Maryland Transportation Systems Management & Operations

Strategic Implementation Plan

August 2016

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor
Pete K. Rahn, MDOT Secretary
Greg C. Johnson, P.E., SHA Administrator

Maryland Department of Transportation

SHA

State Highway Administration

Message from the Administrator

On behalf of Maryland Governor Larry Hogan and Maryland Department of Transportation (MDOT) Secretary Pete Rahn, thank you for your interest in Maryland's transportation system. With the Governor's focus on Changing Maryland for the Better, the Maryland Department of Transportation's State Highway Administration (MDOT SHA) is focused on providing a balanced, reliable, safe, efficient and affordable transportation system to all of Maryland's citizens and businesses.

We continue to invest in roads to reduce gridlock, improve safety, and reliably transport people and goods. In summer 2015, Governor Hogan announced $1.97 billion in funding to upgrade highways and bridges throughout the State. This investment into the highway system allows us to address long-standing highway needs and reduce severe congestion to make Maryland more attractive for economic development and allow Maryland's citizens to travel much easier. SHA uses a performance-based approach to provide its users with a high quality highway system. With a focus on policies, programs, and projects that systematically address both recurring (every day) and nonrecurring (weather, crashes, work zones, special events, etc.) congestion, we continue to preserve and improve the State highway system while supporting Maryland's economic competitiveness and the quality of life of our citizens.

With more than 50 percent of congestion caused by incidents, real-time information about transportation choices is a valuable and necessary commodity. In addition to safety and congestion, transportation system reliability is another key indicator to ensure we provide our customers with a safe travel experience in Maryland. As part of this report, engineers researched and investigated the underlying causes of congestion to assist in implementing short and long-term strategies to improve traffic flow.

Maryland's transportation network includes more than 31,000 miles of roadway, more than 5,000 bridges, and two tunnels to provide mobility for vehicle drivers who travel more than 58 billion miles in Maryland each year. Additionally, 800 miles of rail lines and public transit systems serve a combined ridership of more than 400 million passengers annually. Additionally, the State has major marine facilities at the Port of Baltimore and 18 publicly owned airports including the Baltimore/Washington International Thurgood Marshall Airport. It is imperative to keep people and goods moving to have a healthy and competitive economy to support Maryland families and businesses.

At SHA, operating and managing our infrastructure is a critical part of our core mission. While our customers expect smooth and less congested roads, they also demand increased productivity, efficiency, and accountability (value from the use of tax and toll dollars). Increasingly, technology is adding to these customer expectations….think about the availability of real-time traffic information delivered right to our smart devices now versus just five years ago!

In order to meet these expectations, MDOT SHA recognizes the role of a Transportation Systems Management & Operations (TSM&O) Program as a key component to fulfill our core mission. A TSM&O Program leverages technology solutions, innovations and partnerships to maximize the use of existing capacity thereby making our system safer, reliable and more efficient. It's about making it easier for all of our customers – whether a commuter, truck driver, or tourist -- to travel reliably from point A to point B; it's about creating a world class transportation system that attracts business to our state; it's about using new sources of data to make better, more informed, decisions on transportation investments; it's about all of these and more. But at the end of the end, it's about meeting our customer's expectations.

This Maryland TSM&O Strategic Implementation Plan builds upon an already strong foundational philosophy of operations and management within our agency. It sets a course for implementing key actions that will greatly enhance our ability to meet our full potential by putting in place specific technical and business processes, as well as underlying institutional arrangements, resulting in a TSM&O Program that firmly steers our agency culture towards system management and operations. Creating a formalized TSM&O Program will help us to not only meet customer expectations, but help us learn how to anticipate a future where technology continues to change how we travel, how we do business, and how we operate. We are committed to delivering on the Governor's pledge to be "Open for Business" as the economic vitality of our State, creating jobs and opportunities, is closely tied to transportation.

Gregory C. Johnson, P.E
State Highway Administrator

Acknowledgements

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Contents

Executive Summary

Transportation Systems Management & Operations (TSM&O) has emerged as a formal discipline for transportation agencies throughout the country. The intent of TSM&O is to assist agencies more effectively in operating existing facilities and systems to maximize their full service potential. TSM&O strategies aim to better leverage capacity limitations due to congestion, incidents, construction, weather, poor signalization, and other factors.

MDOT/SHA is deploying TSM&O strategies to actively manage Maryland's multimodal transportation network. This Strategic Implementation Plan summarizes a business case for TSM&O; establishes the mission, vision, goals, objectives and performance measures for TSM&O within MDOT/SHA; and identifies the strategies and projects required to implement TSM&O in the areas of leadership/organization, business processes, tools and data. It also recommends resource needs to carry out the Plan.

Fortunately, TSM&O is not a new concept to MDOT/SHA and a strong management and operations foundation already exists. In fact, the agency is involved, at some level, in many TSM&O Strategies such as (but not limited to):

- Traffic incident management
- Work zone management
- Traveler information services and demand management
- Road weather information
- Freeway management and managed lanes
- Active Traffic Management
- Integrated Corridor Management
- Traffic signal operation
- Electronic payment/toll collection
- Emergency response
- Freight management

A TSM&O Executive Committee and Steering Committee will oversee execution of this TSM&O Strategic Implementation Plan in an effort to ensure that MDOT/SHA can:

- Broaden the array of options in project feasibility studies to include TSM&O improvements as standard agency processes, including tradeoffs with capacity improvements;
- Consider mechanisms for evaluating TSM&O strategies on a corridor basis;
- Develop and use reliability metrics that inform comparisons among TSM&O investment decision trade-offs;
- Capitalize on modeling work at University of Maryland (UMD) that is creating customized, data-driven, objective decision-support tools for selecting strategies;
- Implement a tracking and reporting process focused on the TSM&O long-range plan and contents of TIP/STIP to better communicate and coordinate between MDOT/SHA planning and local jurisdictions; and
- Review current funding processes to identify and program TSM&O improvement projects.

The MDOT/SHA TSM&O Mission, Vision, and Goals are:

Mission

To establish and maintain a TSM&O program and implement supporting projects within Maryland Department of Transportation State Highway Administration improving mobility and reliability for all people and goods through planned operations of transportation facilities.

Vision

Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems.

Goals

GOAL 1. Develop and Implement a Sustainable TSM&O Program at MDOT/SHA.

GOAL 2. Improve travel time reliability for both people and freight on both freeways and arterials.

GOAL 3. Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions.

GOAL 4. Improve the travelling public's experience on Maryland highways by enabling customers with information and choices.

For each of these goals, this TSM&O Strategic Implementation plan includes specific objectives, strategies, actions, responsibilities, and implementation time frames.

Finally, a key success factor for TSM&O implementation is to ensure that there is an organizational structure within Maryland SHA, as the responsible MDOT modal agency, to provide oversight of the TSM&O Strategic Implementation Plan, in conjunction with both internal and external stakeholders. This plan includes a proposed organizational set up for TSM&O within MDOT/SHA including the creation of a new TSM&O Program Manager position to facilitate institutional and programmatic TSM&O strategy integration within existing SHA offices. This strategy integration will take place in coordination with both internal and externals stakeholders and in conjunction with a TSM&O specific communications and outreach plan (as identified in this Strategic Implementation Plan).

Maryland Department of Transportation
State Highway Administration

TSM&O

Transportation Systems Management and Operations

Pete K. Rahn, MDOT Secretary
Gregory C. Johnson, P.E., SHA Administrator

Vision: Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems

Mission: To establish and maintain a TSM&O program and implement supporting projects within Maryland SHA improving mobility and reliability for all people and goods through planned operations of transportation facilities

Goal 1.
Develop and implement a sustainable TSM&O program at SHA

Objective 1.1.
Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

- **Strategy 1.1a.** Identify and implement means of incorporating TSM&O into relevant agency policies
- **Strategy 1.1b.** Determine current and future TSM&O improvements and strategies that should be included in the planning process and estimate their relative effectiveness in responding to the specific causes of recurring and non-recurring congestion
- **Strategy 1.1c.** Develop modifications to the SHA Project Development Process (PDP) to accommodate TSM&O
- **Strategy 1.1d.** Develop a comprehensive ITS asset management process

Objective 1.2.
Promote culture supporting TSM&O both inside and outside of SHA and raise overall TSM&O awareness

- **Strategy 1.2a.** Identify staffing resources within SHA
- **Strategy 1.2b.** Develop a communications and outreach strategy and associated training, outreach, and communication products
- **Strategy 1.2c** Coordinate TSMO activities with other modes, MPOs, and local agencies with clear common objectives

Goal 2.
Improve travel time reliability for both people and freight

Objective 2.1.
Develop freeway and arterial master plans by April 2018

- **Strategy 2.1a.** Develop Arterial System Master Plan
- **Strategy 2.1b.** Develop Freeway Master Plan
- **Strategy 2.1c.** Stay apprised of new applications, systems, and technologies and plan to integrate as appropriate
- **Strategy 2.1d.** Work with MdTA, MDOT/MVA, and the private sector to develop and implement a connected and automated vehicle program in Maryland
- **Strategy 2.1e.** Establish a framework for an institutionalized approach to support funding and deployment of operational improvements (including freight) on freeways and arterials

Objective 2.2.
Develop Integrated Corridor Management (ICM) plans by December 2018

- **Strategy 2.2a.** Focus on integrated freeway and arterial management and operations
- **Strategy 2.2b.** Develop ICM Program Master Plan for consistent consideration of ICM on corridors that possess attributes necessary to apply ICM

Goal 3.
Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.1.
Implement a comprehensive, system level performance measurement program to monitor mobility and reliability targets by June 2017

- **Strategy 3.1a.** Develop a data supported system for performance reporting
- **Strategy 3.1b.** Continue participation in research and collaboration efforts to advance TSM&O practices through TRB, FHWA, AASHTO, ITS America, University research centers, and consultants

Objective 3.2.
Develop a TSM&O Program Performance Monitoring System

- **Strategy 3.2a.** Develop a monitoring program to assess progress, benefits and challenges

Objective 3.3.
Coordinate and ensure TSM&O is considered in SHA's Asset Management Program

- **Strategy 3.3a.** Incorporate TSM&O into Transportation Asset Management Plan (TAMP) and TAMP Implementation

Objective 3.4.
Include reliability in existing traffic analyses and travel forecasting modelling tools

- **Strategy 3.4a.** Develop modelling tools that effectively incorporate travel time reliability and can be used to provide a framework for evaluating tradeoffs of various TSM&O operational strategies

Goal 4.
Improve the travelling public's experience on Maryland highways

Objective 4.1.
Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O

- **Strategy 4.1a.** Provide reliable and accessible real-time modal choice information to travelers and other stakeholders at all times
- **Strategy 4.1b.** Coordinate activities with other modes, MPOs, and local agencies to incentivize changing travel behavior

Objective 4.2.
Enhance travelling public's knowledge and understanding of TSM&O operational strategies and their respective benefits

- **Strategy 4.2a.** Develop education and outreach tools, including use of web-based and social media applications, targeted to the travelling public
- **Strategy 4.2b.** Conduct regular surveys targeted towards the traveling public to determine level of customer satisfaction with SHA's application of TSM&O operational strategies

Introduction

The missions of Departments of Transportation are shifting. They are not only concerned with building and maintaining roads, but also with ensuring maximum benefit from the transportation system that exists today. States with significant urbanized areas, like Maryland, are challenged with addressing growing mobility needs with limited financial resources and increasing demands for transportation improvements from the public. Right-of-way is becoming scarce and highway funds remain constrained. Insufficient funding and other resource constraints are the new transportation reality. Maryland Department of Transportation State Highway Administration (MDOT/SHA) is addressing a reality where transportation resources must be carefully allocated to meet agency objectives regarding safety, mobility, commerce, and environmental preservation. Therefore, it is essential to make the most of the present system before adding new infrastructure. Transportation System Management and Operations (TSM&O) is gaining momentum as an essential function of state departments of transportation to maximize operation of the transportation system.

