391
Total Commuters	1,713,342	5,538,754	133,091,043
% Commuters Driving Alone	71.0%	77.3%	76.9%
% Commuters Carpooling	8.9%	9.7%	10.7%
% Commuters Using Public Transportation	11.4%	5.1%	4.7%
Mean Travel Time to Work (Minutes)	28.7	25.1	25.1

(*Source: US Census Bureau 2005 American Community Survey)*

Roadway System

As shown in **TABLE 3**, the District 6-0 Region encompasses a substantial network of roadways. As reported in *PennDOT's 2005 Highway Statistics*, the region contains 14,703.5 linear miles of roadway, signifying 12% of the Commonwealth's total linear mileage. This includes 3,560.3 linear miles of roadway maintained by PennDOT, with the remaining road miles maintained by the Pennsylvania Turnpike Commission (PTC), and municipalities.

TABLE 3: District 6-0 Region Linear Miles, 2005

County	PennDOT Linear Miles	Total Linear Miles
Bucks	960	3,413.7
Chester	1,021.7	3,490.7
Delaware	447.9	1,795.3
Montgomery	770.3	3,573.7
Philadelphia	360.6	2,430.3
Regional Total	3,560.3	14,703.5
Statewide Total	39,889.6	120,667.2

(Source: PennDOT's 2005 Highway Statistics)

According to the *2005 Texas Transportation Institute's Urban Mobility Study* the Philadelphia Metropolitan area is the 28th most congested in the nation. Area commuters experience an average of 38 hours of rush-hour delay due to congestion each year. As part of PennDOT's *2005 Highway Statistics*, they posted the Daily Vehicle Miles Traveled (DVMT) for each county in the state. **TABLE 4** depicts the daily DVMT across the region, which is substantial. Total DVMT on all roadways in the region was approximately 71.1 million miles. The DVMT on PennDOT roadways was approximately 51.2 million miles. Even though District 6-0 contains only 12% of the Commonwealth's roadway miles, it is responsible for 24% of the DVMT.

TABLE 4: District 6-0 Daily Vehicle Miles of Travel, 2005

County	PennDOT DVMT	Total DVMT
Bucks	10,501,652	13,696,055
Chester	9,010,904	11,831,982
Delaware	8,627,403	10,180,602
Montgomery	11,631,999	19,109,546
Philadelphia	11,475,529	16,316,414
Regional Total	51,247,487	71,134,599
Statewide	224,176,551	295,628,006

(Source: PennDOT's 2005 Highway Statistics)

As part of the Strategic Corridor Investment Planning Process, the DVRPC has pre-defined corridors of regional significance for each of the five counties. The following is a draft list of preliminary routes that were presented to the stakeholders at Task Force Meeting #2. These are not the final routes which will ultimately be included in the Prioritizing Strategic Regional Corridors within Southeastern Pennsylvania for Operational Investments Database.

TABLE 5.1: Bucks County Priority Corridors

Interstate	US Routes	PA Routes	
I-95	US-1	PA-32	PA-309
I-276	US-13	PA-113	PA-313
I-476	US-202	PA-132	PA-332
		PA-152	PA-412
		PA-179	PA-413
		PA-212	PA-513
		PA-213	PA-563
		PA-232	PA-611
		PA-263	PA-663

TABLE 5.2: Chester County Priority Corridors

Interstate	US Routes	PA Routes	
I-76	US-1	PA-10	PA-340
	US-30	PA-23	PA-345
	US-202	PA-29	PA-352
	US-322	PA-41	PA-372
		PA-52	PA-472
		PA-82	PA-724
		PA-100	PA-796
		PA-162	PA-841
		PA-252	PA-842
		PA-272	PA-896
		PA-282	PA-926

TABLE 5.3: Delaware County Priority Corridors

Interstate	US Routes	PA Routes	
I-95	US-1	PA-3	PA-352
I-476	US-13	PA-252	PA-420
	US-30	PA-291	PA-452
	US-202	PA-320	PA-491
	US-322		

TABLE 5.4: Montgomery County Priority Corridors

Interstate	US Routes	PA Routes	
I-76	US-1	PA-23	PA-309
I-276	US-30	PA-29	PA-320
I-476	US-202	PA-63	PA-332
	US-422	PA-73	PA-363
		PA-100	PA-463
		PA-113	PA-563
		PA-152	PA-611
		PA-232	PA-663
		PA-263	

TABLE 5.5: Philadelphia County Priority Corridors

Interstate	US Routes	PA Routes	
I-76	US-1	PA-3	PA-291
I-95	US-13	PA-63	PA-309
I-676	US-30	PA-73	PA-532
		PA-232	PA-611

Included in the DVRPC Draft ITS Master Plan, are nine Integrated Management Corridors defined for the District 6-0 Region. They include:

- US-1
- US-202 / US-322
- US-30 / US-202
- I-76
- I-476
- US-422
- I-476 / PA-309
- I-95 North
- I-95 South

The District 6-0 Region contains intermodal facilities and service providers that support passenger and freight, including:

- Philadelphia International Airport
- Northeast Philadelphia Airport
- Norfolk Southern Morrisville Intermodal Facility
- Port of Bucks
- Tioga Marine Terminal
- South Philadelphia Rail and Port Complex
- Penn Terminals
- CSX Twin Oaks Auto Terminal
- CSX Transflo Facility

Transportation Management Associations (TMA) operating within the region include the Bucks County TMA, Center City District, TMA of Chester County, Delaware County TMA, Greater Valley Forge TMA, and Partnership TMA. These organizations work together to respond to the transportation issues within the immediate communities as well as regional transportation needs throughout Southeastern Pennsylvania. The TMAs' ultimate role is to communicate the public sector position, while bringing the message of the community back to the transportation decision-makers in the public sector.

District 6-0 houses two of the nine nuclear power generating reactors in the state at the Limerick Power Plant located in Montgomery County.

The District 6-0 Region also contains stadiums and other venues that house major sporting and recreational events in the City of Philadelphia, and other major destinations, including:

- Lincoln Financial Field (Philadelphia Sports Complex)
- Citizens Bank Ballpark (Philadelphia Sports Complex)
- Wachovia Center (Philadelphia Sports Complex)
- Wachovia Spectrum (Philadelphia Sports Complex)
- AMTRAK's 30th St. Station (Center City, Philadelphia)
- Pennsylvania Convention Center (Center City, Philadelphia)
- King of Prussia Mall (King of Prussia)

2.2 ITS and Operations Activities at the District Level

ITS Devices

District 6-0 is one of the State's foremost leaders in ITS and Operations and has embarked in multiple efforts to alleviate congestion. There are numerous ITS devices currently deployed, with many more under design or construction. The equipment currently deployed throughout District 6-0 includes:

- Automatic Traffic Recorders
- Closed Circuit Television (CCTV)
- Vehicle Detection
- Dynamic Message Signs (DMS)
- Freeway Service Patrol
- Information Exchange Network
- In Pavement Loop Sites
- Ramp Metering
- Transportation Management Center (TMC)

An inventory and understanding of these existing and planned systems is crucial to the needs analysis development of an Operations Plan. These existing systems and deployments were used as the basis for the identification of the regional needs which could be addressed by operational solutions or ITS deployment. **TABLE 6** includes an Inventory of Existing ITS Infrastructure in District 6-0.

TABLE 6: District 6-0 Existing ITS Devices/Services

Region-wide ITS Device	Interstates	Other Highways	Region Totals
CCTV	68	45	113
DMS Permanent	25	11	36
DMS portable/semi-permanent	12	8	20
Loop Detectors	43	0	43
Microwave Detection	22	0	22
Video Detection	1	13	14
Ramp Metering	15	0	15
Traffic Signals	0	6,165	6,165
Traffic Signal Systems	0	165	165

District 6-0 also employs numerous service patrol vehicles which expedite in the removal of disabled vehicles and small, non-hazardous debris following an incident. This service helps in reducing the total time needed to clear incidents and allows travel times to remain more reliable. **TABLE 7** lists the current limits and coverage hours of permanent service patrol coverage along the region's roadways.

TABLE 7: District 6-0 Permanent Freeway Service Patrol Coverage

Roadway (Limits)	Coverage
I-95 (Delaware State Line to Airport)	Rush Hour
I-95 (Airport to Woodhaven Road)	14 Hours/Day
I-76 (Schuylkill Expressway)	14 Hours/Day
I-476 (Blue Route)	Rush Hour
US-422 (US-202 to PA-29)	Rush Hour
US-202 (US-30 to Henderson Road)	Rush Hour

In addition to the devices and services that are operating throughout the District 6-0 Region, there are numerous others planned to be deployed through current and upcoming construction. **TABLE 8** outlines the ITS devices under/near construction by District 6-0

TABLE 8: District 6-0 ITS Devices Under/Near Construction

Regional ITS Project	CCTV	DMS	Vehicle Detection
I-76 ITS Construction	44	7	47
Rt. 202 Section 3IT	33	18	58
Rt. 23 Section ITC	3	3	3
Rt. 309 ITS Construction	21	9	42

Traffic Management Center (TMC)

A TMC is responsible for implementing real-time congestion management and incident management strategies essential to maximizing the operation and safety of the expressway system. A TMC is critical to incident management response as well. By collecting, coordinating and disseminating traffic information to both incident management responders (directly) and to the traveling public (through DMS and traffic information providers), incidents are cleared more efficiently and travelers are provided near real-time information on which to base their travel decisions. Currently, traffic management and operations for the PennDOT Engineering District 6-0 are directed from the TMC at the district office in King of Prussia, PA. The TMC was constructed in 1993 and has recently begun staffing on a 24/7 basis.

As part of the DVRPC Destination 2030 Long Range Transportation Plan, additional TMCs are planned for Center City Philadelphia and the Delaware River Port Authority (DRPA). Upgrades to the TMC located at the Philadelphia Sports complex is also a future consideration, however not a part of the Destination 2030 Plan.

Traffic Signals

There are currently 6,165 traffic signals operating in the District 6-0 Region. These signals account for approximately 50% of the 13,600 signals deployed throughout the Commonwealth. All traffic signals in the District are maintained by the individual Townships in which they are located and the City of Philadelphia.

In 2005, following the release of the National Traffic Signal Report Card, the State Transportation Advisory Committee (TAC) completed a statewide signal study. As part of the study, the TAC concluded that traffic signals are assets that need to be better managed; signals should be a shared responsibility; and signals should be considered at both the corridor and regional level. The conclusions of this study led to the incorporation of statewide project TSOP-08 - Development of a Statewide Traffic Signal Asset Management System (TSAMS). TSAMS is planned as a tool to improve traffic signal planning, design, installation, maintenance, and operation by serving as a repository of traffic signal information (e.g., locations, type and age of equipment, traffic signal permits, signal conditions, and other pertinent information).

The region's stakeholders have agreed not to program any new closed loop traffic signal systems until a policy is developed which identifies a strategic set of corridors for which these signal systems are appropriate. To this end, the DVRPC is currently working on a "Strategic Corridor Investment Plan" which consists of a GIS model that will use specific, weighted, transportation data inputs to prioritize regional signalized corridors. As part of the Strategic Corridor Investment Planning process, a working group will be established to discuss more in depth the identified corridors and prioritization criteria as well as other aspects of this effort. The ROP development process can be helpful in supporting the development of this plan and the identification of some appropriate corridors.

Integrated Corridor Management

District 6-0, in a joint effort with Montgomery County, SEPTA and multiple local stakeholders has developed the Schuylkill Expressway Corridor Transportation System Management (SECTSM) Plan. The plan, adopted in 2004, focuses on improving the utilization of existing transportation facilities along I-76 and its parallel routes. The TSM is the regional pilot for integrated corridor management and as such it is important that all components of the plan be implemented and evaluated in order to establish benchmarks for other regional corridor projects. The following TSM projects have currently been deployed or programmed for the I-76 corridor:

- Montgomery County Emergency Operations Center Video Link /Fiber Connection
- I-76/I-476 Ramp Signage
- I-76 Accident Analysis
- SEPTA Bus Stop Information System
- Information Kiosk Deployments
- Fender Bender Signage
- Trailblazer Signage
- Arterial signal system and ITS deployments

Regional Integrated Multi-Modal Information Sharing (RIMIS)

The DVRPC is currently in the process of developing RIMIS, an information exchange network linking highway and traffic operation centers, transit agencies, emergency management organizations and traffic reporting services among others. The forum for regional coordination of this project is occurring through the DVPRC's ITS Technical Task Force. The primary objectives of RIMIS are to improve transportation operations and facilitate greater coordination and real-time information exchange between these stakeholders. Once initiated, RIMIS will consist of a web based software package, database and online network providing information relating to incident notification, incident tracking, traffic and transit conditions, traffic control resources, and emergency support resources. Data interfaces will automatically capture information and distribute it to regional transportation and emergency operations agencies. Having this automated system in place will greatly reduce the time necessary to notify appropriate organizations following incidents on the region's roadways. RIMS is planned to be integrated with PennDOT's Road Closure Reporting System (RCRS) and scheduled to begin deployment and testing in the fall of 2007.

2.3 Other Regional ITS/Operations Initiatives

Regional Transit Initiatives

Transit initiatives in the District 6-0 region focus on advanced efforts through the Southeastern Pennsylvania Transportation Agency (SEPTA). SEPTA, along with the MBTA in Boston is one of only two multi-modal transit agencies in the United States which operate bus, subway, high speed rail, trackless trolley (light rail), regional rail and paratransit vehicles. SEPTA's annual ridership of over 300 million travelers makes it the sixth largest transit network in the nation. The Operations Control Center located at SEPTA headquarters at 1234 Market Street in Philadelphia is the primary command and control point for their bus, rail, and regional rail services. The control center also serves to manage emergency response and traveler information dissemination and delivery.

Following a pilot program on the Schuylkill Expressway Corridor, SEPTA equipped Automatic Vehicle Location (AVL) in December of 2005. The AVL system uses Global Positioning Systems (GPS) to provide location information and scheduling status in real-time to the SEPTA Operations Control Center and enhances the operation and reliability of service. PennDOT District 6-0 has taken an interest in using AVL data from SEPTA as a tool to monitor traffic conditions on the region's roadways. A planned direct fiber connection between the two agencies will allow for this information exchange to take place. Starting in June 2006, SEPTA also began deploying AVL to all of its Customized Community Transit (CCT) vehicles. This feature will improve the dispatching of CCT vehicles, as well as allow the dispatcher to more accurately describe location and arrival time.

Another future ITS/Operations deployment includes upgrades to the fare collection system. The FY 2007-2010 capital program sets aside $22 million in funding for the modernization of revenue collecting systems and equipment. Under the program, electronic fare cards would replace tickets and tokens and card readers would be placed on all busses and light rail vehicles, eliminating the need for exact change. Card readers will also be deployed to all subway and rail stations.

In the 2007 Capital Projects Update, SEPTA included a project for the construction of information kiosks at existing facilities. These kiosks will be operated using point and click technology. SEPTA is also deploying new DMS and public address systems to rail and regional rail stations. The long-term vision is to continue the deployment of these systems in stations and transit vehicles, ultimately deploying traveler information to bus stops and providing real-time arrival information to passengers.

Pennsylvania Turnpike Commission (PTC) Initiatives

The Pennsylvania Turnpike Commission (PTC) operates and maintains approximately 85 miles of highway in the District 6-0 Region, with a total DVMT of 5,352,237 miles. On these roadways, the PTC has deployed the following ITS devices:

- 6 – CCTV Cameras
- 4 – DMS
- 9 – Highway Advisory Radios (HAR)
- 16 – Traffic Flow Detection Systems

As with PennDOT, the PTC has programmed numerous operational improvement projects. The following list overviews the near and short-term projects programmed by the PTC in the District 6-0 Region, as well as their planned deployment date.

- Traffic.com traffic flow data service contract – Coverage area from the Downingtown Interchange to the Delaware River Bridge and from the junction at the Mid-County Interchange to the Lansdale Interchange. – Summer 2007
- Milepost 326 to 331 lane widening – This project will include 2 CCTV; one at the Valley Forge Interchange and one on the mainline approaching the ramps. – Summer 2007
- Early action project in advance of the 6-lane widening from A-20 Mid-County Interchange to 5 miles north on the Northeast Extension – Includes 5 DMS to be located eastbound before the Norristown Interchange; westbound before the Fort Washington Interchange; southbound before the Quakertown Interchange and northbound on the Blue Route before the Mid-County Interchange. Also includes two CCTV to be deployed at the Lansdale and Mid-County Interchanges. – Fall 2007
- Slip Ramp project at Rt. 29 milepost 320 – Includes 1 CCTV. – Spring 2008
- Statewide Road Weather Information System – Project has proposed to add six new locations throughout the state. – Fall 2008
- Traffic.com traffic flow project – Includes coverage from the Lansdale interchange to the Quakertown Interchange – Fall 2008
- I-95 Interchange project advanced ITS – Project to include 8 DMS and 2 CCTV. – Fall 2008

In addition to the Pennsylvania Turnpike and SEPTA, there are many other agencies undertaking operations projects which should be coordinated with PennDOT. These agencies include: New Jersey DOT, Delaware DOT, Delaware River Port Authority, Burlington County Bridge Commission, Delaware River Joint Toll Bridge Commission, County 911 Centers, Pennsylvania State Police, Philadelphia Sports Complex, and Philadelphia International Airport.

2.4 National Initiatives

The Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires consideration of transportation systems operations and management from two primary levels in the planning process. First, long-range transportation plans shall contain operational and management strategies to improve the performance of existing transportation facilities. Second, within transportation management areas, the transportation planning process shall address congestion management through a process that provides for safe and effective integrated management and operation of the transportation system.

FHWA is focusing on a number of high-priority efforts to help reduce congestion on the nation's highways in support of the US DOT Secretary's Congestion Relief Initiative. Together, these efforts will provide information that allows more informed decisions, better coordination, and quicker action to avoid and reduce traffic congestion.

Furthermore, the SAFETEA-LU Real-Time System Management Information Program (Section 1201) is to provide all states with the capability to monitor, in real time, the traffic and travel conditions of the major highways of the United States and to share that information to improve the security of the surface transportation system, to address congestion problems, to support improved response to weather events and surface transportation incidents, and to facilitate national and regional highway traveler information.

Finally, the Work Zone Safety and Mobility Final Rule takes effect in October 2007. The Final Rule places increased emphasis on maintaining travel mobility in construction work areas through enhanced operations, traffic management, and public information strategies.

The ROP clearly provides a strong link to the operations and management elements of the long range plan and the plan's constituent projects and strategies support many of the elements related to the Congestion Initiative, Section 1201, and the Work Zone Safety and Mobility Final Rule.

2.5 Regional Planning Process

The primary planning partner for the District 6-0 Region is the Delaware Valley Regional Planning Commission (DVRPC).

Transportation Improvement Program and Long-Range Plan

The DVRPC is responsible for programming all planned projects as part of the Transportation Improvement Program (TIP). The TIP is a requirement of federal transportation legislation, most recently the SAFETEA-LU which was enacted in August, 2005. It contains information on a wide array of transportation projects including aviation, bicycle facilities, planning studies, road improvements and transit, among others.

Regionally significant projects must be drawn from the region's Long Range Plan (LRP) and all projects in the TIP must help implement the plan's goals. The LRP, required by federal law, is the document which helps direct transportation and land use decisions over a minimum 20 year horizon. The TIP represents the program of short-term improvements coming out of the LRP. The LRP presents an extensive list of policies and strategies as well as identifies the actions required to carry them out. DVRPC's current plan, Destination 2030, was adopted by the DVRPC board in June, 2005.

The TIP covers a four-year period but is updated every two, with the last update occurring for FY 2007. There are approximately 20 organizations that participate in these TIP updates, including member governments, operating agencies, and state and federal agencies. For a project to be considered for placement on the TIP, it must be sponsored by one of these member agencies. Once a project is nominated, it is evaluated by the Regional Transportation Committee (RTC) which is composed of regional planners, citizen representatives, transit operators and transportation interest groups. The final list of projects to be incorporated into the TIP is determined by the DVRPC Board.

The projects that are developed out of the ROP process are to be programmed on the 2009 TIP. The development of the 2009-2012 TIP is on-going. A meeting will be held in the summer of 2007 to review a candidate list.

Statewide Transportation Improvement Program

The Statewide Transportation Improvement Programs (STIP in 2001 and 2003) were developed for all areas of the state in cooperation with planning partners. They allowed for a broad range of public comment, included all modal and intermodal surface transportation projects and were consistent with MPO, RPO, independent county long range plans. The program provides a forum where decision-makers identify issues/opportunities and make informed decisions regarding the programming and implementation of transportation projects and services that address these issues and opportunities.

3. REGIONAL OPERATIONS FRAMEWORK

3.1 Regional Approach to Operations

District 6-0 has one of the most broad and advanced ITS/Operations programs in the state. The systems already implemented as well as those proposed in this plan can be used as a model for other districts. During the ROP process, the existing ITS/Operations systems currently in place were examined in order to identify the current operational needs of the region.

Operations Needs Areas

A major step in any study or planning process is to identify, discuss and prioritize a list of needs and strategies. The examination of existing conditions and ITS inventory, as well as projects currently programmed as part of the FY 2007-2010 TIP helped to identify potential gaps and shortcomings in the region. During a stakeholder workshop meeting held in February, 2007 the planning partners and practitioners of the region identified specific needs areas for the region.

The recommended projects set forth in this plan are designed specifically to address these important needs areas. The objective is not to simply implement ITS projects because the technologies are available, but rather to match existing ITS technologies that meet the transportation needs of the region and follow the operations directive for the entire state. This section will document the needs areas that were developed in order to help define Operations projects to be programmed for deployment.

During the Stakeholder Workshops, the critical operations needs for the District were defined. The discussion focused on the areas of management, deployment, information and coordination. The list below summarizes the identified needs:

- Establish a fiber connection between PennDOT and SEPTA.
- Establish full ITS coverage along the Interstates.
- Establish a link between PennDOT and private industry to help facilitate goods movement. Examples include UPS, FedEX and Ports.
- Define formal career paths for Operations staffing.
- Establish more effective traffic signal management, both regionally and corridor based.
- Improve traffic signal operations and maintenance.
- Establish judicial clearance for incident management.
- Construct Operations Centers for the City of Philadelphia, Philadelphia Sports Complex, and DRPA.
- Have greater consistency in information sharing.
- Shift the primary focus of Operations to arterials for areas that are not served by an Expressway or Interstate.
- Increase Transit Operations capacity.
- Establish a more effective traveler information network.
- Develop Parking Management Systems

- Increase service patrol coverage to include all Interstates and high-volume Expressways.
- Establish more effective corridor management. This includes response plans, ITS deployment on arterials, multi-municipal agreements, consideration of heavy vehicles and clearer signage.
- Improve local incident management by creating pre-defined response plans.
- Complete electronic mapping of detour routes and allow for them to be accessed via the web.
- Enhance the marketing of Transportation Operations by educating the public and establishing better traveler information.
- Mitigate congestion due to incidents by alerting private stakeholders (especially major goods carriers).
- Include all media outlets in traveler information sharing.
- Complete RIMIS deployment.
- Consider the cost of maintenance for Operations projects when planning additional deployment.
- Formalize a fiber communications plan for the signalized arterials.
- Include an Operations and ITS review for all new PennDOT projects.