TSM&O has emerged as a formal discipline for transportation agencies throughout the country. The intent of TSM&O is to assist agencies more effectively in operating existing facilities and systems to maximize their full service potential. TSM&O strategies aim to better leverage capacity limitations due to congestion, incidents, construction, weather, poor signalization, and other factors.

MDOT/SHA is an effective and efficient agency and is deploying TSM&O strategies to actively manage Maryland's multimodal transportation network. This Strategic Implementation Plan summarizes a business case for TSM&O; establishes the mission, vision, goals, objectives and performance measures for TSM&O within MDOT/SHA; and identifies the strategies and projects required to implement TSM&O in the areas of leadership/organization, business processes, tools and data. It also recommends resource needs to carry out the Plan. The Plan is intended to be a living document and will be updated regularly.

Background

In 2014, MDOT/SHA received a Federal Highway Administration (FHWA) SHRP2 implementation assistance grant to administer the L06 program - Institutional Operations to Improve Systems Operations and Management. The SHRP2 L06 project focused on undertaking a comprehensive and systematic examination of the way MDOT/SHA should organize to execute operations programs successfully to improve travel time reliability.

Fortunately, TSM&O is not a new concept to MDOT/SHA and a strong management and operations foundation already exists. In fact, the agency is involved, at some level, in many TSM&O Strategies such as (but not limited to):

- Traffic incident management
- Work zone management
- Traveler information services and demand management
- Road weather information
- Freeway management and managed lanes
- Active Traffic Management
- Integrated Corridor Management
- Traffic signal operation
- Electronic payment/toll collection
- Emergency response
- Freight management

Additional examples that demonstrate MDOT/SHA's commitment to TSM&O and the organization's continuing efforts to enhance and improve management and operations include:

- ***Annual Mobility Reporting and Mobility Dashboard***. Since 2012, Maryland SHA has been producing an annual Mobility Report. The mobility report demonstrates SHA's focus on applying a performance based approach to provide a high quality and reliable highway system. In 2014, SHA improved accessibility to the contents of the Mobility Report by creating a web-based Mobility Dashboard.
- ***Reliability Roadmap***. The Reliability Roadmap includes a set of projects that, when ultimately implemented, will provide a travel time reliability analytical framework that can effectively inform transportation investment decisions such that TSM&O projects can compete on equal footing with traditional capacity projects. The Reliability Roadmap includes the application of SHRP 2 and other reliability products that could enhance the planning and preliminary engineering functions of SHA.
- ***Analysis, Modeling, and Simulation Tools***. SHA has successfully developed several effective modeling tools for traffic analysis and travel forecasting in recent years. Major models developed or in progress include the Maryland Statewide Transportation Model; Activity Based Regional Travel Model; Mesoscopic Models of Travel Demand and Traffic Dynamics for Subarea and Corridor Studies; Agent Based Travel Behavior Model; and the Model of Sustainability and Integrated Corridors. The Reliability Roadmap includes specific projects that will integrate related SHRP 2 analytic tools with these various modeling efforts.

- ***Reliability Tool Implementation***. This project will pilot the implementation of a number of SHRP 2 reliability products including a travel time reliability monitoring program; the use of SHRP 2 and FHWA tools and methodologies in revaluating long range major capital projects; and methodologies for considering reliability in project development and design.
- ***SHA Business Planning***. SHA values relate to excellence in its people, work, relationships, and work environment. SHA Business Plan goals related to safety, mobility/economy, system preservation and maintenance, managing the agency, environmental compliance and stewardship, and customer communications, service, and satisfaction. A number of operations related performance measures are included with the mobility/economy goal area including travel time reliability.
- ***TSM&O Strategy Implementation Efforts***. The MDOT Secretary's office is looking to implement TSM&O strategies in the I-270 Corridor and a number of strategies are currently under analysis in this corridor and in other corridors as well. These strategies include Active Traffic Management and Integrated Corridor Management as well as hard shoulder running, reversible lanes, and ramp metering.
- ***Statewide Operations Center (SOC) Reconfiguration.*** Recently the MDOT/SHA leadership approved moving forward with a project to reconfigure the entire statewide operations center. The SOC continues to operate as the center of the CHART Program, but new demands and technologies have made the current space obsolete, despite a floor reconfiguration in 2005. The reconfigured SOC will provide space that better facilitates information management and supports functionality that meets a variety of evolving demands on the facility.

In an effort to build upon this substantial TSM&O foundation, a Capability Maturity Model (CMM) workshop was held in spring of 2014 to conduct an organizational self-assessment. The following types of questions were examined in the CMM: How does operations fit into a transportation agency's overall program? What changes can be made in agency culture and training to promote operations? Which local and regional public agencies and private-sector organizations are essential to the various aspects of operations? Are there emerging technologies, systems, or organizational structures that can be used to advance intra-agency and interagency communications and therefore operations? A key tangible result from this CMM workshop is this TSM&O Strategic Implementation Plan.

The Plan will ensure MDOT/SHA can:

- Broaden the array of options in project feasibility studies to include TSM&O improvements as standard agency processes, including tradeoffs with capacity improvements;
- Consider mechanisms for evaluating TSM&O strategies on a corridor basis;
- Develop and use reliability metrics that inform comparisons among TSM&O investment decision trade-offs;
- Capitalize on modeling work at University of Maryland (UMD) that is creating customized, data-driven, objective decision-support tools for selecting strategies;
- Implement a tracking and reporting process focused on the TSM&O long-range plan and contents of TIP/STIP to better communicate and coordinate between MDOT/SHA planning and local jurisdictions; and
- Review current funding processes to identify and program TSM&O improvement projects.

A TSM&O Steering Committee and an Executive Committee were formed and used to guide the Plan development process.

Figure 1 provides a timeline for the workshops and signification meetings leading up to the adoption of the Plan.

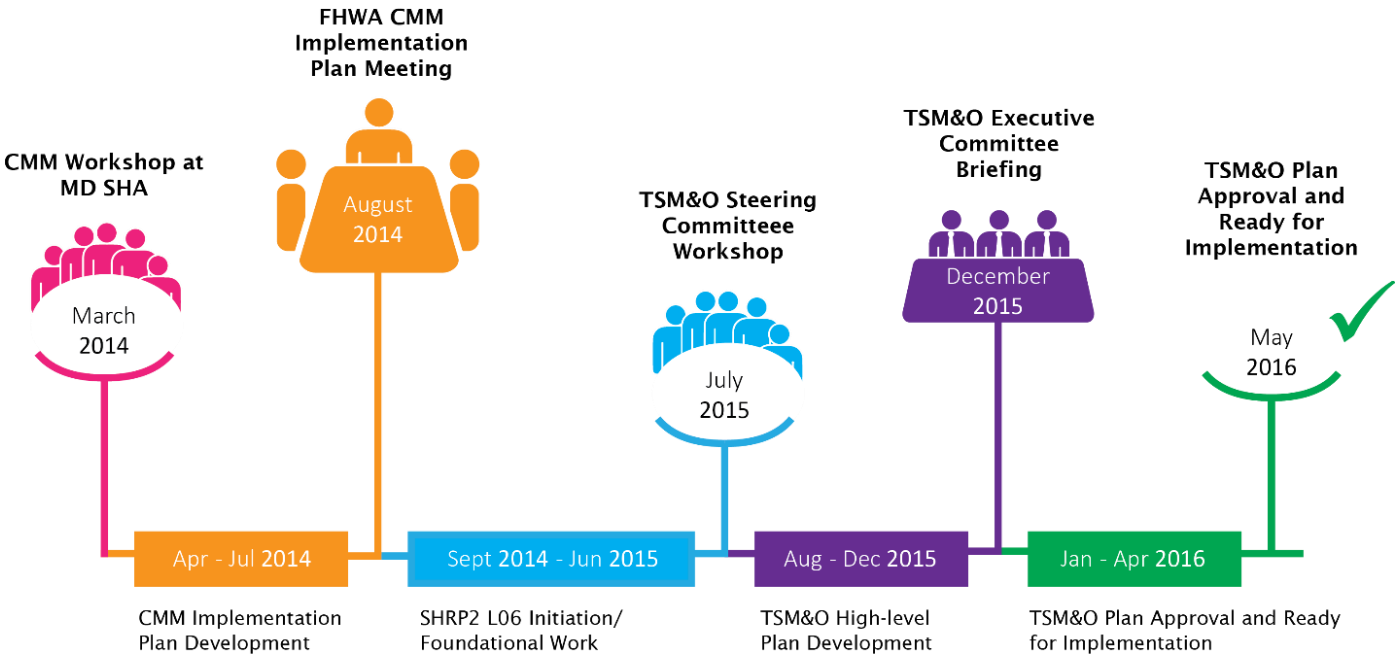


Figure 1 Plan Adoption Timeline

This plan is organized in the following sections:

3.0 Mission and Vision

4.0 Strategic Plan including Goals, Objectives, and Strategies

5.0 Organizational Set-up and Stakeholder Involvement including description of key internal and external stakeholders

6.0 Implementation plan with specifics for action items and deliverables

7.0 Communication Plan to ensure TSM&O success

8.0 Next Steps

Appendix A - Roadmap summarizing activities/projects, schedule and resources

Mission and Vision

Mission

To establish and maintain a TSM&O program and implement supporting projects within Maryland Department of Transportation State Highway Administration improving mobility and reliability for all people and goods through planned operations of transportation facilities.

Vision

Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems.

Federal legislation, Moving Ahead for Progress in the 21st Century (MAP-21), defines TSM&O as "integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system." Frequently, planning for operations is used synonymously with TSM&O. The Federal Highway Administration's (FHWA) *Planning for Operations* glossary defines TSM&O as, "an integrated program to optimize the performance of existing infrastructure through the implementation of systems, services, and projects designed to preserve capacity and improve security, safety, and reliability." Both definitions facilitate real time system optimization for maintaining a high quality highway system. Expanding the diversity of approaches to improving mobility is essential to a transportation agency's efficiency.

The proposed definition for MDOT/SHA TSM&O is:

An integrated approach to programmatic optimization of planning, operations, and maintenance in implementing new and existing multi-modal systems, services, and projects to preserve capacity and improve the security, safety, and reliability of our transportation system.

Strategic Plan

TSM&O strategies ensure more efficient and reliable travel. A TSM&O program needs to include consideration of tools to measure, analyze and assess the benefits of the strategies. A key measure to evaluate operational strategies is travel time reliability. MDOT/SHA has previously recognized this important connection through the development of its Reliability Roadmap – a plan to fully develop and integrate travel time reliability techniques into planning, programming, design and operations within the agency. A systemic approach provides a long-term solution to MDOT/SHA's long-range needs.

Performance measurement and capturing impacts on the travel system is at the core of TSM&O. Impacts to freight shippers, carriers, commuters, weekend travelers can be captured through assessing the reliability of the roadways. TSM&O promotes reliable travel and elevates the importance of travel time reliability. The economic health within communities across Maryland depends on a reliable transportation system and businesses rely on predictable travel time for delivery of their supplies and their products. Like freight shippers, drivers too have typical commute times that they plan for. When a trip takes twice as long as planned, appointments are missed, meetings cancelled, others are forced to wait, and the traveler is generally viewed as tardy. These outcomes adversely affect quality of life. Economic opportunities improve greatly for travelers and shippers when a reliable transportation system exists supported by a TSM&O program.

Nonrecurring delay due to crashes, construction, weather, and other events is a significant contributor to heavy and severe congestion. The most efficient way for an operating agency to address congestion is to target and manage congestion caused by these sources. Nonrecurring conditions are addressed through TSM&O improvements including real time management of the system. Implementers such as traffic engineers and transportation management center staff deal with congestion in real or near real time—they focus on dealing with the congestion that travelers are facing today. This includes mitigating work zone traffic conditions through active traffic management. Active traffic management is an essential component of TSM&O and is a primary solution to high demand caused by special events including concerts, sporting events, and work zones. MDOT/SHA's CHART Program focuses on crashes, construction, vehicle breakdowns, and weather, which cause an estimated 60% of the total congestion.

To assess the performance, measures should be selected to allow for a comparable evaluation. Measuring the performance of the transportation system may require data and tools that are not yet broadly available at the planning and programming levels. In order to meet demands for results, accountability, and demonstrated performance - operational data should be acquired. Furthering TSM&O, through a formal program, will also enhance MDOT/SHA's ability provide real time monitoring and to collect traffic data through the installation of additional monitoring instruments.

When comparing TSM&O improvements to capacity improvements the return on investment and benefit cost analysis usually justifies the operational improvement. This is particularly evident when investigating the travel time reliability on severely congested roadways. Monetizing the improvements by selecting indicators such as value of time, value of travel time reliability, and fuel costs allows for direct comparisons. MDOT/SHA monitors

some of these costs through their annual mobility reporting process. The net cost and time savings outcome will favor TSM&O from a travelers' perspective. Additionally, projects adding capacity often have huge environmental impacts, which delay project development as well as construction. The TSM&O program will tailor messages to educate the audience that operating and managing the transportation system is just as important as improving or adding capacity.

Connection with MDOT/SHA's Plans and Initiatives

Development of a TSM&O program is consistent with MDOT/SHA's Mission, Business Plan, Long Range Plan, and the newly adopted MDOT Excellerator performance management system. Mobility is a primary function of MDOT/SHA: the Maryland Transportation Plan (MTP), Attainment Report, State Highway Mobility Report, and Business Plan all contain goals and objectives related to increasing the quality of mobility on Maryland's roadways. The Maryland Transportation Plan is a long-range plan with a 2035 horizon that was completed in 2014. This twenty-year plan includes a mission, vision and goals related to the quality of service provided by Maryland's transportation system. Identified transportation strategies in support of the Quality of Service is a goal include investing in user technologies and sharing of real-time data, as well as addressing bottlenecks. These strategies support reducing congestion through the improvement of vehicle travel times. Transportation projects promoting the Quality of Service goal should improve travel time reliability for automobiles and trucks. The MDOT/SHA Business Plan identifies mobility and economy as key performance areas with associated goals, objectives, performance measures and strategies. Travel reliability is an objective within MDOT/SHA's Business Plan with supporting performance measures and strategies. Indirectly system reliability and the day-to-day experience of the travelling public are emphasized in all of Maryland's mobility plans.

The objectives of the TSM&O program will align with MDOT/SHA programmatic goals and assist MDOT/ SHA in meeting their mobility goals. State programs and plans such as MTP, MDOT/SHA Business Plan, Excellerator, and the Maryland State Highway Mobility Report will tie into the TSM&O program. Bringing TSM&O into these plans further promotes travel time reliability. Implementing SHRP 2 research at the state level will also benefit planning for operations. Furthermore MAP-21 emphasizes performance based planning and supports TSM&O – at its core TSM&O is based on performance measurement

The following section describes four goals with associated objectives and strategies recommended for implementing a TSM&O program within MDOT/HA. Most of these strategies support objectives contained in MDOT/SHA Business Plan or the 2035 Maryland Transportation Plan.

GOAL 1. Develop and Implement a sustainable TSM&O program at MDOT/SHA

Objective 1.1. Incorporate TSM&O oriented practices in policy development and in routine planning and programming business processes by 2018

> *Strategy 1.1a.* Identify and implement means of incorporating TSM&O planning and evaluation methods into relevant agency policies

Strategy 1.1b. Determine current and future TSM&O improvements and strategies that should be included in the planning process and estimate their relative effectiveness in responding to the specific causes of recurring and non-recurring congestion

Strategy 1.1c. Develop modifications to the SHA Project Development Process (PDP) to accommodate TSM&O

Strategy 1.1d. Develop a comprehensive ITS asset management process

Objective 1.2. Promote culture supporting TSM&O both inside and outside of SHA and raise overall TSM&O awareness

Strategy 1.2a. Identify staffing resources within SHA

Strategy 1.2b. Develop a communications and outreach strategy and associated training, outreach, and communication products

Strategy 1.2c. Coordinate TSM&O activities with other modes, MPOs, and local agencies with clear common objectives

Strategy 1.2d. Develop a work zone management plan and committee

GOAL 2 Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.1. Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1a. Develop Arterial System Master Plan including pilot for implementation/application

Strategy 2.1b. Develop Freeway Master Plan including pilot for implementation/application

Strategy 2.1c. Stay apprised of new applications, systems, and technologies and plan to integrate as appropriate

Strategy 2.1d. Work with MdTA, MDOT/MVA, and the private sector to develop and implement a connected and automated vehicle program in Maryland

Strategy 2.1e. Establish a framework for an institutionalized approach to support funding and deployment of operational improvements (including those targeting freight movement) on freeways and arterials

Objective 2.2. Develop Integrated Corridor Management (ICM) plans to coordinate the assets of multiple transportation disciplines to provide reliable movement of people and goods by December 2018

Strategy 2.2a. Focus on integrated freeway and arterial management and operations

Strategy 2.2b. Ensure consistent consideration of ICM on corridors that possess attributes necessary to apply ICM including freight

Goal 3. Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.1. Implement a comprehensive system level performance measurement program to monitor progress toward mobility and reliability targets by June 2017

Strategy 3.1a. Develop a data supported system for performance reporting

Strategy 3.1b. Continue participation in research and collaboration efforts to advance TSM&O practice

Objective 3.2. Develop a TSM&O Program Performance Monitoring System

Strategy 3.2a. Develop a monitoring program to assess progress, benefits and challenges

Objective 3.3. Coordinate and ensure TSM&O is considered in SHA's Asset Management Program

Strategy 3.3a. Incorporate TSM&O into Transportation Asset Management Plan (TAMP) and TAMP Implementation

Objective 3.4. Include reliability in existing traffic analyses and travel forecasting modelling tools

Strategy 3.4a. Develop modelling tools that effectively incorporate travel time reliability and can be used to provide a framework for evaluating tradeoffs of various TSM&O operational strategies

Goal 4. Improve the travelling public's experience on Maryland highways by enabling customers with information and choices

Objective 4.1. Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O

Strategy 4.1a. Provide reliable and accessible real-time modal choice information to travelers and other stakeholders at all times

Objective 4.2. Enhance travelling public's knowledge and understanding of TSM&O operational strategies and their respective benefits

Strategy 4.2a. Develop education and outreach tools, including use of web-based and social media applications, targeted to the travelling public

Strategy 4.2b. Conduct regular surveys targeted towards the traveling public to determine level of customer satisfaction with SHA's application of TSM&O operational strategies

Organizational Setup & Stakeholder Involvement

A key success factor for TSM&O implementation is to ensure that there is an organizational structure within Maryland SHA, as the responsible MDOT modal agency, to provide oversight of the TSM&O Strategic Implementation Plan implementation, in conjunction with both internal and external stakeholders.

Organizational Setup

Figure 2 shows how the proposed organizational structure, known as the TSM&O Executive Committee, will be responsible for overall oversight and guidance of the TSM&O Program including carrying out the actions identified in this Strategic Implementation Plan. Note that, through the course of the development of this Plan, SHA leadership determined that the creation of a new specific "Office of TSM&O" was not required. Rather, it was determined that a new "TSM&O Program Manager" position be created to facilitate institutional and programmatic TSM&O strategy integration within existing offices.

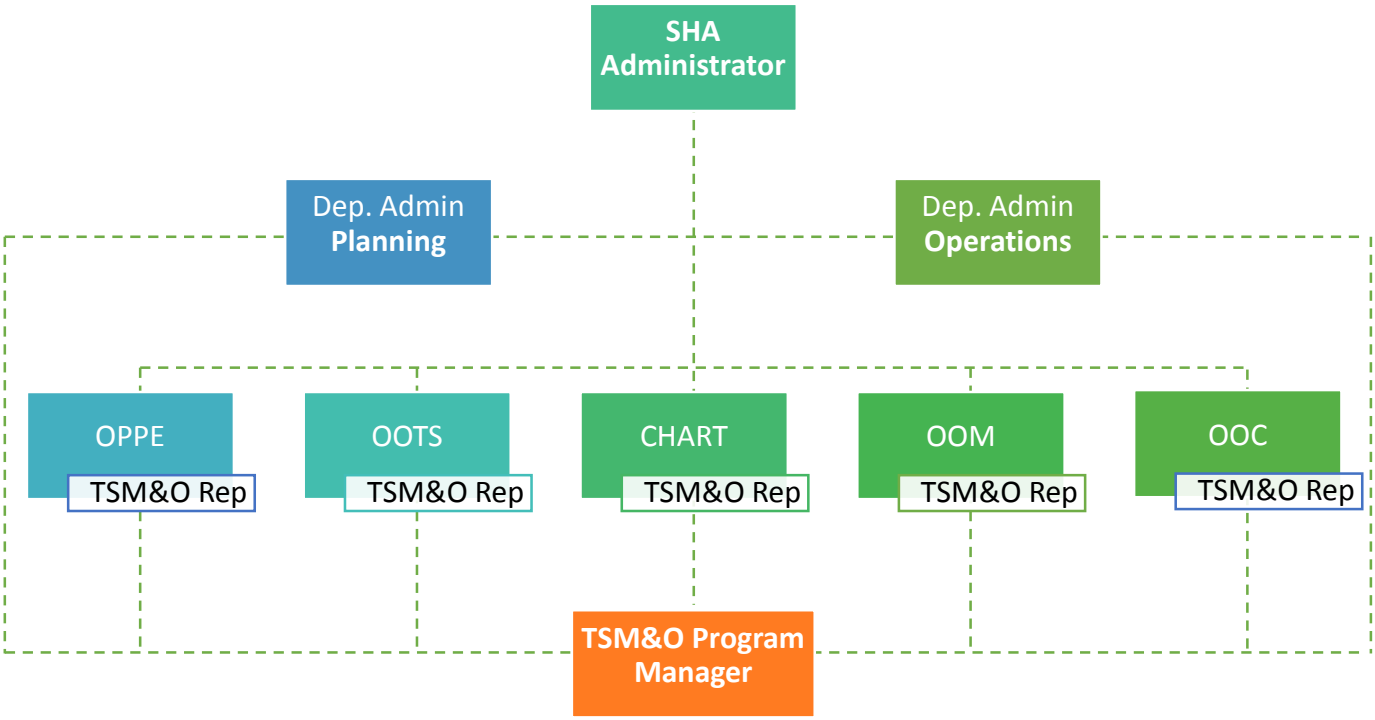


Figure 2 Proposed TSM&O Organizational Structure

- ***SHA Administrator*:** The SHA Administrator is the Chair of the TSM&O Program Executive Committee. The Administrator, as SHA's top executive, has overall responsibility for the TSM&O Program including proposed resource allocation/requests to the MDOT Secretary.
- ***Deputy Administrator, Planning:*** The Deputy Administrator, Office of Planning and Preliminary Engineering, is one of two co-Chairs of the TSM&O Program Executive Committee, the other being the Deputy

Administrator, Operations. The TSM&O Program co-Chairs have day-to-day oversight of the TSM&O Program manager and the agency Offices working to achieve the strategic, programmatic, and institutional integration required to carry out the TSM&O Program. The Deputy Administrator for OPPE focuses on planning and engineering for more effective management and operations.