The general needs that came out of this discussion were categorized into the following four primary needs areas:

- Incident and Event Management
- Traveler Information
- Corridor & Congestion Management
- Institutional Coordination

3.2 Operations Area – Incident and Event Management

The Incident and Event Management Operations area refers to enhancing the plans, policies, procedures and coordination needed to more effectively respond to and manage incidents on the region's roadways. Identified, ongoing, high priority regional initiatives in incident and event management include DVRPC's Incident Detour Route Mapping Program; PennDOT Expressway Service Patrol (coverage area discussed in TABLE 7) and; existing incident management task forces covering the I-76/I-476 Interchange, I-95 in Bucks County, US-422, and PA-309.

The primary objectives of this effort are to increase overall safety and reduce the amount of time necessary to respond to and clear a roadway incident. To achieve these objectives, the focus of this operations area consists of:

- Strengthening relationships between transportation agencies and incident responders.
- Initiating comprehensive policies and procedures for the response to incidents.
- Improving capabilities for detection of incidents.
- Establishing more effective methods of alerting private stakeholders to incidents.
- Updating and electronic cataloging of detour routes.

TABLE 9 describes the potential project deployments for Incident and Event Management

TABLE 9: Recommended Incident and Event Management Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
Establish Incident Management Task Forces on Key Corridors – Task Forces will organize incident responders and transportation agencies, develop pre-defined emergency response plans, institute training programs, conduct incident reviews, and establish incident response teams.	DVRPC	TSOP-01-Inter-agency Incident Reporting System TSOP-03 –Interstate Incident Management Program TSOP-05 – Incident Management Processes and Procedures
Continue to Update and Provide PennDOT Detour Routes via the Internet – Updating existing routes and instituting and expanding upon a web-based detour routing program accessible to incident responders. Considerations include future integration with Road Closure Reporting System.	DVRPC	TSOP-02 – Road Closure Reporting System TSOP-05 – Incident Management Processes and Procedures TSOP-12 – Mobility in Work Zones
Investigation of Pilot Program for Closure of Limited Access Highways – Planning and implementation of a program to deploy ramp closure devices to a limited access highway in the District 6-0 Region.	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program TSOP-05 Incident Management Processes and Procedures
Service Patrol Coverage Phase I – Short Term Implementation includes: ▪ Maintain funding for all existing coverage ▪ Rush hour coverage on I-95 in Bucks County ▪ Permanent rush hour coverage on PA-309	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program
Service Patrol Coverage Phase II – Long Term Implementation includes: ▪ Expand coverage to 16hr/day on all interstates ▪ Limited overnight and weekend coverage on all interstates ▪ Rush hour coverage on US-1, US-30, US-202, US-422, PA-63	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program

3.3 Operations Area – Traveler Information

Improving the efficiency of the transportation system requires that travelers are informed about the various travel options as well as the real-time operating conditions of the transportation system. The primary objectives of this effort are to increase the quantity and accuracy of en-route and pre-trip traveler information provided to the general public as well as the goods movement community.

To achieve these objectives, the focus of this operations area consists of:

- Expanding on partnerships with Information Service Providers (ISPs) and other partners for the intake and integration of traveler information. An existing agreement with trafficland.com will make PennDOT video available to the public via the internet.
- Enhancing partnerships with the goods movement community.
- Expanding deployment of current traveler information systems.
- Incorporating new methods for the intake and delivery of traveler information.

TABLE 10 describes the potential project deployments for Traveler Information.

TABLE 10: Recommended Traveler Information Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
Develop and Distribute Traffic Information Pamphlet to Goods Movement Community – Highlight alternate sources of traveler information. Using these sources can help dispatch centers divert their fleets sooner and keep more trucks off of congested roadways.	PennDOT 6-0	TSOP-04 – Incident Management Traveler Information
Traveler Information System Deployment to Tourist/Intermodal Centers – Evaluation of current traveler information systems currently initiated and expanded deployments to include: ▪ 30th St. Station ▪ King of Prussia Mall ▪ Philadelphia International Airport ▪ Philadelphia Convention Center	PennDOT 6-0	TSOP-04 – Incident Management Traveler Information
Develop Recommendations for NHS Connectors – Includes developing cost estimates and implementing operational improvements proposed in the DVRPC Goods Movement Task Force NHS Connector Report	DVRPC Goods Movement Task Force	TSOP-18 – Freight Movements Assessment

TABLE 10 (Cont.): Recommended Traveler Information Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
Deploy Parking Management System for Philadelphia International Airport – Deployment to long-term, short-term, and cell phone lots. PennDOT can display parking information on local DMS.	Philadelphia International Airport	None
Deploy Parking Management System to Philadelphia Sports Complex - System would unify the many parking options around the sports complex under one system and assist in alleviating congestion during large-scale events	Philadelphia Sports Complex	None
Deploy Parking Management System to Select SEPTA Facilities – SEPTA parking information to be displayed online or on DMS to help entice travelers to use public transit more frequently	SEPTA	None

3.4 Operations Area – Corridor and Congestion Management

There are a number of ITS systems which can help to address recurring congestion issues. ITS projects laid out in this plan are intended to fill in gaps in ITS on the region's Interstates and major arterials. Improving traffic signal operations and management is also of very high regional importance as it can help to effectively utilize capacity on regional arterials. Improved transit operations can help to increase use of public transportation and alleviate congestion on the region's roadways. Through increased coordination with PennDOT and the deployment and utilization of specific ITS technologies, regional roadway and transit operations can be greatly enhanced.

To achieve these objectives, the focus of this operations area consists of:

- Deploying Regional Interstate ITS to fill in all current mainline coverage gaps.
- Creating an asset management system for traffic signals and system interconnection.
- Optimizing traffic signal timings to minimize traffic delays at intersections and along corridors.
- Developing programs to prioritize signal system upgrades and signal optimization.
- Transferring control of traffic signals to PennDOT during incident conditions to improve traffic flow during diversions.
- Building upon the regional fiber communications network.
- Deploying new Operations Centers to regional transportation agencies.
- Enhancing transit operations.
- Building upon project deployments recommended in SECTSM report.

TABLE 11 describes the potential project deployments for Corridor and Congestion Management.

TABLE 11: Recommended Corridor and Congestion Management Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
I-95 Interstate ITS Deployment (DE State Line to Airport) – Project includes deployment of: ▪ 19 CCTV Cameras ▪ 5 DMS ▪ 40 Vehicle Detectors	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program
I-95 Interstate ITS Deployment (Island Ave. to Vine St.) – Project Includes Deployment of: ▪ 6 CCTV Cameras ▪ 2 DMS ▪ 20 Vehicle Detectors	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program

TABLE 11(Cont.): Recommended Corridor and Congestion Management Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
I-95 Interstate ITS Deployment (Bus. Rt.1 to NJ State Line) – Project Includes Deployment of: ▪ 9 CCTV Cameras ▪ 8 DMS ▪ 40 Vehicle Detectors	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program
I-476 Interstate ITS Deployment (I-95 to PA Turnpike) – Project Includes Deployment of: ▪ 9 CCTV Cameras ▪ 8 DMS ▪ 35 Vehicle Detectors	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program
Deployment of Future I-76 TSM Component Projects – Areas of focus include: ▪ Arterial signal system and ITS deployment ▪ Increased data collection along I-76 Corridor ▪ Enhanced communications between 911 centers ▪ Establishment of permanent position for traffic signal operations ▪ Automated speed enforcement	PennDOT 6-0	TSOP-03 – Interstate Incident Management Program TSOP-05 – Incident Management Processes and Procedures TSOP-11 – Technology Assisted Enforcement
Develop Regional Strategic Corridor Investment Plan – Areas of focus include: ▪ Identify and prioritize regional corridors ▪ Compile data along corridors for traffic signal asset management system ▪ Identify specific needs along each corridor ▪ Establish criteria for weighing prioritization inputs ▪ Identify type of interconnect/ communication	DVRPC	TSOP-03 – Interstate Incident Management Program TSOP-08 – TAC Signal Study Implementation
Strategic Arterial Corridor Signal Inspection and Revision Program – To be applied to priority corridors identified by Strategic Corridor Investment Plan. Program includes contracting vendors to provide inspections, traffic counts, and revised timing plans on 3-5 year cycles.	PennDOT 6-0	TSOP-03 Interstate Incident Management System TSOP-08 – TAC Signal Study Implementation

TABLE 11 (Cont.): Recommended Corridor and Congestion Management Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
Strategic Arterial Corridor Signal System Upgrade Program – To be applied to priority corridors identified by Strategic Corridor Investment Plan. Program includes advanced signal system upgrades, interconnection, and bringing signals back to District 6-0 TMC	PennDOT 6-0	TSOP-08 TAC Signal Study Implementation
Signal Priority for Transit Vehicles – Deployment of signal priority for use by SEPTA busses. Focus will be on corridors which have already deployed signal preemption for emergency vehicles. Corridor selection will be tied in to prioritization through Strategic Corridor Investment Plan.	SEPTA PennDOT 6-0 Local Municipalities	TSOP-17 Statewide Transit Operations
Construction of Operations Center for DRPA – Deployment timeframe and location are still to be determined. Construction would include a fiber connection to the PennDOT 6-0 TMC.	DRPA	TSOP-09 STMC and TMC
Construction of Operations Center for Philadelphia Department of Streets – Locations to include facility located at G St. and Ramona St. as well as a possible secondary center location. Construction includes fiber connection to TMC which can be routed through fiber to be deployed as part of I-76 ITS construction.	Philadelphia Department of Streets	TSOP-09 STMC and TMC

3.5 Operations Area – Institutional Coordination

Interagency communication is essential to the efficient management and operation of a regional transportation system. This area reflects the need to both increase the capacity of information sharing as well as the management in the dissemination and utilization of that information. Effective center-to-center communication systems allow all transportation-related agencies to share data and information in a timely and efficient manner. Personnel are able to conduct operations safely and efficiently with seamless communication. A collaborative effort is currently underway to complete and fully implement the RIMIS system between Fall 2007 and Summer 2009. Once fully implemented, RIMIS will become an interface for information exchange and coordination among stakeholders throughout the region. The DVRPC ITS Technical Task Force has been the forum for this regional coordination.

The focus of the Institutional Coordination Operations Area includes:

- Completing and implementing the Regional Integrated Multi-modal Information Sharing (RIMIS) Program.
- Establishing a greater consistency in information sharing.
- Improving the management of transportation operations.

TABLE 12 describes the potential deployments for Institutional Coordination.

TABLE 12: Recommended Institutional Coordination Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
Completion and Implementation of RIMIS System – Implementation of web based system incorporating data interfaces which will gather and distribute real time information among regional transportation stakeholders. Includes additional funding requirements beginning in FY 2009.	DVRPC	TSOP-01 Inter-Agency Incident Reporting System TSOP-05 – Incident Management Processes and Procedures
Construct Fiber Connection to DelDOT - Fiber connection to DelDOT TMC can be made through fiber installed on US-202.	PennDOT 6-0	TSOP-01 Inter-Agency Incident Reporting System TSOP-13 ITS and IT
Construct Fiber Connection to NJDOT – Fiber connection to NJDOT TMC can be made through DRPA bridges or through fiber to be installed as par of I-95/PA Turnpike Interchange Project.	PennDOT 6-0	TSOP-01 Inter-Agency Incident Reporting System TSOP-13 ITS and IT

TABLE 12 (Cont.): Recommended Institutional Coordination Project Deployments

Project Description	Lead Agency	Pertinent TSOP Projects
City of Philadelphia Last Mile Fiber Connections – Fiber connection including software and integration between PennDOT 6-0 and the following agencies: ▪ Philadelphia Department of Streets ▪ Philadelphia Emergency Operations Center ▪ Philadelphia Police ▪ Philadelphia Sports Complex	PennDOT 6-0	TSOP-01 Inter-Agency Incident Reporting System TSOP-13 ITS and IT
Construct Fiber Connection to Select PSP Stations - Fiber connection including software and integration to the PSP dispatch centers located at Philadelphia, Avondale, Media, Skippack, and Trevose.	PA State Police PennDOT 6-0	TSOP-01 Inter-Agency Incident Reporting System TSOP-13 ITS and IT

3.6 Framework Summary

The list of the Needs Areas that were identified at Stakeholder Workshop #1 are listed in **TABLE 13**. The Needs Areas were developed by the planning partners and transportation agencies in the region. Task Force Groups for each need area were formed and met to develop Project Concepts that would help to address the needs. The Project Concepts were developed out of the TSOP projects listed by PennDOT. Some of these concepts were not addressed through deployment projects, but through institutional suggestions to PennDOT Leadership.