- ***Deputy Administrator, Operations***: The Deputy Administrator, Office of Engineering and Operations, is one of two co-Chairs of the TSM&O Program Executive Committee, the other being the Deputy Administrator, Planning. The TSM&O Program co-Chairs have day-to-day oversight of the TSM&O Program manager and the agency Offices working to achieve the strategic, programmatic, and institutional integration required to carry out the TSM&O Program. The Deputy Administrator for Engineering and Operations focuses on TSM&O operations strategy implementation and maintenance in conjunction with other offices, divisions, and the districts.
- ***CHART (Coordinated Highways Action Response Team)*****:** The Director of the Office of CHART and ITS Development serves as a member of TSM&O Program Executive Committee. The Director (or the Director's designee) supports the TSM&O Program Manager on a day-to-day basis. The Director has responsibility for ensuring that TSM&O Strategic Implementation Plan strategies and action items, assigned to CHART as lead office, are carried out. When necessary, and as identified in the TSM&O Strategic Implementation Plan, the Office of CHART provides support to other Offices that have lead responsibility for a particular strategy and related action items.
- ***Office of Traffic & Safety*****:** The Director of the Office of Traffic & Safety serves as a member of TSM&O Program Executive Committee. The Director (or the Director's designee) supports the TSM&O Program Manager on a day-to-day basis. The Director has responsibility for ensuring that TSM&O Strategic Implementation Plan strategies and action items, assigned to the Office of Traffic & Safety as lead office, are carried out. When necessary, and as identified in the TSM&O Strategic Implementation Plan, the Office of Traffic & Safety provides support to other Offices that have lead responsibility for a particular strategy and related action items.
- ***Office of Maintenance:*** The Director of the Office of Maintenance serves as a member of TSM&O Program Executive Committee. The Director (or the Director's designee) supports the TSM&O Program Manager on a day-to-day basis. The Director has responsibility for ensuring that TSM&O Strategic Implementation Plan strategies and action items, assigned to the Office of Maintenance as lead office, are carried out. When necessary, and as identified in the TSM&O Strategic Implementation Plan, the Office of Maintenance provides support to other Offices that have lead responsibility for a particular strategy and related action items.
- ***Office of Planning & Preliminary Engineering:*** The Director of the Office of Planning and Preliminary Engineering serves as a member of TSM&O Program Executive Committee. The Director (or the Director's designee) supports the TSM&O Program Manager on a day-to-day basis. The Director has responsibility for ensuring that TSM&O Strategic Implementation Plan strategies and action items, assigned to the Office of Planning & Preliminary Engineering as lead office, are carried out. When necessary, and as identified in the TSM&O Strategic Implementation Plan, the Office of Planning & Preliminary Engineering provides support to other Offices that have lead responsibility for a particular strategy and related action items.
- **Office of Construction:** The Director of the Office of Construction serves as a member of the TSM&O Program Executive Committee. The Director has responsibility for coordinating with OOC staff on TSM&O initiatives.
- ***TSM&O Program Manager*****:** The TSM&O Program Manager provides overall support to the TSM&O Executive Committee and has day-to-day responsibility for working with the Office Director TSM&O (and/or their

designees) and the Deputy Administrators to carry out the TSM&O Strategic Implementation Plan and the overall TSM&O Program.

Stakeholder Involvement

While SHA must organize for TSM&O Program oversight, it is important that critical stakeholders are involved, they are engaged, and there is a solid plan for continued outreach to them. Having a clear understanding of who these stakeholders are is a necessary prerequisite. Stakeholders can be generally classified as "Internal Offices" and "External Partners" relative to MDOT.

Internal offices of MDOT

MDOT Level: Secretary of Transportation; Deputy Secretary for Operations; Office of Planning and Capital Programming; Maryland Motor Carrier Program; Office of Transportation Technology Services

SHA Executive Level: State Highway Administrator; Deputy Administrator/Chief Engineer for Planning, Engineering, Real Estate, and Environment; Deputy Administrator/Chief Engineer for Operations.

MVA Management: Administrator and Chair of MDOT Connected/Automated Vehicle Task Force.

Maryland Transit Administration: Core Operations; Operations Control Center; Maryland Rail Commuter (MARC) and Commuter Bus Operations; Office of Planning.

Maryland Transportation Authority (MdTA): Deputy Executive Director; Division of Operations.

Maryland Aviation Administration: Operations and Maintenance.

Maryland Port Administration: Operations.

Figure 3 Internal offices of MDOT

External Partners to MDOT/SHA

- State, Regional, County, and Local Governments and Coordinating Organizations:
  - Legislature: Elected Officials and key staff;
  - Maryland Emergency Management Agency (MEMA); State Police, Dept. of Env.;
  - County Elected Officials via the Consolidated Transportation Program (CTP) Tour; County Transportation and Planning agency management and technical leadership; City of Baltimore and the 23 counties and their local jurisdictions that are stakeholders;
  - Washington Metropolitan Area Transit Authority (WMATA); Metropolitan Area Transportation Operations Coordination (MATOC);
  - Six Metropolitan Planning Organizations (MPO's) for: Baltimore; National Capital Region; Cumberland; Hagerstown-Eastern Panhandle; Salisbury-Wicomico; and Wilmington Area;
  - Seven Regional Planning Councils;
  - Adjacent State DOTs, transit, and intercity rail related organizations;
  - I-95 Corridor Coalition including their contracts with private sector traffic data providers;
- U.S. Department of Transportation units addressing TSM&O; National Park Service; National Weather Service;
- Partner Disciplines and Organizations (e.g. Traffic Incident Management (TIM)responders);
- Special Event Venues: Private Traffic Control Centers of sports stadiums; private large special events such as golf tournaments, or semi-public events such as the State Fair and county fairs;
- Traveling Public and representative advocacy groups (i.e. American Automobile Assoc.; Transit User groups, American Trucking Assoc., etc.);
- Business/Economic Development Organizations (Boards of Trade, Chambers of Commerce);
- Academic and Research Institutions (i.e. UMD, Morgan State Univ., John Hopkins Univ.);
- Professional Organizations (i.e. Institute of Transp. Eng.; ITS America and ITS Maryland; National Operations Center of Excellence (NOCoE).

As evident in the two lists above, there are many stakeholders for TSM&O in Maryland. The intent of the above lists is not to provide a complete enumeration of such stakeholders, particularly for the external stakeholders. Rather it is to give context to the following table that provides more detail regarding specific offices and position titles associated with the key internal office stakeholders. This generalized stakeholder registry is useful to better understand and assess stakeholders and their role/stake in the process of developing and implementing the TSM&O Strategic Plan. The *Maryland Manual On-Line*, published by the Maryland State Archives, is an excellent source and listing of current information and contacts that is updated daily. Developing and presenting a full registry of all stakeholders would provide too much detail for this TSM&O Strategic Plan and categorical listings are used here instead, particularly for the external partner stakeholders.

Table 1 builds upon the lists the key stakeholder internal offices of MDOT and SHA from the first list and provides the following:

- MDOT Administration; position title, person holding the position;
- Role – Function for getting TSM&O Implemented;
- Contact information of telephone and e-mail;
- Selected TSM&O Requirements – Expectations that have been expressed by some stakeholders in interviews, including their needs and wants (longer lists of expectations are available);
- Influence on TSM&O activities including authority and responsibility; and
- Classification of levels of required coordination for TSM&O policy and daily coordination, which are categorized as being either high, medium, or low.

Table 1 Internal Stakeholder Details

Stakeholder / Office	Role – Function: For getting TSM&O Implemented	Contact Information	Requirements / Expectations: Expressed Expectations, Needs or Wants (given to date)	Influence: Authority / Responsibility	Classification: Required for Coordination
MDOT/ Secretary of Transportation Peter K. Rahn	Oversees entire department; decides on resource allocations	(410) 865-1000 secretary@mdot.state.md.us	TBD	Full authority and responsibility	High for policy Low for daily
MDOT/ Deputy Sec. for Operations James F. Ports, Jr.	Advocate adequate resources for TSM&O; review policy consistency	(410) 865-1000 jports@mdot.state.md.us	TBD	Oversees: SHA, Transit, Port, Aviation, and Motor Vehicle Admin.	High for policy Low for daily
MDOT/ Office of Planning and Capital Programming Heather R. Murphy	Structure Consolid. Trans. Prog. (CTP) to account for value of TSM&O	(410) 865-1275 hmurphy@mdot.state.md.us	TBD	Prepare Consolidated Transp. Program (CTP) using input of others	High to work with offices to provide resources
SHA/ State Highway Administrator Gregory C. Johnson	Oversees administration; proposes resource allocations to Secretary	(410) 545-0400 shaadmin@sha.state.md.us	Analytical processes/tools in place for trade-off decision making. Clearly communicating benefits.	Full authority and responsibility for the State highway system	High for policy Low for daily
SHA/Dep. Admin. / Chief Eng. For Pl., Eng., R.E., Env. Gregory I. Slater (Acting)	Oversees planning and engineering and facilitates more effective operations	(410) 545-0411 gslater@sha.state.md.us	Analytical processes/tools in place for trade-off decision making. Clear cut role(s) re TSM&O.	Develop projects that balances transport with env./real estate	High for policy Low for daily
SHA/Dep. Admin. / Chief Eng. For Operations David Coyne	Oversees CHART and four other Divisions and seven District Engineers	(410) 545-0360 dcoyne@sha.state.md.us	Analytical processes/tools in place for trade-off decision making. Clear cut role(s) re TSM&O.	Coordinate central offices and districts to improve performance	High for policy and resource allocation
SHA/Dir. Of CHART & ITS Development Glenn McLaughlin (Acting)	Manage CHART; relate to operations by others and use of ITS technology	(410) 787-5859 gmclaughlin@sha.state.md.us	Integrate signals/CHART; Support OOTS with IT; Elevate multi-modal traveler Information to MDOT	Monitor operations, incident response, and inform travelers	High for policy Medium for freeway operations

SHA/Dir. Of Traffic & Safety Cedric Ward	Oversees the operation of the State's traffic signals and safe operations	(410) 787-5814 cward@sha.state.md.us	More proactive signal operations; ICM is a big opportunity approach; have more TE expertise in CHART	Operate signal system, highway safety stat., motor carrier program	High for policy Medium for arterial operations
SHA/Dir. Of Maintenance Russell A. Yurek	Provides good repair for facilities and operational devices for traffic flow	(410) 582-5505 ryurek@sha.state.md.us	Hard to maintain CHART devices; Invest in agency IT systems; Need winter weather Perform. Meas.	Maintains roads and operations devices to keep traffic flowing	Medium for policy Medium for daily
SHA/Dir. Pl. & Preliminary Engineering Gregory I. Slater	Manages planning, and eng. To facilitate TSM&O project implementation	(410) 545-0412 gslater@sha.state.md.us	Analytical processes/tools in place for trade-off decision making. Clear cut role(s) re TSM&O.	Monitors traffic flow trends; forecasts short and long term traffic	Medium for policy Low for daily
SHA/Dir. Customer Relations and Information Valerie Burnette Edgar	Interacts with SHA customer base helping address their concerns and needs	(410) 545-5658 vburnetteedgar@mdot.state.md.us	TBD	Provides customers with info. on actions; user feedback path	Low for policy Low for daily
MdTA/ Chief. of Operations Derek A. Jones	Manages MdTA facilities for good operation and coordinates with SHA operations	(410) 537 1301 djones1@mdta.maryland.gov	TBD	Develop and operate bridges, tunnels, and toll roadways	High for transit policy; low for road operations
MTA/Dir. of Operations Dep. Chief Operations Off. John Duncan	Manages MTA operations and services and coordinates with SHA operations	(410) 454-7795 jduncan@mta.maryland.gov	TBD	Develop and operate transit services in most of state; support ICM	High for policy MdTA facilities, Medium for daily
SHA/Dir. Office of Policy and Research Dr. Richard Woo	Coordinate TSM&O research activities	(410) 545-0340 rwoo@sha.state.md.us	TBD	TBD	Medium for policy Low for daily
SHA/Dir. Office of Construction Steven Marciszewski	Coordinate with construction staff	(410) 572-5235 smarciszewski@sha.state.md.us	TBD	TBD	Medium for policy Low for daily

Stakeholder Involvement Strategies

A list of stakeholder related involvement strategies is provided to help better organize the Internal Offices to develop and implement an improved TSM&O Program within MDOT/SHA that will work to the benefit of the many identified External Partners, while minimizing perceived adverse impacts to them. These involvement strategies implicitly recognize that the TSM&O Strategic Plan is:

1. Addressing important concerns for improved performance management in delivering enhanced TSM&O services to MDOT/SHA customers,

2. Setting a decision making process that is a reasonable approach,

3. Listening and hearing concerns of those internally and externally to MDOT/SHA who perceive they are affected while not necessarily trying to act on the concerns of each and every Internal Office and/or External Partner stakeholder, and

4. Concluding, that while a sustainable TSM&O Strategic Plan and Program may be difficult to implement, overall implementing it will be better than not addressing the concerns.

Some of the identified expected impacts and/or concerns of key external partners include:

- Need for awareness of TSM&O; skepticism as to its value;
- How will the TSM&O Program blend in with the TIP process;
- Will TSM&O meet capacity needs;
- Will TSM&O have unanticipated adverse impacts that might lead to speeding, cut-through traffic, or other unsafe conditions; and
- Are transit and non-motorized modes (e.g., bicycling and walking) adversely impacted?

In an effort to address these expected perceived impacts and/or concerns there is a need to develop a communications and outreach strategy including associated training, outreach, and communication products. Specific strategic stakeholder involvement actions include:

- Preparation of an External Partner Communications and Outreach Plan;
- Creating concise communications products for targeted External Partners;
- Creating TSM&O outreach material for use in the CTP Tours and/or pre-tours; and
- Providing opportunities for feedback and listening sessions for External Partners that document concerns and/or issues with implementing an improved TSM&O Program.

Implementation Plan

This implementation portion of the Plan describes and interconnects program components and subcomponents. Organizational roles, responsibilities, and strategic relationships (internal and external) will be established. The implementation portion of the Plan can be even more successful if the services, projects, and activities are in alignment with mission, vision, goals, and objectives, contribute to measured performance, and are supported by effective leadership and organizational structures, effective business processes, and adequate resources. These tables identify responsible offices, action items, deliverables, resources required and a timeline for implementation.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.1 - Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

Strategy 1.1a - Identify and implement means of incorporating TSM&O into relevant agency policies

Action items

- 1.1a.I. Evaluate the inclusion of reliability in MDOT mission, vision, and strategic plans.
- 1.1a.II. Develop a policy and procedure for TSM&O – Draft policy statement needs to address establishing TSM&O structure (office/functional area responsibilities). The procedure will include an institutional framework for TSM&O – including roles for steering and executive committees.
- 1.1a.III. Incorporate planning for operations in all processes within SHA - Maryland Transportation Plan 2035 and SHA Business Plan.
- 1.1a.IV. Identify methods for evaluating capacity vs. TSM&O options considering: service issues, network scale, time to implement, incremental improvement options capital operating and maintenance costs, cost-effectiveness related to relevant performance measures.

Deliverables

- 1a. Policy and Procedure to establish TSM&O structure for evaluating the benefits operational projects, side-by-side, with capacity projects.
- 1b. Inclusion of reliability in appropriate plans.
- 1c. Incorporation of TSM&O in SHA business processes.
- 1d. Report documenting quantitative improvements in travel times/speeds for Maryland based on identified TSM&O improvements. Comparison of existing eligible improvements to assess if mobility needs are met through new TSM&O projects.

Outcome

- TSM&O processes become institutionalized in the State Highway Administration.

Responsible offices

Office of Planning & Preliminary Engineering (OPPE) with support from Office of Traffic & Safety (OOTS), and Office of CHART

Resources needed

Staff hours, travel time reliability analysis tools, deterministic models, MD SHA managerial support

Timeline

1.1a.I. by Q 3 2016

1.1a.II. by Q 3 2016

1.1a.III. by Q 1 2017

1.1a.IV. by Q 2 2017

Dependencies

Strategies 1.2a. and 1.2b.

Existing plans supported by strategy

SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7

Maryland Transportation Plan – Quality of Service goal

MDOT Excellerator, Tangible Result # 2

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.1 - Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

Strategy 1.1b - Determine current and future TSM&O improvements and strategies that should be included in the planning process and estimate their relative effectiveness in responding to the specific causes of recurring and non-recurring congestion

Responsible offices

OPPE, OOTS, and Office of CHART

Resources needed

Staff hours, travel time reliability analysis tools, deterministic models, MD SHA managerial support

Timeline

1.1b.I. by Q 4 2016

1.1b.II. by Q 1 2016

1.1b.III. by Q 1 2016

1.1b.IV. by Q 1 2016

1.1b.V. by Q 3 2016

Dependencies

Strategy 1.1a.

Existing plans supported by strategy

SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7

Maryland Transportation Plan – Quality of Service goal

MDOT Excellerator, Tangible Result # 2

Action items

- 1.1b.I. Identify strategies for implementing TSM&O improvements at various scales: area-wide, corridor, and facility-specific. These could include: Ramp Metering, Advanced Traffic Management, Work Zone Management, Arterial Management, Variable Speed Limits, Hard Shoulder Running, Managed Lanes, etc.
- 1.1b.II. Document the SHA project programming process.
- 1.1b.III Determine how to get projects in the range of $1 - $3M projects programmed, develop a systematic approach to including these types of projects in routine programming processes.
- 1.1b.IV. Develop a process for benefit cost comparison of projects across the state (as opposed to current approach to comparing projects along the same facility).
- 1.1b.V. Develop a process for prioritizing corridors for TSM&O implementation.

Deliverables

- 1.e. Report documenting 1) the geographic application of identified TSM&O improvements, and 2) a process for statewide benefit cost comparisons.
- 1.f. Technical report supporting changes to the existing project prioritization system to include operational projects.

Outcome

- TSM&O Operational projects will be included in 5 year program plan and Cost Feasible Plan.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.1 - Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

Strategy 1.1c - Develop modifications to the SHA Project Development Process (PDP) to accommodate TSM&O

Responsible offices

Office of Planning & Preliminary Engineering

Resources needed

Staff hours, travel time/speed data

Timeline

1.1c.I. by Q 3 2016

1.1c.II. by Q 1 2017

1.1c.III. by Q 3 2017

Dependencies

Strategy 3.4a.

Existing plans supported by strategy

None

MDOT Excellerator, Tangible Result # 2

Action items

- 1.1c.I. Develop a set of equations that predict reliability as a function of the data normally used in the project development process (volume, capacity, number of lanes).
- 1.1c.II. Incorporate reliability into project development process as a metric.
- 1.1c.III. Include TSM&O in MD SHA's "practical design" process.

Deliverable

- 1.g. Revised project development guidance document including travel time reliability.
- 1.h. Report on how TSM&O should be considered as part of "practical design."

Outcome

- Travel time reliability analyses are a key factor in the project development process.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.1 - Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018

Strategy 1.1d - Develop a comprehensive ITS asset management process

Responsible offices

CHART and OOM

Resources needed

Staff hours

Timeline

1.1d.I. by Q 3 2017

1.1d.II. By Q 3 2017

1.1d.III. by Q 4 2017

1.1d.IV. by Q 2 2017

Dependencies

Strategies 3.3a. and 2.1e.

Existing plans supported by strategy

SHA Business plan 3.5.1, 3.5.2, 3.5.5, 3.5.6, 3.5.7

Maryland Transportation Plan – System Preservation goal

MDOT Excellerator, Tangible Result # 2

Action items

- 1.1d.I. Evaluate ITS asset management needs.
- 1.1d.II. Determine lifecycle costs of ITS instruments.
- 1.1d.III. Quality assurance, assessing whether detectors are capturing quality data.
- 1.1d.IV. Create a data hub - refer to specifics in the CMM.

Deliverable

- 1.i. Report identifying asset management need and lifecycle costs.
- 1.j. Data hub.
- 1.k. QA/QC report on detector data.

Outcome

- MD SHA will better account for and maintain ITS instruments – higher quality sensor data.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.2 - Promote culture supporting TSM&O both inside and outside of SHA and raise overall awareness

Strategy 1.2a - Identify staffing resources within SHA

Responsible offices

TSM&O Executive Committee with support from OPPE, OOTS, CHART, Office of Maintenance (OOM)

Resources needed

Designated staff time from OPPE, OOTS, CHART, OOM

Timeline

1.2a.I. by Q 2 2016

1.2a.II. by Q 3 2016

1.2a.III. by Q 4 2016

Dependencies

Strategy 1.1a.

Existing plans supported by strategy

SHA Business Plan Mobility/Economy KPA

Maryland Transportation Plan – Safety & Security, Quality of Service; and Economic Prosperity

MDOT Excellerator, Tangible Result # 2

Action items

- 1.2a.I. Develop long-term strategy for TSM&O staffing and potential outsourcing.
- 1.2a.II. Establish a formal TSM&O Program Manager position (job description to include TSM&O).
- 1.2a.III. Establish a quarterly program reporting mechanism for SHA Senior Management.

Deliverables

- 1.l. Staffing Plans including potential for outsourcing.
- 1.m. Format for quarterly report.

Outcome

- Staffing Plan and a hired TSM&O Program Manager.

Goal 1- Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.2 - Promote culture supporting TSM&O both inside and outside of SHA and raise overall awareness

Strategy 1.2b - Develop a communications and outreach strategy and associated training, outreach, and communication products

Responsible offices

OPPE with Office of Customer Relations and Information (OCRI) , CHART, OOTS, OOM

Resources needed

Designated staff time

Timeline

1.2b.I. by Q 4 2016

1.2b.II. by Q 3 2016

1.2b.III. by Q 3 2016

1.2b.IV. by Q 4 2016

1.2b.V. by Q 1 2017

1.2b.VI. by Q 1 2017

Dependencies

None

Existing plans supported by strategy

None

MDOT Excellerator, Tangible Result # 2

Action items

- 1.2b.I. Document the audiences (internal offices as well as external partners), messages, and strategies used to communicate and market TSM&O in a Communications & Outreach Plan. Capture the roles and responsibilities for individual offices/functional areas as well as a tiered approach for stakeholder outreach.
- 1.2b.II. Create a concise communication product to showcase the Top 3 things to know about Travel Time Reliability and TSM&O for external audiences.
- 1.2b.III. Create TSM&O outreach materials to raise the awareness of TSM&O in CTP tours (or pre-tours).
- 1.2b.IV. Increase the engagement in TSM&O implementation efforts with the development of a comprehensive TSM&O training program for MDOT employees.
- 1.2b.V. Develop a TSM&O webpage.
- 1.2b.VI. Create a briefing for TSO, TBU, Planning Director, CHART Board, and others.

Deliverables

- 1.n. Communications & Outreach Plan.
- 1.o. TSM&O training program.