TABLE 13: District 6-0 Regional Project Matrix

Needs Areas	High Level Needs	Project Concepts
Incident and Event Management	Improve Incident Management at the regional level	Complete electronic mapping of detour routes and make available on the web
		Develop an interoperable radio system
		Expand regional incident management task forces
	Alert private stakeholders	Alert Goods Movement carriers of incidents
	Reduce duration of incidents	Increase limits and duration of service patrol coverage
		Investigate and promote methods to clear incidents more quickly
		Increase ITS coverage to cover all Interstates
		Increase ability to close limited access highways immediately following incidents
Traveler Information	Increase efficiency of goods movement through traveler information to carriers	Establish information sharing between PennDOT and private industry
		Alert Goods Movement Carriers of incidents
	En-Route	Deploy DMS to key locations
	Pre-Trip	Deploy information kiosk to key locations
		Make recommendations to enhance planned 511 system
	Provide real-time parking information	Deploy parking management systems at key locations
Corridor and Congestion Management	Full ITS Coverage of Interstates	Identify gaps in Interstate ITS coverage and program deployments
	Focus on Arterials where area is not serviced by an Interstate	Include fiber on closed-loop signal projects to accommodate additional ITS
		Identify gaps in Arterial ITS coverage and program deployments
		Identify and prioritize corridors needing new signal system deployment
	Improve traffic signal operations and management	Introduce system for systematic retiming of traffic signals
		Formalize an asset management plan for signalized Arterials
	Utilize ITS Technologies for Transit	Deploy signal preemption for transit vehicles
		Share AVL data with other agencies
Institutional Coordination	Increase capacity to share information between agencies	Establish high-speed data connections between agencies
		Establish information sharing protocols
		Complete regional fiber communications backbone
		Regional Integrated Multi-modal Information Sharing (RIMIS)
	Address current needs for additional TMCs	Construct additional Operations Centers

4. REGIONAL PROGRAM

4.1 Overview

Projects that fall under the ROP are developed based on PennDOT's vision and address one or more of PennDOT's operational needs. The needs of the District 6-0 Region fall under some or all of the projects set forth in the TSOP and are adopted by the ROP. The projects referenced in this plan are selected because of their ability, collectively, to establish an operations framework for PennDOT and contribute markedly towards achieving PennDOT's operational goals. Many of the projects lay a foundation for important work in such areas as incident management and traveler information.

The following is a list of the projects relevant to ROP efforts for the District 6-0 Region that were programmed in the TSOP:

- TSOP-01 Inter-Agency Incident Reporting System
- TSOP-02 Road Closure Reporting System
- TSOP-03 Interstate Incident Management Program
- TSOP-04 Incident Management Traveler Information
- TSOP-05 Incident Management Processes and Procedures
- TSOP-08 TAC Signal Study Implementation
- TSOP-09 STMC and TMCs
- TSOP-10 ITS Equipment Maintenance
- TSOP-12 Mobility in Work Zones
- TSOP-13 ITS and IT
- TSOP-17 Statewide Transit Operations
- TSOP-18 Freight Movement Assessment

These projects are the building blocks of the ROP. They are significant statewide priorities that were outlined in the TSOP and can be paralleled to regional needs that can bring potential benefits to District 6-0.

4.2 Mainstreaming Operations

Pennsylvania's Regional ITS Architecture set the plan for "mainstreaming" ITS throughout Pennsylvania. "Mainstreaming" is, simply, getting technology issues in the transportation environment in front of the representative regional bodies for discussion, analysis, and decision making, in the same way that traditional transportation improvements are processed. ITS and Operations can no longer be considered just a PennDOT initiative, but must now be viewed as requiring regional input.

The ROP lays out the region's short-term and long-term approach to transportation operations. It identifies, defines, and prioritizes operational-focused projects for the region that are consistent with regional and statewide operations objectives. The extent

of devices to be deployed and the funding available for deployment are the factors used to determine implementation.

4.3 Project Priorities and Sequences

The Recommended ROP project deployments were developed based on group discussions held at the four Stakeholder Workshop/Task Force meetings. Each project was categorized as a short-term or long-term deployment based on the projects overall need, required funding, and complexity. Detailed project descriptions can be found in **Appendix A** for short-term projects and **Appendix B** for long-term projects.

Once project lists were formulated, the regional stakeholders were asked at Stakeholder Workshop #2 to rank each project deployment based on the need they saw each as having in the District 6-0 Region. Stakeholders voted separately for long-term and short-term, so two lists of project priorities came out of the process. Stakeholders were asked to vote on a scale of 1 (low priority) to 5 (high priority). This ranking process was used to determine regional priorities as each Stakeholder saw fit for the District 6-0 Region. A number of factors were considered when establishing these rankings:

- Need
- Complexity of the Project
- Funding Availability
- Prior Projects that would be required
- Regional Coordination

TABLE 14 identifies the Short-Term project priorities for the District 6-0 Region and **TABLE 15** identifies the Long-Term prioritized projects. The priorities established in this plan are intended to help determine where ITS funding should be focused for the 2009-2012 TIP. It also provides a roadmap for the planning partners to plan, fund, and implement ITS initiatives in a way that supports the regional vision and objectives.

Short-Term Program

The projects listed under the short-term program are those to be implemented/ constructed within a 0-2 year period. Projects proposed for short-term deployment include highway ITS deployment, communications infrastructure, a traffic signal asset management system, transit ITS, and incident management programs. All elements classified as part of the short-term plan are either considered a high-priority or have a relatively low cost/complexity. Short-Term Projects are included below in **TABLE 14**.

The cost of short-term deployments has been broken up into short-term capital costs and long-term operations and maintenance (O&M) costs. Funding for capital costs will be requested through the FY 2009 TIP update or appropriate work programs. It should be noted, however, that since the next TIP update does not occur until FY 2009, short-term projects that will require TIP funding are to be projected out to FY 2009-2011. The long-term O&M costs are to be addressed through statewide maintenance funding or, if funding is unavailable, be included in subsequent ROP updates as an immediate funding need. Also included with the O&M costs is the anticipated year for which that annual cost is to begin occurring.

TABLE 14: District 6-0 Regional Short-Term Project Priorities

Priority	Project ID	Project Deployment	Lead Agency	ST Capital Cost	LT O&M Cost (year)
1	**ST-01**	I-95 ITS Deployment (DE State Line to Airport)	PennDOT 6-0	$13,000,000	$650,000 (2011)
2	**ST-02**	Service Patrol Coverage Phase I	PennDOT 6-0	N/A	$570,000
3	**ST-03**	Philadelphia Last Mile Fiber Connections	PennDOT 6-0	$1,000,000	$60,000 (2009)
4	**ST-04**	Completion and Implementation of RIMIS System	DVRPC	$250,000 / additional data interface	$350,000 (2009)
5	**ST-05**	Develop Regional "Strategic Corridor Investment Plan"	DVRPC	$75,000	$20,000
6	**ST-06**	Strategic Arterial Corridor Signal Inspection and Revision Program	PennDOT 6-0	N/A	$3,000/signal (2008)
7	**ST-07**	Strategic Arterial Corridor Signal System Upgrade Program	PennDOT 6-0	N/A	$15,000/signal (2009)
8	**ST-08**	Establish Incident Management Task Forces	DVRPC	$100,000	$20,000/TF (2008)
9	**ST-09**	Fiber Connection to DelDOT	PennDOT 6-0	$250,000	$15,000
10	**ST-10**	Continue to Update and Provide PennDOT Detour Routes via the Internet	DVRPC	N/A	TBD
11	**ST-11**	Limited Access Highway Ramp Closures	PennDOT 6-0	$50,000 plus deployment cost	TBD
12	**ST-12**	Signal Priority for Transit Vehicles	SEPTA, PennDOT 6-0, Municipalities	$10,000/signal $5,000/vehicle	$1,000/signal $500/vehicle (2009)
13	**ST-13**	Develop Recommendations for NHS Connectors	DVRPC Goods Movement Task Force	TBD	TBD
14	**ST-14**	Traveler Information Pamphlet for Goods Movement	PennDOT 6-0	$100,000	TBD

Long-Term Program

The ITS/Operations recommendations proposed for long-term deployment according to the ROP should be completed beyond 2 years. These deployments include Interstate ITS deployments, communications infrastructure, construction of new operations centers, and parking management. The projects listed as "long-term" are those that require large amounts of funding, are highly complicated or are not as high of a priority.

The bi-annual ROP updates will allow these projects to be updated as they progress to their deployment stage. All elements classified as part of the long-term plan are considered on a 3-4 year timeframe and included below in **TABLE 15**.

TABLE 15: District 6-0 Regional Long-Term Project Priorities

Priority	Project ID	Project Deployment	Lead Agency	Capital Costs	O&M Costs
1	**LT-01**	I-476 ITS Deployment (I-95 to PA Turnpike)	PennDOT 6-0	$8,000,000	$300,000
2	**LT-02**	I-95 ITS Deployment (Island Ave. to Vine St.)	PennDOT 6-0	$3,600,000	$150,000
3	**LT-03**	I-95 ITS Deployment (Bus Rt. 1 to NJ State Line)	PennDOT 6-0	$5,200,000	$210,000
4	**LT-04**	Service Patrol Coverage Phase II	PennDOT 6-0	$600,000	$3,500,000
5	**LT-05**	Fiber Connection to Select Pennsylvania State Police Barracks	PA State Police	$750,000	$50,000
6	**LT-06**	Construction of Operations Center for City of Philadelphia	Philadelphia Department of Streets	TBD	TBD
7	**LT-07**	Fiber Connection to NJDOT	PennDOT 6-0	$250,000	$15,000
8	**LT-08**	Construction of Operations Center for DRPA	DRPA	TBD	TBD
9	**LT-09**	Parking Management System for Select SEPTA Facilities	SEPTA	$100,000/site	$10,000/site
10	**LT-10**	Parking Management System for Philadelphia International Airport	Philadelphia International Airport	$600,000	$50,000

TABLE 15 (Contd.): District 6-0 Regional Long-Term Project Priorities

Priority	Project ID	Project Deployment	Lead Agency	Capital Costs	O&M Costs
11	**LT-11**	Deployment of Future I-76 TSM Component Projects	PennDOT 6-0	TBD	TBD
12	**LT-12**	Traveler Information System Deployment to Regional Tourist/Intermodal Centers	PennDOT 6-0	$20,000/site	$2,000/site
13	**LT-13**	Parking Management System for Philadelphia Sports Complex	Philadelphia Sports Complex	$500,000	$50,000

4.4 Regional Oversight

Ultimately, to be successful, ROP implementation will require the collaboration of many stakeholders. However, to help move the implementation process forward, it is expected that District 6-0 and the regional planning partners will provide oversight and eventually be responsible for championing this Plan. This Committee will further track progress on implementation, oversee any regional projects, track performance measures and lead the update of any future ROPs.