Outcome

- Achievement of overall TSM&O program objectives, increased awareness of SHRP2 reliability and capacity efforts, increased internal MDSHA and MDOT engagement in the TSM&O program, changed behavior and perceptions among the traveling public and internal stakeholders about reliability and TSM&O.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.2 - Promote culture supporting TSM&O both inside and outside of SHA and raise overall awareness

Strategy 1.2c - Coordinate TSM&O activities with other modes, MPOs, and local agencies with clear common objectives

Responsible offices

OPPE with support from Maryland Transit Administration, Metro, Metropolitan Washington Council of Governments, Baltimore Metropolitan Council, Department of Energy, and Office of CHART

Resources needed

Staff hours, managerial support from involved agencies, possible monetary resources

Timeline

This is meant to be an ongoing process

Deliverable 1.r. by Q 4 2017

Dependencies

Strategy 4.1a.

Existing plans supported by strategy

Maryland Transportation Plan – Environmental Stewardship and Quality of Service goals

MDOT Excellerator, Tangible Result # 2

Action items

- 1.2c.I. Implement strategies to quantify and increase:
  - Park and ride usage,
  - ride-sharing, and
  - carpooling annually.
- 1.2c.II. Improve traveler information capabilities annually to ensure reliable information to travelers and stakeholders.

Deliverables

- 1.q. Tangible advertisements supporting moving automobile users to other modes.
- 1.r. Annual report on typical commute times, fuel savings, and economic efficiencies of modal choice.

Outcome

- Increase in kiss-and-ride usage, ride-sharing, and carpooling annually.

Goal 1 - Develop and implement sustainable TSM&O program within SHA to implement TSM&O

Objective 1.2 - Promote culture supporting TSM&O both inside and outside of SHA and raise overall awareness

Strategy 1.2d - Develop a work zone management plan and committee

Responsible offices

OOC with support from OPPE, OOTS, CHART and OOM

Resources needed

Staff hours, managerial support from involved agencies

Timeline

This is meant to be an ongoing process

Deliverable 1.g. by Q 4 2017

Dependencies

None

Existing plans supported by strategy

Maryland Transportation Plan – SHA Business Plan Mobility/Economy KPA

MDOT Excellerator, Tangible Result # 2, 4, 6

Action items

- 1.2.d.I. Develop a work zone managment plan
- 1.2.d.II. Establish a work zone management committee

Deliverables

- 1.g. Work zone management plan

Outcome

- Increase in kiss-and-ride usage, ride-sharing, and carpooling annually.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.1 - Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1a - Develop Arterial System Master Plan

Responsible offices

OOTS with CHART, OOM, OPPE support

Resources needed

OOTS staff to lead effort with staff support from other offices; consultant support; additional staff (internal and/or outsourced) for O&M.

Timeline

2.1a.I. by Q 2 2017

2.1a.II. by Q 3 2017

2.1a.III. by Q 1 2018

Dependencies

Strategies 3.1a, 2.1c. and 2.1e.

Existing plans supported by strategy

SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7

Maryland Transportation Plan – Quality of Service goal

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Action items

- 2.1a.I. Develop signal system ConOps & high level requirements (include system communications, detection, timing (local control), and coordination (arterial signal coordination).
- 2.1.a.II. Develop high-level signal system design including budget (capital and O&M), staffing plan, and plan for CHART system integration.
- 2.1.a.III. Develop phased signal system Implementation Plan.

Deliverables

- 2.a. ConOps & high-level requirements document.
- 2.b. Signal systems design document.
- 2.c. Signal systems phased Implementation Plan.

Outcome

- An efficiently coordinated/timed arterial signal system with properly maintained detection and communications infrastructure that allows for, where appropriate, integrated freeway and arterial operations.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.1 - Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1b - Develop Freeway Master Plan

Action items

- 2.1b.I. Choose performance measures that will assist with systemically identifying freeway hot spots. These hot spots are indicators of inefficient travel at points in the system.
- 2.1b.II. Evaluate operational improvements' ability to resolve mobility needs at hot spots and record results.
- 2.1b.III. Create a comprehensive plan including all the operational improvements that were identified as practical solutions to mobility needs identified in 2.2a.II. This document should include freeway improvements planned out five years into the future.

Deliverables

- 2.d. Report identifying freeway hot spots, including methodology for identifying hot spots and calculations supporting the metrics.
- 2.e. Technical documents providing analysis of operational improvements suitability for addressing identified mobility needs.
- 2.f. Freeway master plan.

Outcome

- A fully coordinated approach to resolving travel inefficiencies on freeways. Knowledge of planned operational improvements to address future mobility needs.

Responsible offices

OPPE and CHART

Resources needed

OPPE staff to lead effort with staff support from other offices; consultant support; additional staff

Timeline

2.1b.I. by Q 4 2016

2.1b.II. by Spring 2017

2.1b.III. by Q 4 2017

Dependencies

Strategies 3.1a, 2.1c. and 2.1e.

Existing plans supported by strategy

SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7

Maryland Transportation Plan – Quality of Service goal

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.1 - Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1c - Stay apprised of new applications, systems, and technologies and plan to integrate as appropriate

Responsible offices

TSM&O Steering Committee with support from OPPE, OOTS, CHART, OOM

Resources needed

Designated staff time from OPPE, OOTS, CHART, OOM

Timeline

2.1c.I. by Q 3 2017

2.1c.II. by Q 3 2017

Dependencies

Strategies 2.2a., 2.2b., and 3.1b.

Existing plans supported by strategy

SHA Business Plan Objective 2.1&2.1

Maryland Transportation Plan – Safety & Security, Quality of Service; and Economic Prosperity

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Action items

- 2.1c.I. Evaluate DOIT and SHA's procurement processes and identify constraints and challenges to technology acquisition and ways to mitigate these constraints and challenges.
- 2.1c.II. Evaluate and implement operational strategies such as: ramp metering, advanced traffic management, arterial management, variable speed limits, hard shoulder running, managed lanes, etc.

Deliverables

- 2.g. Procurement and Operational Strategy Evaluation Reports.
- 2.h. CV/AV Strategic Plan.

Outcome

- Offices will work together to leverage technology; efficient technology procurement processes; newly implemented operational strategies for enhanced system optimization; deployed C/AV systems.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.1 - Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1d - Work with MdTA, MDOT/MVA, and the private sector to develop and implement a connected/ automated vehicle program in Maryland

Responsible offices

OPPE with assistance from OOTS and CHART

Resources needed

Designated staff time from involved offices

Timeline

2.1d.I. by Q 4 2016

2.1d.II. by Q 3 2017

2.1d.III. by Q 3 2017

2.1.d.IV. by Q 3 2018

Dependencies

None

Existing plans supported by strategy

None

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Action items

- 2.1d.I. Organize a C/AV Taskforce.
- 2.1d.II. Research C/AV facets that will immediate impact Maryland's transportation system.
- 2.1d.III. Compose C/AV Program Plan.
- 2.1.d.IV. Implement Program Plan.

Deliverables

- 2.i. Schedule C/AV Taskforce meetings.
- 2.j. Report(s) on C/AV's immediate impact Maryland's transportation system.
- 2.k. C/AV Program Plan.
- 2.l. Program Plan implemented.

Outcome

- MD SHA adopts project improvements to accommodate C/AV vehicles. Data from the C/AVs is leveraged to improve real time monitoring and performance reporting.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Responsible offices

OPPE with OOTS and CHART

Resources needed

Staff hours, possible sensors (equipment), analytical tools, travel time/speed data

Timeline

2.1e.I. by Q 3 2016

2.1e.II. by Q 4 2016

2.1e.III. by Q 4 2016

2.1b.IV. by Q 2 2017

2.1b.V. by Q 1 2018

2.1e.VI. by Q 4 2017

2.1e.VII. by Q 1 2018

Dependencies

Strategies 2.1a., 2.1b., 1.1a. and 1.1b.

Existing plans supported by strategy

SHA Business Plan strategies 2.1.4, 2.1.5, 2.1.7

Maryland Transportation Plan – Quality of Service goal

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Objective 2.1 - Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018

Strategy 2.1e - Establish a framework for an institutionalized approach to support funding and deployment of operational improvements (including those targeting freight movement) on freeways and arterials

Action items

- 2.1e.I. Document existing funding/programming process for freeway and arterial operational and capacity projects.
- 2.1e.II. Develop specific case studies/scenarios to show how the freeway and arterial funding process could work.
- 2.1e.III. Capture performance measures that provide clear indicators
- 2.1e.IV. Evaluate mobility performance measure tools.
- 2.1e.V. Document system requirements for the program.
- 2.1e.VI. Determine short-term and long-term phasing of truck parking, freeway and arterial monitoring systems.
- 2.1e.VII. Define roles and responsibilities for system deployment, operations and maintenance.

Deliverables

- 2.m. Technical report including case studies and guidance on programming freeway and arterial operational projects.
- 2.n. Concept of Operations for monitoring systems.

Outcome

- Freeway and Arterial operational projects are routinely included in MPO TIPs and MD SHA's 5 year work program AND Mechanism for deploying operational improvements is institutionalized – allowing operational improvements to become a recurring process.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.2 - Develop Integrated Corridor Management (ICM) plans to coordinate the assets of multiple transportation disciplines to provide reliable movement of people and goods by December 2018

Strategy 2.2a - Focus on integrated freeway and arterial management and operations

Responsible offices

OOTS and CHART with OOM support

Resources needed

Designated staff time for OOTS, CHART, and OOM; University and Consultant Support

Timeline

2.2a.I. by Q 2 2017

2.2a.II. by Q 4 2017

2.2a.III. By Q 2 2018

2.2a.IV. by Q 2 2018

Dependencies

Strategies 2.2b. and 2.1e.

Existing plans supported by strategy

SHA Business Plan Objective 2.1, 2.2, 2.3

Maryland Transportation Plan – Safety & Security, Quality of Service; and Economic Prosperity

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Action items

- 2.2a.I. Use Existing I-95 ICM ConOps Grant to Identify Opportunities for freeway and arterial management integrated operations.
- 2.2a.II. Generate a project management plan and a system engineering management plan.
- 2.2a.III. Create an ICM Analysis, Modeling, and Simulation Plan.
- 2.2a.IV. Design an ICM Deployment Approach.

Deliverables

- 2.o. I-95 ICM ConOps to Include Strong Focus on Integrated Freeway and Arterial Management and Operations.

Outcome

- I-95 ICM ConOps, AMS Plan, and Implementation Plan to have strong focus on integrated freeway and arterial management and operations that will ultimately lead to deployed integrated systems.

Goal 2 - Improve travel time reliability for both people and freight on both freeways and arterials

Objective 2.2 - Develop Integrated Corridor Management (ICM) plans to coordinate the assets of multiple transportation disciplines to provide reliable movement of people and goods by December 2018

Strategy 2.2b - Ensure consistent consideration of ICM on corridors that possess the attributes necessary to apply ICM including freight

Action items

- 2.2b.I. Use AMS tools developed under I-95 ICM project to identify promising operational strategies incrementally in significant corridors.
- 2.2b.II. Develop an ICM Program Master Plan for SHA Metropolitan Baltimore-Washington Transportation System Network.
- 2.2b.III. Program ICM Master Plan operational strategies into specific deployment projects.

Deliverables

- 2.p. ICM Program Master Plan.
- 2.q. ICM Deployment Program.

Outcome

- Incremental deployment of ICM operational strategies that improve congestion, reliability, and safety on prioritized corridors.

Responsible offices

OPPE with OOTS, CHART, and OOM

Resources needed

Designated OPPE, OOTS, CHART, and OOM staff support;
Consultant Support

Timeline

2.2b.I. by Q 1 2018

2.2b.II. by Q 1 2018

2.2b.III. by Q 1 2019

Dependencies

Strategies 2.2a. and 2.1e.

Existing plans supported by strategy

SHA Business Plan Objective 2.1, 2.2, 2.3

Maryland Transportation Plan – Safety & Security, Quality of Service; and Economic Prosperity

MDOT Excellerator, Tangible Results #'s 2, 4, 5, 10

Goal 3 - Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.1 - Implement a comprehensive system level performance measurement program to monitor progress toward mobility and reliability targets by June 2017

Strategy 3.1a - Develop a data supported system for performance reporting

Responsible offices

OPPE with support from OOTS

Resources needed

Coordination with data providers, both internal and external to ensure a constant stream of data; system development skills; data analysts/scientists; statistician (designing experimental controls, examining trends in underlying factors including economic factors).

Timeline

3.1a.I. by Q 1 2017

3.1a.II. by Q 1 2017

3.1a.III. by Q 1 2017

3.1a.IV. by Q 1 2017

3.1a.V. by Q 2 2017

Dependencies

Strategies 1.1a., 2.1c. and 3.2a.

Existing plans supported by strategy

SHA Business Plan Objective 2.1, 2.2, 2.3

Maryland Annual Performance Report

MDOT Excellerator, Tangible Results #'s 4, 6, 10

Action items

- 3.1a.I. Ensure that all data are assembled, integrated (conflated), cleaned and made analysis-ready.
- 3.1a.II. Develop a process for target setting that combines technical information with policy activities to derive targets.
- 3.1a.III. Identify, analyze, and rank the bottlenecks on state highways quarterly by location, facility type, total delay, congestion type, duration, and average and worst queue length.
- 3.1a.IV. Perform before/after studies annually to evaluate project benefits for both recurring congestion related projects and operational improvements, especially mobility improvements realized from the signal timing program.
- 3.1a.V. Develop reporting mechanisms, including reports and dashboards, documenting mobility trends in key corridors as well as regionally and statewide; bottlenecks, and the results of the before/after studies.

Deliverables

- 3a. Mobility Data Readiness Report along with an ongoing system for maintaining data readiness.
- 3b. Target Setting Policy Report documenting both the technical steps for supporting target setting as well as the process for determining targets at the policy level.
- 3c. Bottleneck Analysis Methodology Report.

3d. Before/After Analysis Methodology Report.

- 3e. Mobility Performance Reporting Plan.
- 3f. periodic production of reporting reports and dashboards.

Outcome

- Performance reporting provides transparency and information to the public and decision-makers. Trend analysis and before/after studies allow agencies to identify problem areas and to determine what worked and what didn't in terms of investments, leading to changes in investment style.

Goal 3 - Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.1 - Implement a comprehensive system level performance measurement program to monitor progress toward mobility and reliability targets by June 2017

Strategy 3.1b - Continue participation in research and collaboration efforts to advance TSM&O practices through TRB, FHWA, AASHTO, ITS America, University research centers, and consultants

Responsible offices

OPPE

Resources needed

Coordination with FHWA, TRB, AASHTO, ITS America, Universities, and consultants to acquire latest research and training opportunities

Timeline

3.1b.I. by Q 3 2017

3.1b.II. by Q 3 2017

3.1b.III. is an ongoing task

3.1b.1 is an ongoing task

Dependencies

None

Existing plans supported by strategy

None

MDOT Excellerator, Tangible Results #'s 4, 6, 10

Action items

- 3.1b.I. Compose TRB paper on MD SHA TSM&O program.
- 3.1b.II. Organize FHWA workshop or Peer Exchange on Planning for Operations.
- 3.1b.III. Synthesize AASHTO, ITS America, and other reports for application in Maryland.
- 3.1.b.IV. Coordinate with FHWA and NCHRP TSM&O Efforts.

Deliverables

- 3.g. TRB paper submitted for publication.
- 3.h. FHWA Planning for Operations workshop/Peer Exchange conducted.
- 3.i. New research synthesized and distributed on a quarterly basis.
- 3.j. Incorporation of MDOT/SHA Strategic Plan concepts in NCHRP/FHWA reports.

Outcome

- MDOT/SHA increases its visibility in the TSM&O arena and becomes a model for other transportation agencies. MDOT/SHA is recognized as a leader in TSM&O implementation.

Goal 3 - Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.2 - Develop a TSM&O Program Performance Monitoring System

Strategy 3.2a - Develop a monitoring program to assess progress, benefits, and challenges

Responsible offices

TSM&O Executive Committee with support from the Steering Committee

Resources needed

Staff hours, benefit cost analysis tool

Timeline

3.2a.I. by Q 2 2018

3.2a.II. Q 1 2018

Dependencies

Strategies 1.1a., 1.2a. and 3.1a.

Existing plans supported by strategy

None

MDOT Excellerator, Tangible Results #'s 4, 6, 10

Action items

- 3.2a.I. Conduct an annual benefit cost analysis after project implementation.
- 3.2a.II Identify TSM&O performance measures and develop a monitoring plan.
- 3.2a.II. Quarterly TSM&O project reviews.

Deliverables

- 3.k. Benefit cost analysis report upon conclusion of a B/C analysis.
- 3.l. Quarterly TSM&O project review reports.

Outcome

- MD SHA will have the ability to assess their return on investment for TSM&O projects.

Goal 3 - Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.3 - Coordinate and ensure TSM&O is considered in SHA's Asset Management Program

Strategy 3.3a - Incorporate TSM&O into Transportation Asset Management Plan (TAMP) and TAMP Implementation

Responsible offices

OOM, OOTS, CHART

Resources needed

Software, analysis tools, staff time and vehicles for field deployment

Timeline

3.3a.I. by Q 4 2016

3.3a.II. by Q 4 2017

3.3.a.III by Q 4 2017

Dependencies

Strategy 1.1d.

Existing plans supported by strategy

SHA Business Plan Goal 2

2035 MTP goal of System Preservation

MDOT Excellerator, Tangible Results #'s 4, 6, 10

Action items

- 3.3a.I. Coordinate with MDOT TAMP process to ensure TSM&O is incorporated.
- 3.3a.II Develop Asset Inventory for freeway and arterial ITS and TSM&O components.
- 3.3a.III. Write a Work Plan for TAMP inclusion that includes asset management objectives, measures, gaps, lifecycle costs and risk management analysis, a financial plan, and investment strategies.

Deliverables

- 3.m. Reference to TAMP in official MDOT TAMP.
- 3.n. Asset Inventory - Spreadsheet listing all operational assets (instruments, detectors, etc).
- 3.o. Work Plan for TSM&O TAMP.

Outcome

- Comprehensive individual repository of all SHA operational assets, improved performance management, scenario analysis, and reporting.

Goal 3 - Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions

Objective 3.4 - Include reliability in existing traffic analyses and travel forecasting modelling tools

Responsible offices

OPPE

Resources needed

Travel time reliability models and staff time

Timeline

3.4a.I. by Q 4 2016

3.4a.II. By Q 3 2017

Dependencies

Strategies 1.1a., 1.1c. and 3.1a.

Existing plans supported by strategy

SHA Business Plan Goal 2

2035 MTP Quality of Service goal area

MDOT Excellerator, Tangible Results #'s 4, 6, 10

Strategy 3.4a - Develop modelling tools that effectively incorporate travel time reliability and can be used to provide a framework for evaluating tradeoffs of various TSM&O operational strategies

Action items

- 3.4a.I. Assess existing and available travel time reliability models for their use in planning for operations.
- 3.4a.II. Create new predictive models to fill any gaps identified in the assessment.

Deliverables

- 3.p. Technical memo comparing the functions and outputs of existing models.
- 3.q. Framework and methodology for new predictive models.

Outcome

- Reliability will be included in travel forecasting and modelling tools.

Goal 4 - Improve the travelling public's experience on Maryland highways by enabling customers with information and choices

Objective 4.1 - Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O

Strategy 4.1a - Provide reliable and accessible real-time modal choice information to travelers and other stakeholders at all times

Responsible offices

OPPE and CHART with MDOT and Private Sector Support

Resources needed

Designated CHART staff time

Timeline

4.1a.I. by Q 1 2017

4.1a.I. by Q 4 2017

4.1a.I. by Q 2 2017

4.1a.IV. By Q 2 2017

4.1a.V. by Q 2 2017

4.1a.I. by Q 1 2017

Dependencies

Strategies 1.4a. and 3.1a.

Existing plans supported by strategy

SHA Business Plan Objective 2.3; Maryland Transportation Plan – Quality of Service

MDOT Excellerator, Tangible Results #'s 2, 5, 6, 10

Action items

- 4.1a.I. Continue to improve CHART's capabilities for providing traffic information to regional integrated transportation data collection and distribution systems annually.
- 4.1a.II. Provide enhancements to the 511 service annually.
- 4.1a.III. Improve traveler information capabilities annually to ensure reliable information to travelers and stakeholders. Examine use of private sector in collection/distribution capabilities.
- 4.1a.IV. Investigate role of MDOT (vs. SHA) in leading this strategy from multi-modal perspective.
- 4.1a.V. Enhance capture of traffic incident location data.
- 4.1a.VI. Employ new technologies to improve coordination during incident management

Deliverables

- 4.a. CHART Traveler Information Future Strategy White Paper.
- 4.b. Ongoing CHART System Enhancements.

Outcome

- Enhanced 511 and other Traveler Information Services providing real-time info including mode choice.

Goal 4 - Improve the travelling public's experience on Maryland highways by enabling customers with information and choices

Objective 4.1 - Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O

Strategy 4.2a - Develop education and outreach tools, including use of web-based and social media applications, targeted to the travelling public

Responsible offices

Customer Relations and Information Office with OPPE

Resources needed

Website development software and staff time

Timeline

4.2a.I. by Q 3 2016

4.2a.II. by Q 3 2016

4.2a.III by Q 3 2016

Dependencies

Strategy 4.2b

Existing plans supported by strategy

SHA Business Plan Goal 6

MDOT Excellerator, Tangible Results #'s 2, 5, 6, 10

Action items

- 4.2a.I. Create a transportation website focused on the operations of the users.
- 4.2a.II. Create a traffic operations Twitter account and assign staff to regularly provide updates.
- 4.2a.III. Create YouTube videos highlighting the benefits of various operational strategies.

Deliverables

- 4.e. Active website with a URL accessible to the public.
- 4.f. Active Twitter account with periodic updates.
- 4.g. Short instructional videos posted onto YouTube.com.

Outcome

- Traveling public increase their knowledge base on how to utilize TSM&O strategies.

Goal 4 - Improve the travelling public's experience on Maryland highways by enabling customers with information and choices

Objective 4.1 - Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O

Strategy 4.2b - Conduct regular surveys targeted towards the traveling public to determine level of customer satisfaction with SHA's application of TSM&O operational strategies

Responsible offices

Customer Relations and Information Office with OPPE

Resources needed

Survey generation and analysis software, staff time, and a physical place to host survey

Timeline

4.2b.I by Q 4 2017

4.2b.II. by Q 4 2017

4.2b.III. by Q 4 2017

4.2b.IV. by Q 4 2017

Dependencies

Strategies 4.2a

Existing plans supported by strategy

SHA Business Plan Goal 6

MDOT Excellerator, Tangible Results #'s 2, 5, 6, 10

Action items

- 4.2b.I. Create survey questions evaluating satisfaction with TSM&O operational strategies.
- 4.2b.II. Prepare a plan for outreach and administering the survey.
- 4.2b.III. Proctor the survey.
- 4.2b.IV. Analyze the results.

Deliverables

- 4.h. Document containing final survey questions.
- 4.i. Outreach plan.
- 4.j. Report including survey results.

Outcome

- Traveling public increase their knowledge base on how to utilize TSM&O strategies; SHA receives feedback on what is working best and where further improvements to the TSM&O program are needed.

Communication & Outreach Plan

The success of the TSM&O program in Maryland is dependent on effective communication and outreach. A communications strategy will help Maryland communicate benefits, educate stakeholders, and gain buy-in for both TSM&O strategies and the TSM&O program. Currently, few internal employees and a very small portion of the traveling public are aware of the term "TSM&O," much less the concepts and practices underlying it and the benefits and strategies it can produce. To address a need for education and awareness building, a communications plan will be developed to propose a series of strategies, messages, and tactics to communicate TSM&O practices and improve awareness both among SHA and MDOT employees and the traveling public.