4.5 Measuring Success

To better ensure that operations-related efforts are producing meaningful results, projects that can be measured, should be. For most of the projects within the ROP, there are one or more key measures proposed to monitor the effectiveness of the project. While we would ideally measure desired outcomes, in the absence of outcome measures, the team suggests measures that are more output-oriented.

The goal of performance measurement is to attempt to quantify and understand the impacts of projects to assist in future decision-making. What worked? What didn't work? And why? This is critical in assessing the benefits of policies or projects and will be useful in making the case for future operations projects.

Some caveats should be given. Isolating and measuring the true impacts of operations policies, programs and projects is challenging. Determining and quantifying cause and effect can be extremely difficult in a dynamic environment such as a transportation system. Care needs to be exercised so that any such analysis is technically grounded and defensible. In developing each project, the Steering Committee should make a determination as to whether impacts of projects can be analyzed at a reasonable cost. Suggested performance measures for each project are listed in the project descriptions in **Appendix A and B**.

4.6 Institutional Considerations

Throughout the various stakeholder meetings, there were many needs areas raised and suggestions made that fall outside of the limits of ROP project deployments. These suggestions are, nonetheless, regionally significant and need to be captured as part of the ROP. Participants believed that to be appropriately addressed many of these suggestions and recommendations needed to be raised at a level higher than the PennDOT District or the region – either by PennDOT Central Office or the state government. This section identifies and discusses those institutional concerns that were identified as most critical in the opinion of ROP participants.

The institutional suggestions made by District 6-0 Stakeholders fall into the following six categories:

- Increased Capacity for Information Sharing
- Improved Incident Clearance
- 511 System Deployment Recommendations
- Operations Management
- Enhanced Coordination With Pennsylvania Turnpike
- Personnel

Increased Capacity for Information Sharing

The DVRPC is in the process of implementing the Regional Integrated Multi-Modal Information Sharing (RIMIS) system, which, when completed will provide an interface for regional transportation agencies and emergency responders to exchange information. The interface will include a software package, online network and database that will eventually be integrated with the Roadway Closure Reporting System (RCRS).

In the initial rollout, access to RIMIS will be restricted to public agencies. Noting this limited access, Information Sharing Protocols should be built between PennDOT and Information Service Providers (ISPs) to facilitate the efficient exchange of information and ultimately its dissemination to the general public. Statewide, there should be a data intake and integration effort to assist in the delivery of traveler information to the public. PennDOT has already put steps in motion to provide PennDOT video to the public through a partnership with trafficland.com.

An additional suggestion was to include an early action component to ITS deployment projects which would bring individual elements online as they become operational. This would involve PennDOT and contractor policy changes, as currently PennDOT does not assume ownership of individual devices until the entire system has become operational.

Recommendations to consider:

- Building Information Sharing Protocols.
- Intaking and Integrating Statewide Data.
- Including Early Action Components to ITS Deployment Projects.

Improved Incident Clearance

State law currently requires motorists involved in minor incidents to, if possible, move their vehicle out of the flow of traffic. Many motorists, however, do not know that this law exists and are reluctant to move their vehicles for fear of insurance claims being denied. In order to make drivers more aware of this requirement, the Schuylkill Expressway Corridor Transportation Systems Management (SECTSM) Plan included a project deploying fender bender signage throughout the I-76 Corridor. The regional stakeholders felt that these types of deployments should be expanded throughout the entire region and be accompanied by a regional marketing campaign to make travelers more aware of these laws.

Going a step further, the states of Florida and Washington have recently enacted Rapid Clearance programs. Rapid Clearance includes a flat fee for tow trucks that respond to incidents as well as liquid damages for trucks which take longer than 90 minutes to clear the roadway. The program also includes cash incentives for those trucks which bring proper equipment to clear roadway debris from the scene. Along the Florida Turnpike, Rapid Clearance has led to a 30 minute reduction in incident duration. The stakeholders recommended that the region as a whole investigate and promote rapid clearance legislation at the statewide level.

Recommendations to consider:

- Promote Quick Clearance Laws.
- Investigate and Promote Rapid Clearance Legislation.
- Conduct Table-Top Exercises.
- Conduct Joint Training – NIMS/ICS.

511 System Deployment Recommendations

The regional stakeholders have recommend that included in the 511 website deployment, there be a multi-modal trip planning component. A multi-modal trip planner would be most helpful to travelers traveling into the city of Philadelphia and may need to use a combination of car, bus, rail, and walking to arrive at their destination. Also, being able to pre-plan a trip covering multiple modes of transportation will help encourage travelers to rely more on public transit. In addition to multi-modal trip planning, the 511 system should contain information from adjoining state's transportation agencies including DelDOT, NJ DOT, DRPA, BCBC, NJ Transit, PATCO, AMTRAK.

Recommendations to consider:

- Include Multi-Modal Trip Planning Component in 511 Website Deployment.
- Include Information from Adjoining States.

Operations Management

One item of great interest within the Workshop and Task Forces was the perceived limited visibility and importance of ITS and operations within PennDOT. In an effort to elevate operations, the stakeholders have recommended conducting ITS and Operations reviews on all new PennDOT and land development projects being planned throughout

the district. These reviews should be linked to FHWA's new work zone regulations. When feasible, PennDOT should consider employing ITS devices to facilitate work zone traffic management. Once construction is completed, these devices can become permanent.

As the focus shifts towards better operating the transportation systems that we currently have in place, there will need to be a plan in place in order to ensure that the operations systems deployed are working up to their designed potential. To this end, the regional stakeholders have recommended developing a statewide ITS asset management plan to identify metrics for performance standards as well as policies and procedures for the operations and maintenance of these assets.

Recommendations relating to traffic signal operations coming out of task force discussions include recommending to PennDOT Central Office that a strike off letter should require that traffic signals have the capability for dual operation. It was also recommended that district staff be responsible for signal operations during incident and other emergency conditions. For this to occur, Memorandums of Understanding (MOU) must be in place between PennDOT and the individual municipalities.

A recurring topic of discussion throughout the stakeholder workshops and incident/event management task forces were the benefits that could be incurred by converting to an interoperable radio system. The regional stakeholders are recommending that a statewide interoperable radio system be established. The district currently operates an 800 Mhz. radio as part of the PA-309 construction project, and has shown great success in its capacity for facilitating more seamless communications. Having an interoperable system in place will greatly increase the coordination in the deployment of emergency responders and management of incidents.

Recommendations to consider:

- Conduct Operations and ITS Reviews on All New PennDOT Projects.
- Utilize ITS Devices in Work Zones.
- Create Statewide ITS Asset Management Plan.
- Convert to Statewide Interoperable Radio System.
- Design Signals for Dual Operation
- Establish MOUs with Municipalities for Operations of Signals During Incidents.
- Lobby for the Creation of a Dedicated Funding for Operations in the Transportation Budget

Enhanced Coordination with Pennsylvania Turnpike

As noted in Section 2, the Pennsylvania Turnpike Commission (PTC) operates approximately 85 miles of highways throughout the District. As these highways are some of the most heavily traveled and congested in the region, there were many suggestions throughout task forces and workshops made pertaining to the general need for more and better coordination between the PTC and regional transportation stakeholders as well as making an effort to get the PTC involved in future ROP updates and activities.

When incidents occur on the Pennsylvania Turnpike traffic is diverted onto PennDOT operated parallel routes. A general need identified was to update the existing incident management plan, "Plan X". In doing so, it was recommended that a joint operations committee and task force be formed through the DVRPC where specific initiatives can be considered including updating the incident management plan, standardization and coordination of signing on I-476 and along parallel roadways. These groups would establish a forum for ongoing, regular meetings between the PTC and regional transportation stakeholders.

ITS initiatives recommended include constructing a fiber connection between PennDOT and the PTC, making it possible for video, DMS, and data sharing between the two agencies. Installing conduit and fiber along the Northeast extension will provide PennDOT with a means of further broadening its fiber communications backbone.

Recommendations to consider:

- Data and video sharing through a fiber connection with PennDOT
- DMS Sharing
- Coordination of Parallel Routes
- Establishing Task Forces Through DVRPC
- Forming a Joint Operations Committee
- Sign Deployment to I-476
- Conduit Deployment on Northeast Extension to Quakertown
- Creating a Joint Incident Management Plan
- Invite PTC to play a larger role in future ROP updates and activities

Personnel

Historically, PennDOT's mission has been to be the designer, builder and maintainer of the state roadway system. Due to the recognition of increasing congestion, the advent of new technologies, and fiscal constraints, it is now being asked to improve operations of the transportation system. This is a concern that has been raised by other ROP stakeholder groups throughout the state and is currently being addressed at the statewide level through the development of TSOP-20: Personnel/Organization. It has been recommended by the regional stakeholders that District 6-0 address its operations staffing needs in concurrence with the policies that come out of this statewide effort.

Additional district suggestions relating to personnel include creating an Assistant District Executive of Operations and elevating the District ITS Coordinator to a full time position. Another position that was suggested was that of a Regional Signals Manager, who would coordinate and advance the district's signal needs. It was noted that during the creation of these positions it should be made clear exactly what the job responsibilities of these individuals will include, in order that they be able to better devote their time to enhancing the region's signal and operations direction. There is also a need to establish a formal training program for both PennDOT and consultant operations staffing.

Recommendations to consider:

- Address Staffing Needs in Concurrence with TSOP-20.

- Create Assistant District Executive of Operations and Move District ITS Coordinator to a Full Time Position.
- Create a Regional Signals Manager Position.
- Establish a Standard Training Program for Operations Staffing.

5. APPROACH TO FUNDING

Linking planning and operations is important to improve transportation decision-making and the overall effectiveness of the system. Coordination between planners and operators helps ensure that regional transportation investment decisions reflect full consideration of all available strategies and approaches to meet regional goals and objectives.

Funding is a powerful tool for promoting participation. Agencies may be unaccustomed to coordinating with other agencies for operations, or perceive that coordination provides more hardship than benefit. When this is the case, providing additional resources in exchange for participation may overcome this issue. Planning partners can champion operations through training and other forums to promote regional operations strategies. Linking participation to funding access is the key. For example, an agency may become eligible for matching funds only by participating in a regional operations training program or an established regional operations group.

Almost every transportation agency identifies inadequate funding as a major concern. At the same time, virtually every agency acknowledges that funding constraints are a major impetus for advancing operations strategies. In many cases planners often become champions for relatively low-cost operations strategies after recognizing that the discrepancy between available funds and the cost of new capital investments to maintain regional mobility is too high.

Funding Sources

There are a number of funding sources that can support operations activities and equipment. Funding for system operations traditionally has relied on the discretionary budgets of individual agencies. However, due to the mainstreaming of operations through TSOP and ROP activities, statewide policies now allow several funding sources to be used for regional operations programs. Federal programs are also in place to encourage and promote the safe and efficient management and operation of integrated, intermodal surface transportation systems to serve the mobility needs of people and freight and foster economic growth and development.

Regional Funding

Depending on the project type, various funding approaches may be available for consideration. In the ROP, for priority projects, a project description and high-level scope of the project should have been developed. Projects should have been defined in terms of planning type projects or deployment-type projects. Planning-type projects are programmatic and policy-oriented in nature. If the project is a planning-type project, it may be considered in the DVRPC's Work Program.

Projects that define and lead to specific ITS deployment can proceed into the TIP process for funding. These types of projects can either become stand-alone capital deployment or can be packaged as part of a wide-area deployment or construction project. These deployment projects will be required to follow the USDOT-defined

systems engineering process. Using this process will ensure consistency with project definition, integration, and consideration of ongoing operations and maintenance requirements. The FY 2009 TIP update process will be completed in Summer 2008.

At the discretion of each planning partner and PennDOT District, projects may arrange pooled funding to achieve multi-jurisdictional benefit. PennDOT's Central Office may also decide to fund multiple cross-jurisdictional efforts using A-140 or other mechanisms to ensure coordinated statewide benefit. These types of pooled funding arrangements are project-specific and can be achieved when coordination and cooperation exists and the benefits of pooled or Central Office funding outweigh the administrative cost.

Federal Funding

There is flexibility in the use of federal funds for operations projects championed by planning partners and PennDOT. FHWA can fund traffic monitoring, management, and control for continued operations of the system, freeway surveillance, incident management efforts, travel information systems, and traffic signal control.

Federal funds are eligible for operating costs in labor, administrative, utilities, rent, and system maintenance associated with hardware and software maintenance (preventive and corrective).

For the use of interstate maintenance (IM) funds, eligibility is based on how "maintenance" and the Interstate Maintenance program are defined in Title 23 (USC 119, 116). If the project is a capital improvement to the interstate highway (such as deploying field devices to improve the highway) or involves preventive maintenance on the devices themselves, it would be eligible for IM funds.

Some of the eligible IM costs include:

- Infrastructure-based improvements, such as new DMS, CCTV, detectors, and communication systems.
- Replacement or rehabilitation of infrastructure, such as replacing components of DMS or CCTVs.
- Preventative maintenance on the roadway traffic management infrastructure.
- Preliminary engineering directly related to infrastructure improvements.

If the project involves operations costs involving communications maintenance (routine or corrective) it would not be eligible.

6. CONCLUSION

Transportation agencies today do not have the luxury of undertaking massive new capacity expansion projects, yet are challenged to improve mobility and reduce congestion for travelers, visitors and businesses on its transportation system.

In response to these requirements, new approaches and innovative techniques are being explored to improve the system's operational performance, as well as keep the network safe and secure. Better management of existing facilities is simply the new way of doing business.

Through the guidance of the statewide Transportation Systems Operations Plan and the implementation of region-specific projects documented in this report, these needs are being addressed.

The regional solutions addressed in the ROP tend to be cost effective in supporting (not eliminating) regional congestion issues. So as the region begins to review transportation options, a goal should be to have ITS and operations solutions examined, weighed and equally placed in the public forum for regional consideration and funding. This will ensure that innovative and cost effective solutions get a fair hearing alongside more costly capacity expansion projects.

Continued success relies on integration and coordination between PennDOT, regional planning partners and transportation stakeholders who together will systematically build operations programs based on policies, studies and physical deployments. These improvements will ultimately help improve the mobility, better manage incidents and emergencies and provide for real-time traveler information.

With the long-range scope of these efforts it will take hard work from Stakeholders in the District 6-0 Region and the surrounding PennDOT Districts to fully realize the goals set out in the ROP. In return the District 6-0 Region will have a safer and more reliable transportation system for its future.

APPENDIX A: SHORT-TERM PROJECT DEPLOYMENTS

ST-01: I-95 ITS DEPLOYMENT (DE STATE LINE TO AIRPORT)

PROJECT DESCRIPTION AND SCOPE: Project will address gaps in ITS device coverage on I-95 from the Delaware State Line to the Philadelphia International Airport. Deployment includes the following ITS devices:

- 19 CCTV Cameras
- 5 DMS
- 40 Vehicle Detectors

PROJECT LEAD: PennDOT District 6-0

PERTINENT TSOP PROJECTS: TSOP-03

ESTIMATED SCHEDULE: 2-4 yrs. (programming for FY 2009)
Design: 1-2 yrs.
Deployment: 1-2 yrs. immediately following design

ESTIMATED COSTS:
Capital: $13,000,000
Annual O&M: $650,000 (2011)

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV, DMS, vehicle detection, fiber-optic communications.

PREREQUISITES AND DEPENDENCIES: Completion of the statewide Interstate ITS Deployment Plan.

PERFORMANCE MEASURES: % of lane-miles of facilities (by classification) covered by CCTV, detection devices, etc.; reduction in non-recurring hours of delay.

BENEFITS: Improved surveillance, detection, verification and notification of incidents and emergencies along I-95.

OTHER CONSIDERATIONS AND ISSUES: ITS deployment could possibly be programmed as part of the I-95/US-322 Interchange project.

ST-02: Service Patrol Coverage Phase I

Project Description and Scope: Existing service patrol coverage has been shown to have very positive feedback from motorists. A high priority need is to increase coverage to include all Interstates. Phase I of this project includes implementations to be made within the next two years. Elements of this project include:

- Maintain funding for all existing coverage
- Expand I-95 coverage to include all of Bucks County on a rush hour basis
- Continue rush hour coverage on PA-309 following completion of construction project

Project Lead: PennDOT 6-0

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 0-2 years
Study: N/A
Design: N/A
Deployment: 0-2 years

Estimated Costs:
Capital: N/A
Annual O&M: $570,000 (2008)

Project Type: Program Development

Level of Effort: Complex

Technology Components *(if applicable)*:

Prerequisites and Dependencies: None

Performance Measures: Number of motorists served; Reduction in time necessary to clear incidents.

Benefits: Will complete rush hour service patrol coverage on the region's interstates. Service Patrol coverage helps to keep corridors safe and reduce delay resulting from incidents.

Other Considerations and Issues: Annual operations costs vary as they are driven by the fluctuations in costs for fuel and insurance. It was suggested that this project be incorporated as an additional element to the renewal of the existing service patrol contract when it expires at the end of 2008.

ST-03: City of Philadelphia Last Mile Fiber Connections

Project Description and Scope: Construction of a fiber connection and deployment of additional software and equipment to the following locations in the City of Philadelphia:

- Philadelphia Streets Department – G and Ramona St.
- Philadelphia Sports Complex Operations Center – Wachovia Center
- Philadelphia Emergency Operations Center – 240 Spring Garden St.
- Philadelphia Police Dispatch Center – One Franklin Square

Project Lead: PennDOT 6-0
Other Stakeholders: Philadelphia Streets Department, Philadelphia Sports Complex, Philadelphia Fire Department, Philadelphia Police.

Pertinent TSOP Projects: TSOP-01, TSOP-13

Estimated Schedule: 1-2 yrs	**Estimated Costs:**
Study: N/A Design: 0-1yrs Deployment: 0-1 yrs	Capital: $1,000,000 Annual O&M: $60,000 (2009)

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Fiber-optic communications, video sharing equipment and software.

Prerequisites and Dependencies: Selection of connection locations and completion of fiber construction on I-76.

Performance Measures: Improved incident management and coordination; Reduction in incident response time.

Benefits: Access to video footage and other information will help to enhance the Police and EOC's abilities to respond to incidents and 911 calls. Direct connection to PennDOT will allow the Streets department to better manage city roadways and allow the Sports Complex to better manage congestion resulting from large scale events.

Other Considerations and Issues: N/A

ST-04: Completion and Implementation of RIMIS System

Project Description and Scope: The Regional Integrated Multi-modal Information Sharing (RIMIS) program has been developed as a collaborative effort between the DVRPC and multiple regional transportation stakeholders. RIMIS will consist of web based software centered on Transcom's RA Web. Once implemented, the software will incorporate data interfaces which automatically capture information and distribute it to regional transportation and emergency operations agencies. Information distributed will include incident notifications, maintenance and construction activities, congestion levels, travel speeds and VMS information. Current progress includes development of concept of operations and functional requirements. The system is scheduled to begin implementation in Fall 2007.

Funding had been put in place to purchase the license, purchase equipment and software, construct two data interfaces and operate the system for the first year. Additional funding will be required in FY 2009 to add additional data interfaces and continue operations of the system.

Project Lead: DVRPC
Other Stakeholders: PennDOT 6-0, Counties, DRPA, FHWA, PTC, SEPTA, City of Philadelphia, NJDOT

Pertinent TSOP Projects: TSOP-01, TSOP-05

Estimated Schedule: 0-2 yrs	**Estimated Costs:**
Study: N/A	Capital: $250,000/Data Interface
Design: N/A	Annual O&M: $350,000 (2009)
Deployment: 0-2 yrs	

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: RIMIS software and data interfaces.

Prerequisites and Dependencies: TIP funding is required for the operations of the system beyond FY 2008 as well as the cost of adding additional data interfaces.

Performance Measures: Improvement in inter-agency coordination; access to real-time traffic and transit information.

Benefits: The RIMIS system will provide a single interface with which to distribute and receive information from multiple stakeholders and provide a "big picture" of events occurring throughout the region. This information exchange will help to facilitate improved inter-agency coordination.

Other Considerations and Issues: Additional data interfaces will be funded through TIP amendments as needed whenever agencies are ready to construct the data interface. TIP funding will be shared by NJDOT and PennDOT.

ST-05: Develop Regional Strategic Corridor Investment Plan

Project Description and Scope: This project focuses on the creation of a GIS-based Signal Asset Management System to better assist in identifying key corridors for developing a signal upgrade and integration plan. The Plan will include:

- Identifying key arterial corridors to be evaluated and prioritized according to regional function.
- Compiling data along these corridors for the Traffic Signals Asset Management System.
- Identifying specific needs in each corridor, such as signal locations, Closed-Loop Signal Systems, CCTV, and DMS.
- Establishing system of weighing criteria to be used in the evaluation of priority.
- Identify the type of interconnect, signals included in interconnection, locations of master controllers, and type of communications (Should be coordinated with statewide TSAMS effort)

Project Lead: DVRPC
Other Stakeholders: PennDOT 6-0, Counties

Pertinent TSOP Projects: TSOP-03, TSOP-08

Estimated Schedule: 0-1 yrs	**Estimated Costs:**
Study: 0-1 yrs	Capital: $75,000
Design: N/A	Annual O&M: $20,000
Deployment: N/A	

Project Type: Planning

Level of Effort: Moderate

Technology Components *(if applicable)*: Traffic signals GIS database.

Prerequisites and Dependencies: Identification of significant regional corridors. Further development of TSAMS through TSOP-08.

Performance Measures: Signal delay; Travel time (during both normal and incident conditions).

Benefits: As a repository for of traffic signal information this tool can also improve traffic signal planning, design, installation, maintenance and operation.

Other Considerations and Issues: Planning should be coordinated with statewide TSAMS effort. Corridor prioritization will serve as an input into other corridor signal system and ITS deployment projects. Plan will work together with the Signal Inspection/Revision and Signal System Upgrade Programs to create a comprehensive asset management system for the region's traffic signals.

ST-06: Strategic Arterial Corridor Signal Inspection and Revision Program

Project Description and Scope: This program is to be applied to corridors identified as high priority through the Strategic Corridor Investment Plan. It will include contracting vendors to provide signal inspections, traffic counts, and signal retiming at 3-5 year intervals.

Project Lead: PennDOT 6-0
Other Stakeholders: DVRPC, Counties, Municipalities

Pertinent TSOP Projects: TSOP-08

Estimated Schedule: Continuous Updating	**Estimated Costs:**
Study: N/A	Capital: $3,000/signal
Design: N/A	Annual O&M: None
Deployment: N/A	

Project Type: Policy and Program Development **Level of Effort:** Moderate

Technology Components *(if applicable)*: None

Prerequisites and Dependencies: Identification and prioritization of regional corridors through Strategic Corridor Investment Plan.

Performance Measures: Implementation of a systematic process for the periodic updating of traffic signal timings along the region's priority arterials.

Benefits: Regular signal retiming will assure that all signals on priority corridors are operating efficiently, which will, in turn, reduce travel times.

Other Considerations and Issues: This program will work together with the Strategic Corridor Investment Plan and Signal System Upgrade Program to create a comprehensive asset management system for the region's traffic signals.

ST-07: STRATEGIC ARTERIAL CORRIDOR SIGNAL SYSTEM UPGRADE PROGRAM

PROJECT DESCRIPTION AND SCOPE: This program is to be applied to corridors identified as high priority through the Strategic Corridor Investment Plan. Elements of this program will include:

- Advanced signal system upgrades
- Signal interconnection
- Tying of signal systems back to PennDOT 6-0 TMC

PROJECT LEAD: PennDOT 6-0
OTHER STAKEHOLDERS: DVRPC, Municipalities

PERTINENT TSOP PROJECTS: TSOP-03, TSOP-08

ESTIMATED SCHEDULE: Continuous Updating
Study: N/A
Design: N/A
Deployment: N/A

ESTIMATED COSTS:
Capital: $15,000/signal
Annual O&M: varies

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Fiber-optic communications, Closed Loop Signal Systems, ITS devices.

PREREQUISITES AND DEPENDENCIES: Identification and prioritization of regional corridors through Strategic Corridor Investment Plan

PERFORMANCE MEASURES: Reductions in travel time and signal delay.

BENEFITS: Deployment and coordination of advanced signal systems will help in reducing recurring congestion on the regions arterials as well as improve traffic flow when vehicles are diverted onto alternate routes following incidents.

OTHER CONSIDERATIONS AND ISSUES: This program will work together with the Strategic Corridor Investment Plan and Signal System Inspection and Revision Program to create a comprehensive asset management system for the region's traffic signals.

ST-08: Establish Incident Management Task Forces on Key Corridors

Project Description and Scope: Incident management task forces currently exist for the I-76/I-476, US-422, and PA-309 corridors. Additional task forces would improve the coordination and communication between incident responders. I-95, I-76 and I-476 corridors are good candidates for initial deployment. Elements of this project include:

- Holding periodic meetings with transportation organizations and incident responders.
- Conducting table top exercises as practice for incident response
- Instituting training programs for incident responders
- Developing Pre-defined Emergency Response Plans
- Conduct periodic incident reviews between responders and transportation agencies

Project Lead: DVRPC
Other Stakeholders: PennDOT 6-0, PSP, Local Police/Emergency Responders, County TMA's

Pertinent TSOP Projects: TSOP-01, TSOP-03, TSOP-05

Estimated Schedule: 0-2 yrs
Study: N/A
Design: N/A
Deployment: 0-2 yrs

Estimated Costs:
Capital: $100,000
Annual O&M: $20,000/corridor (2008)

Project Type: Program Development

Level of Effort: Simple

Technology Components *(if applicable)*: None

Prerequisites and Dependencies: Selection of appropriate corridors.

Performance Measures: Number of emergency response plans; Number of emergency response exercises conducted per year; Improvement in incident clearance; Number of secondary crashes.

Benefits: Will bring together incident responders and transportation agencies and facilitate greater communications and cooperation. Incident reviews and table-top exercised will help identifying procedures for more efficient and coordinated incident clearance and mitigation.

Other Considerations and Issues: N/A

ST-09: FIBER CONNECTION TO DELDOT

PROJECT DESCRIPTION AND SCOPE: Project includes the construction of a fiber connection and integration to the Delaware Department of Transportation. The connection can be made through fiber installed on US-202

PROJECT LEAD: PennDOT District 6-0
OTHER STAKEHOLDERS: DelDOT

PERTINENT TSOP PROJECTS: TSOP-13

ESTIMATED SCHEDULE: 1-2 yrs
Study: N/A
Design: N/A
Deployment: 1-2 yrs

ESTIMATED COSTS:
Capital: $250,000
Annual O&M: $15,000 (2009)

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Fiber-optic communications

PREREQUISITES AND DEPENDENCIES: Placement of fiber to be deployed as part of planned I-95 ITS projects in Delaware County.

PERFORMANCE MEASURES: Improved traveler information across state borders; Reduction in delay resulting from major incidents.

BENEFITS: Will allow for better response to and coordination of incidents that impact both Delaware and Pennsylvania, most specifically on I-95.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-10: CONTINUE TO UPDATE AND PROVIDE PENNDOT DETOUR ROUTES VIA THE INTERNET

PROJECT DESCRIPTION AND SCOPE: The DVRPC is currently in the process of updating and posting detour routes to the web. This project expands on that effort to:

- Continue to update existing detour routes
- Institute a web based detour routing program accessible to incident responders
- Possible future integration with Roadway Closure Reporting System
- Expand detour routes to include PA Turnpike and DRPA facilities

PROJECT LEAD: DVRPC
OTHER STAKEHOLDERS: PennDOT 6-0

PERTINENT TSOP PROJECTS: TSOP-02, TSOP-05, TSOP-12

ESTIMATED SCHEDULE: Ongoing
Study: N/A
Design: N/A
Deployment: N/A

ESTIMATED COSTS:
Capital: N/A
Annual O&M: TBD

PROJECT TYPE: Program Development

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS *(if applicable)*: GIS database

PREREQUISITES AND DEPENDENCIES: Updating of existing detour routes and GIS database.

PERFORMANCE MEASURES: Easy access to up-to-date detour routes via the internet for transportation agencies and incident responders.

BENEFITS: Detour routes in an electronic format will make them more accessible to all stakeholders as well as being easier to update or change.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-11: Limited Access Highway Ramp Closures

Project Description and Scope: Planning and implementation of a pilot program to deploy ramp closure devices to a limited access highway in the District 6-0 region. Plan will address multiple alternatives including swinging arm gates and DMS. A recommended candidate for initial project deployment was I-476, as it has relatively simple interchanges that are well spaced. Any upgrades to parallel routes will be addressed through the Strategic Corridor Investment Planning Process (ST-4). Project should be coordinated with similar statewide efforts.

Project Lead: PennDOT 6-0
Other Stakeholders: DVRPC

Pertinent TSOP Projects: TSOP-03, TSOP-05

Estimated Schedule: 0-2 years
Study: N/A
Design: 0-2 years
Deployment: Later

Estimated Costs:
Capital: $50,000 for plan development
Annual O&M: N/A

Project Type: Planning

Level of Effort: Moderate

Technology Components *(if applicable)*: Fiber-optic Communications

Prerequisites and Dependencies: None

Performance Measures: Improved incident response; Reduction in delay following incidents.

Benefits: Ability to close highways quickly and efficiently following major incidents will aid emergency responders in clearing incidents.

Other Considerations and Issues: Additional funding will need to be investigated once deployment location and method of closure have been determined. Stakeholders have suggested that a pilot program be coordinated through the I-76 TSM and identified the Gladwyne Interchange as an appropriate location for a feasibility study.

ST-12: Signal Priority for Transit Vehicles

Project Description and Scope: Project includes the deployment of signal priority for SEPTA transit vehicles to critical intersections along select corridors. There will be a focus on corridors which have already installed signal preemption for emergency vehicles. Corridor selection will also be tied into Strategic Corridor Investment Planning Process (ST-04).

Co-Lead Agencies: SEPTA, PennDOT 6-0, Municipalities

Pertinent TSOP Projects: TSOP-17

Estimated Schedule: 1-2 years Study: N/A Design: 0-2 years Deployment: 1-2 years	**Estimated Costs:** Capital: $10,000/signal, $5,000/vehicle Annual O&M: $1,000/signal. $500/vehicle(2009)

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Traffic signal priority

Prerequisites and Dependencies: Completion of Strategic Corridor Investment Plan.

Performance Measures: Improvement in travel time for SEPTA vehicles; Reduction in delays.

Benefits: Will allow for SEPTA busses to run routes with fewer stops at signalized intersections, reducing travel times and fuel consumption.

Other Considerations and Issues: N/A

ST-13: DEVELOP RECOMMENDATIONS FOR NHS CONNECTORS

PROJECT DESCRIPTION AND SCOPE: The DVRPC Goods Movement Task Force has identified key National Highway System (NHS) corridors and connectors in the District 6-0 region and has recommended improvements to be made to these roadways. Under this project, regional stakeholders will develop cost estimates and implement the operational improvements recommended in the report.

PROJECT LEAD: DVRPC Goods Movement Task Force
OTHER STAKEHOLDERS: PennDOT 6-0, Bucks County, Chester County, Delaware County, Montgomery County, City of Philadelphia

PERTINENT TSOP PROJECTS: TSOP-18

ESTIMATED SCHEDULE: 1-2 years
Study: N/A
Design: 1-2 years
Deployment:

ESTIMATED COSTS:
Cost estimates for deployments are to be determined as part of planning effort.

PROJECT TYPE: Planning/Programming

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems, ITS

PREREQUISITES AND DEPENDENCIES: Finalization of NHS Connector Report and Recommendations.

PERFORMANCE MEASURES: Implementation operational recommendations from NHS Connector Report.

BENEFITS: Upgrading the operations of primary goods movement routes will help in increasing the efficiency of goods movement throughout the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-14: Develop and Distribute Traveler Information to Goods Movement Community

Project Description and Scope: Goods Movement Dispatch Centers need to coordinate with transportation agencies and private traffic information providers in order to utilize all existing methods of traveler information. Currently dispatch centers rely on reports from drivers on the road for identification of congested areas. This project includes developing and distributing an information pamphlet, conducting live demonstrations to goods movement organizations, and instituting an online traveler information system specifically for goods movement carriers.

Project Lead: PennDOT 6-0
Other Stakeholders: Goods Movement Dispatch Centers

Pertinent TSOP Projects: TSOP-18

Estimated Schedule: 1-2 years	**Estimated Costs:**
Study: N/A	Capital: $100,000
Design: 0-1 years	Annual O&M: TBD
Deployment: 1-2 years	

Project Type: Deployment

Level of Effort: Simple

Technology Components *(if applicable)*: None

Prerequisites and Dependencies: None

Performance Measures: Reduction in travel times for goods movement carriers.

Benefits: The utilization of alternate methods of traveler information will allow dispatch centers to more effectively divert their fleets around incidents and areas of traffic, keeping trucks off of congested roadways.

Other Considerations and Issues: Direct fiber connection to larger dispatch centers has been recommended as a long-term option to facilitate greater information sharing

APPENDIX B: LONG-TERM PROJECT DEPLOYMENTS

LT-01: I-476 ITS Deployment (I-95 to PA Turnpike)

Project Description and Scope: Project will address gaps in ITS device coverage on I-476 between the I-95 interchange and the Pennsylvania Turnpike. Project includes the deployment of:

- 9 CCTV Cameras
- 8 DMS
- 35 Vehicle Detectors

Project Lead: PennDOT District 6-0

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: N/A	Capital: $8,000,000
Design: 1-2yrs	Annual O&M: $300,000
Deployment: 2-3 yrs	

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: CCTV, DMS, vehicle detection, fiber-optic communications

Prerequisites and Dependencies: Completion of the statewide Interstate ITS Deployment Plan.

Performance Measures: % of lane-miles of facilities (by classification) covered by CCTV, detection devices, etc.; reduction in non-recurring delay.

Benefits: Improved surveillance, detection, verification and notification of incidents and emergencies along I-476.

Other Considerations and Issues: N/A

LT-02: I-95 ITS Deployment (Island Avenue to Vine Street)

Project Description and Scope: Project will address gaps in ITS device coverage on I-95 through Philadelphia. Project includes the deployment of:

- 6 CCTV Cameras
- 2 DMS
- 20 Vehicle Detectors

Project Lead: PennDOT District 6-0

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: N/A	Capital: $3,600,000
Design: 1-2yrs	Annual O&M: $150,000
Deployment: 2-3 yrs	

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: CCTV, DMS, vehicle detection, fiber-optic communications

Prerequisites and Dependencies: Completion of the statewide Interstate ITS Deployment Plan.

Performance Measures: % of lane-miles of facilities (by classification) covered by CCTV, detection devices, etc.; reduction in non-recurring delay.

Benefits: Improved surveillance, detection, verification and notification of incidents and emergencies along I-95.

Other Considerations and Issues: N/A

LT-03: I-95 ITS Deployment (Business Route 1 to New Jersey)

Project Description and Scope: Project will address gaps in ITS device coverage in Bucks County north of the limits of the I-95/PA Turnpike interchange project. Project includes deployment of:

- 9 CCTV Cameras
- 8 DMS
- 40 Vehicle Detectors

Project Lead: PennDOT District 6-0

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 3-4 yrs
Study: N/A
Design: 1-2yrs
Deployment: 2-3 yrs

Estimated Costs:
Capital: $5.200,000
Annual O&M: $210,000

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: CCTV, DMS, vehicle detection, fiber-optic communications

Prerequisites and Dependencies: Completion of the statewide Interstate ITS Deployment Plan.

Performance Measures: % of lane-miles of facilities (by classification) covered by CCTV, detection devices, etc.; reduction in non-recurring delay.

Benefits: Improved surveillance, detection, verification and notification of incidents and emergencies along I-95.

Other Considerations and Issues: N/A

LT-04: Service Patrol Coverage Phase II

Project Description and Scope: Phase II of the ROP Service Patrol Coverage project includes the following elements to be implemented in the next 3-4 years:

- Expand system-wide weekday coverage on all interstates to 16 hours/day
- Deploy limited 16 hours/day weekend coverage to interstates
- Deploy limited overnight coverage to interstates
- Establish rush hour coverage on US-202 (US-30 to West Chester), Woodhaven Expressway, US-1 (PA-63 to New Jersey), US-30 (US-202 to PA-10)
- Consideration and planning for additional arterial coverage

Project Lead: PennDOT District 6-0

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 3-4 yrs
Study: N/A
Design: 1-2yrs
Deployment: 2-3 yrs

Estimated Costs:
Capital: N/A
Annual O&M: $3,500,000

Project Type: Program Development

Level of Effort: Complex

Technology Components *(if applicable)*:

Prerequisites and Dependencies: Implementation of ROP ST-09: Service Patrol Coverage Phase I.

Performance Measures: Number of service patrol vehicles in service, number of motorists served and reduction in time necessary to clear incidents.

Benefits: Will expand upon hours of service patrol coverage on the region's interstates and establish rush hour coverage on many major arterials. Service Patrol coverage helps to keep corridors safe and reduce delay resulting from incidents.

Other Considerations and Issues: Annual operations costs vary as they are driven by the fluctuations in costs for fuel and insurance.

LT-05: Fiber Connection to Select Pennsylvania State Police Barracks

Project Description and Scope: Construction of a fiber connection and deployment of additional software and equipment to Pennsylvania State Police (PSP) Dispatch Centers located at Avondale, Media, Philadelphia, Skippack, and Trevose. Appropriate locations for connection will be evaluated on a station by station basis.

Co-Lead Agencies: PSP, PennDOT 6-0

Pertinent TSOP Projects: TSOP-01, TSOP-13

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: N/A	Capital: $250,000
Design: N/A	Annual O&M: $15,000
Deployment: 3-4 yrs	

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Fiber-optic communications, video-sharing equipment and software.

Prerequisites and Dependencies: None

Performance Measures: Improvement in incident response times.

Benefits: Access to video footage and other information will help to enhance the PSP's ability to respond to incidents.

Other Considerations and Issues: N/A

LT-06: Construction of Operations Center for City of Philadelphia

Project Description and Scope: Construction of primary and secondary Operations Centers with fiber connection to the District 6-0 TMC at the Philadelphia Department of Streets facility located at G St. and Ramona St. Location of backup center TBD. Fiber connection to G and Ramona St. can be made at 9th St. and tied into future deployment as part of I-76 ITS project.

Project Lead: Philadelphia Department of Streets
Other Stakeholders: PennDOT 6-0

Pertinent TSOP Projects: TSOP-09

Estimated Schedule: 3-4 yrs
Study: 0-1 yrs
Design: 1-2 yrs
Deployment: 1-2 yrs

Estimated Costs:
Capital: TBD
Annual O&M: TBD

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: Transportation Operations Center, fiber-optic communications

Prerequisites and Dependencies: None

Performance Measures: Enhanced transportation and incident management capabilities for the Philadelphia Department of Streets.

Benefits: Will allow for enhanced control of ITS/Operations and traffic signals for the Philadelphia Department of Streets.

Other Considerations and Issues: N/A

LT-07: Fiber Connection to NJDOT

Project Description and Scope: Project includes the construction of a fiber connection and integration to the New Jersey Department of Transportation. The connection can be made through fiber to be installed as part of I-95/PA Turnpike Interchange Construction Project, or through DPRA facilities.

Project Lead: PennDOT 6-0
Other Stakeholders: NJDOT

Pertinent TSOP Projects: TSOP-13

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: N/A	Capital: $250,000
Design: N/A	Annual O&M: $15,000
Deployment: 3-4 yrs	

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Fiber-optic communications

Prerequisites and Dependencies: Selection of an appropriate connection location.

Performance Measures: Improved traveler information across state borders; Reduction in delay resulting from major incidents.

Benefits: Will allow for better response to and coordination of incidents that impact both New Jersey and Pennsylvania crossing the Delaware River.

Other Considerations and Issues: N/A

LT-08: Construction of DRPA Operations Center

Project Description and Scope: Construction of an Operations Center with fiber connection to the District 6-0 TMC at a DRPA facility with a location to be determined.

Project Lead: DRPA
Other Stakeholders: PennDOT 6-0

Pertinent TSOP Projects: TSOP-09

Estimated Schedule: 3-4 yrs Study: 0-1 yrs Design: 1-2 yrs Deployment: 1-2 yrs	**Estimated Costs:** To be determined following DRPA plan for complexity of construction.

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: Transportation Operations Center, fiber-optic communications

Prerequisites and Dependencies: DRPA plan for complexity of construction as well as location and deployment timetable.

Performance Measures: Enhanced transportation operations and incident management capabilities for the DRPA.

Benefits: Will allow for DRPA to have increased capabilities in the operations of their facilities as well as share information with PennDOT.

Other Considerations and Issues: N/A

LT-09: Parking Management System for Select SEPTA Facilities

Project Description and Scope: Under this project deployment, a parking management system would be developed for select SEPTA facilities. Displaying parking information online or on DMS can help entice commuters to use public transit more frequently during incidences of roadway congestion. Potential Locations include Cornwells Heights (I-95).

Project Lead: SEPTA
Other Stakeholders: PennDOT 6-0

Pertinent TSOP Projects: None

Estimated Schedule: 3-4 yrs
Study: 0-1 yrs
Design: 1-2 yrs
Deployment: 1-2 yrs

Estimated Costs:
Capital: $100,000/location
Annual O&M: $10,000/location

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Parking Management System, DMS

Prerequisites and Dependencies: Construction of a fiber connection between SEPTA and PennDOT 6-0.

Performance Measures: Travel time for locating parking; Customer satisfaction.

Benefits: Parking management system will help to alleviate alert travelers to parking information at SEPTA facilities and encourage them to use transit services as an alternative.

Other Considerations and Issues: N/A

LT-10: Parking Management System for Philadelphia International Airport

Project Description and Scope: Deployment of a parking management system for the Philadelphia International Airport for both long- and short-term parking and cell phone lots. PennDOT can display parking information on area DMS. Having en-route information on parking will help travelers better plan their trips and seek out alternate arrangements if parking is limited or unavailable. This will decrease the amount of confusion and related congestion once travelers arrive at the Airport.

Project Lead: Philadelphia International Airport
Other Stakeholders: PennDOT 6-0

Pertinent TSOP Projects: None

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: 0-1 yrs	Capital: $600,000
Design: 1-2 yrs	Annual O&M: $50,000
Deployment: 1-2 yrs	

Project Type: Deployment

Level of Effort: Moderate

Technology Components *(if applicable)*: Parking management system, DMS

Prerequisites and Dependencies: None

Performance Measures: Travel time for locating parking; Customer satisfaction.

Benefits: Parking management system will help to alleviate congestion in and around the airport and assist travels in finding appropriate parking.

Other Considerations and Issues: N/A

LT-11: Deployment of Future I-76 TSM Component Projects

Project Description and Scope: This project includes the programming of all I-76 Transportation System Management (TSM) projects yet to be implemented. As it is the prototype integrated corridor management project in the region, all components of the I-76 TSM plan should be implemented and used as a benchmark for future integrated corridor projects. All corridor-related projects are to be incorporated into "Strategic Corridor Investment Plan". This project also includes a prioritization of future TSM projects yet to be programmed which include:

- Incident Clearance Tools
- Retractable Barriers
- Real-time Communications Improvements
- Cell Phone GPS
- Incident Diversion Strategies
- Improved Travel Awareness
- Incident Data Capture
- Staggered Work Times
- Commercial Vehicle Restrictions
- Realignment of EMS Responsibilities
- Automated Speed Enforcement
- Creation of a Signal Systems Operator Position
- Enhanced Communications Between 911 Centers

**Note: This project supports ongoing programming efforts as part of the I-76 TSM, no new deployments have been recommended for programming through the ROP effort, reflected by the lower ranking. However, all of these deployments are of high regional priority.*

Project Lead: PennDOT 6-0
Other Stakeholders: DVRPC, SETPA, Montgomery County, City of Philadelphia

Pertinent TSOP Projects: TSOP-03

Estimated Schedule: 3-4 yrs	**Estimated Costs:** Varies Project to Project
Project Type: Planning and Deployment	**Level of Effort:** Moderate

Technology Components *(if applicable)*: Varies project-to-project

Prerequisites and Dependencies: Prioritization of projects yet-to-be programmed.

Performance Measures: Placement of all I-76 TSM component projects on DVRPC Long Range Transportation Plan.

Benefits: With the completion of the TSM projects, I-76 will be the first integrated corridor in the District 6-0 Region and can be used as a model for similar corridor projects.

LT-12: Traveler Information Deployment to Tourist/Intermodal Facilities

Project Description and Scope: Evaluation of current traveler information systems currently initiated including kiosks and CastNET. Expanded deployments at highly trafficked locations to include:

- 30th St. Station
- King of Prussia Mall
- Philadelphia International Airport
- Philadelphia Convention Center

Project Lead: PennDOT BHSTE
Other Stakeholders: PennDOT 6-0, Philadelphia International Airport, King of Prussia Mall, Pennsylvania Convention Center, SEPTA

Pertinent TSOP Projects: TSOP-04

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: 1-2 yrs	Capital: TBD
Design: 0-1 yrs	Annual O&M: TBD
Deployment: 1-2 yrs	

Project Type: Planning and Deployment **Level of Effort:** Moderate

Technology Components *(if applicable)*: CastNET System, Information Kiosks

Prerequisites and Dependencies: Evaluation of existing traveler information systems.

Performance Measures: Improve traveler's awareness to traffic conditions; Customer satisfaction

Benefits: Enhanced access to regional traffic information at large multi-modal centers will assist out-of town / unfamiliar travelers in route planning.

Other Considerations and Issues:

LT-13: Parking Management System for Philadelphia Sports Complex

Project Description and Scope: Deployment of a parking management system for the entire Sports Complex. As there are many different lots and parking options, a unified system, letting travelers know where spots are available will help to alleviate some of the confusion and related congestion during large events. Project includes deployment of DMS to Broad St. and Pattison Avenue.

Project Lead: Philadelphia Sports Complex
Other Stakeholders: PennDOT 6-0

Pertinent TSOP Projects: None

Estimated Schedule: 3-4 yrs	**Estimated Costs:**
Study: 1-2 yrs	Capital: $500,000
Design: 0-1 yrs	Annual O&M: $50,000
Deployment: 1-2 yrs	

Project Type: Planning and Deployment **Level of Effort:** Moderate

Technology Components *(if applicable)*: Parking Management System, DMS

Prerequisites and Dependencies: None

Performance Measures: Travel time for locating parking; Customer satisfaction.

Benefits: Parking management system will help to alleviate congestion in and around the sports complex during large events.

Other Considerations and Issues: N/A