Communication and outreach play an integral role in achieving each of the four TSM&O program goals. Specific strategies will emerge as the program moves into the implementation phase. Table 2 shows possible communication strategies in each of the four goal areas.

Table 2 Communication Component in TSM&O Goals

TSM&O Strategic/Implementation Plan Goals		Sample Communication Component
Goal 1	Develop a sustainable TSM&O program at SHA	Development of TSM&O kick-off program material to inform internal stakeholders
Goal 2	Improve travel time reliability for both people and freight on both freeways and arterials	Development of externally facing reliability educational materials
Goal 3	Develop data- and performance-driven approaches to support TSM&O planning, programming, implementation and evaluation decisions	Delivery of workshops to educate stakeholders on TSM&O-related performance measurement
Goal 4	Improve real time information for travelling public so they can make more informed decisions	Messaging for public website content

Clear and concise messaging is critical in the early steps of formalizing the program. Maryland SHA's TSM&O program will have clearly defined mission, vision, goals, objectives, and performance measures. Education on these goals and objectives should reach internal and external partners, TSM&O partners, policy makers, and customers. SHA should provide statewide leadership and support for TSM&O. Involved parties, at all levels, should know that the TSM&O program will:

- Employ new technologies to improve coordination during incident management,
- Decrease incident duration and incident delay,
- Allow the traveling public to make better informed travel decisions,
- Provide mobility benefits for transit, freight and highway modes;
- Support transportation safety goals for SHA and partners;

- Enhance coordination between Maryland SHA and local traffic signal operators to optimize signal timing in response to conditions, and
- Enhance ability to manage traffic and increase safety near and within work zones and special event locations.

Audiences for TSM&O Education and Awareness

The communications strategies used in the TSM&O program will be informed by stakeholder analysis. Target audiences include:

- SHA Employees and Offices (e.g. employees in Operations, Planning, Construction and Maintenance, CHART, senior leadership, etc.);
- MDOT Employees and Teams (e.g. other modal teams such as MTA, MPA, etc.);
- Freight operators and stakeholders (e.g. shipping companies, trucking companies, port authority, etc.);
- MPO and Local Agencies (e.g. MPOs such as Baltimore Metropolitan Council, MWCOG, etc., city transportation agencies, transit agencies, etc.);
- Travelling Public (e.g. commuters and daytime travelers, out-of-state visitors, taxi and livery operators, etc.).

Communication Channels

Strategies already utilized by SHA as well as potential additional strategies to advance the TSM&O program goals are shown in Table 3. These strategies are suggested and may be updated based on a more detailed communications plan, to be developed in consultation with SHA leadership and the Communications team in 2016.

Table 3 Sample TSM&O Communication Strategies

Communication Strategy	Audience	Message	Impact
Policy Memo from Administrator	Internal	Value of TSM&O and role for SHA	Provide initial messaging and awareness
Intranet Homepage	Internal	Business case & updates	Inform employees of progress
Intranet TSM&O page	Internal	Program progress	Inform employees of progress
Intranet Project pages	Internal	Project dashboards, budgeting, progress	Inform team members of progress
Email Newsletters/Bulletins (wide to narrow audience)	Internal	Inform progress, engage employees	Deepen understanding of program purpose & project progress
Project Posters	Internal	Inform progress, engage employees	Deepen understanding of program purpose & project progress

Communication Strategy	Audience	Message	Impact
Organization Calendar	Internal	Milestones	Heighten awareness of program
Brownbag lunches/department presentations	Internal	Inform progress, engage employees, inform program	Deepen understanding of program purpose & project progress
Blog/news articles	External	Inform public on strategies, progress, projects	Deepen understanding of benefits and gain buy in
Mass media (newspaper, TV, etc.)	External	Inform public on strategies, progress, projects	Deepen understanding of benefits and gain buy in
Social media (videos, social networks, photos)	External	Inform public on strategies, progress, projects	Deepen understanding of benefits and gain buy in
Branding	Internal/ External	Common look and message	Consistent use of terms across strategies, ensure clear communication

Next Steps

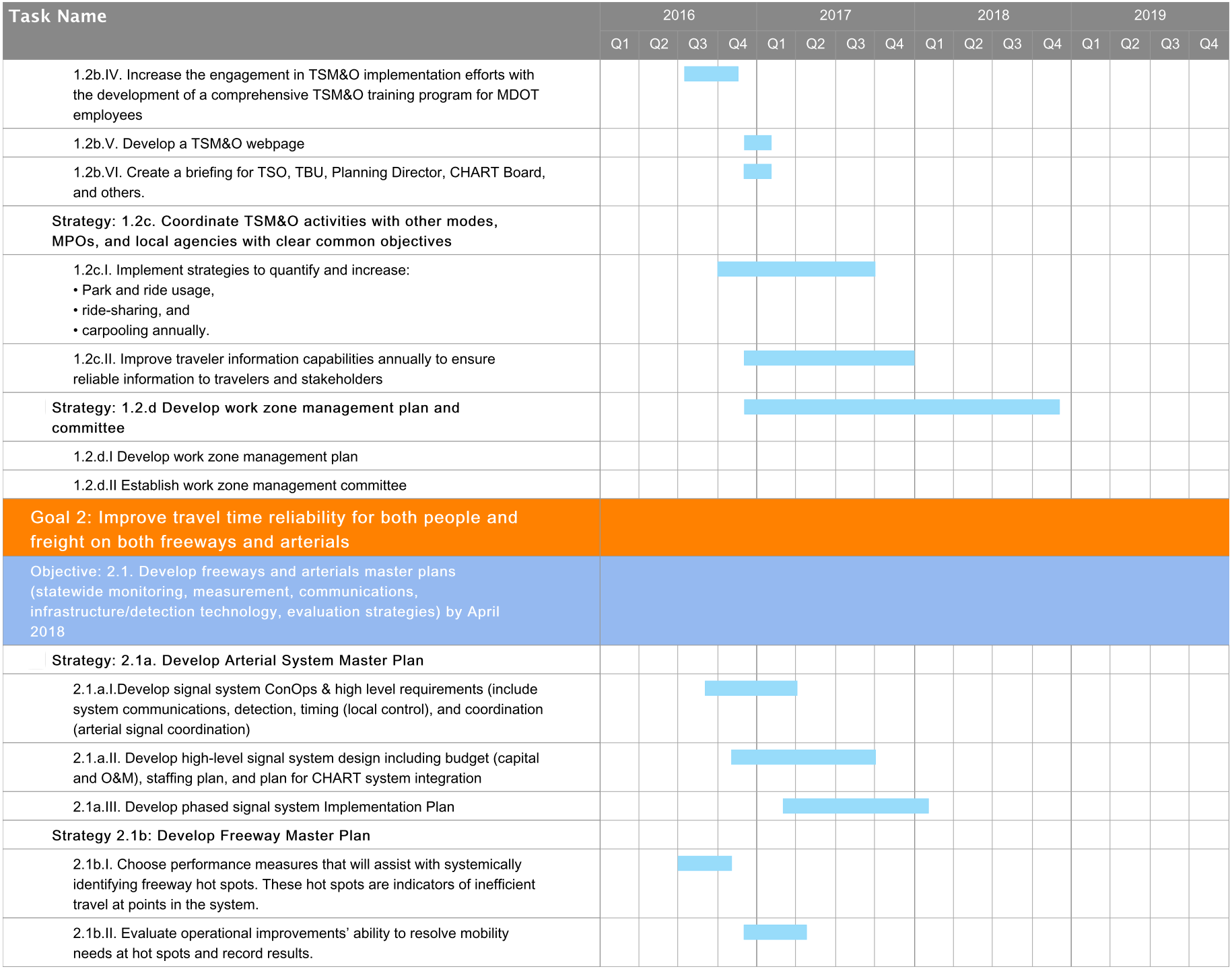
Following the approval of this TSM&O Implementation Plan, MDOT/SHA should take the following steps:

1. Create an official TSM&O Executive Committee.
2. Complete the TSM&O Communication Plan. TSM&O Committee and US DOT Volpe Center should seek input from MDOT/SHA leadership and the MD SHA Office of Communications on the appropriate channels and approaches for internal and external communication. This discussion will inform a more detailed communications plan with messaging and performance goals tied to specific audiences.
3. Secure resources in the way of consultant contract.
4. Begin implementation of Strategic Plan per schedule in Roadmap.
5. Coordinate with FHWA on progress.
6. Continue with internal coordination internal efforts.
7. Pursue the creation of a TSM&O Program Manager position and fill position.

Appendix A - Roadmap

Task Name	2016				2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Goal 1: Develop and Implement a sustainable TSM&O program at SHA																
Objective: 1.1. Incorporate TSM&O oriented practices in routine planning and programming business processes by 2018																
Strategy: 1.1.a .Identify and implement means of incorporating TSM&O planning and evaluation methods into relevant agency policies																
1.1a.I. Evaluate the inclusion of reliability in MDOT mission, vision, and strategic plans.																
1.1a.II. Develop a policy and procedure for TSM&O – Draft policy statement needs to address establishing TSM&O structure (office/functional area responsibilities). The procedure will include an institutional framework for TSM&O – including roles for steering and executive committees.																
1.1a.III. Incorporate planning for operations in all processes within SHA - Maryland Transportation Plan 2035 and SHA Business Plan																
1.1a.IV. Identify methods for evaluating capacity vs. TSM&O options considering: service issues, network scale, time to implement, incremental improvement options capital operating and maintenance costs, cost-effectiveness related to relevant performance measures																
Strategy: 1.1b. Determine current and future TSM&O improvements and strategies that should be included in the planning process and estimate their relative effectiveness in responding to the specific causes of recurring and non-recurring congestion																
1.1b.I. Identify strategies for implementing TSM&O improvements at various scales: area-wide, corridor, and facility-specific. These could include: Ramp Metering, Advanced Traffic Management, Work Zone Management, Arterial Management, Variable Speed Limits, Hard Shoulder Running, Managed Lanes, etc.																
1.1b.II. Document the SHA project programming process																
1.1b.III. Determine how to get projects in the range of $1 - $3M projects programmed, develop a systematic approach to including these types of projects in routine programming processes.																
1.1b.IV.Develop a process for benefit cost comparison of projects across the state (as opposed to current approach to comparing projects along the same facility)																

Task Name	2016				2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.1b.V Develop a process for prioritizing corridors for TSM&O implementation																
Strategy: 1.1c. Develop modifications to the SHA Project Development Process (PDP) to accommodate TSM&O																
1.1c.I. Develop a set of equations that predict reliability as a function of the data normally used in the project development process (volume, capacity, number of lanes)																
1.1c.II. Incorporate reliability into project development process as a metric																
1.1c.III. Include TSM&O in MD SHA's "practical design" process																
Strategy: 1.1d. Develop a comprehensive ITS asset management process																
1.1d.I. Evaluate ITS asset management needs																
1.1d.II. Determine lifecycle costs of ITS instruments																
1.1d.III. Quality assurance, assessing whether detectors are capturing quality data																
1.1d.IV. Create a data hub - refer to specifics in the CMM																
Objective: 1.2 Promote culture supporting TSM&O both inside and outside of SHA and raise overall awareness																
Strategy: 1.2a. Identify staffing resources within MD SHA																
1.2a.I. Develop long-term strategy for TSM&O staffing and potential outsourcing																
1.2a.II. Establish a formal TSM&O Program Manager position (job description to include TSM&O)																
1.2a.III. Establish a quarterly program reporting mechanism for SHA Senior Management																
Strategy: 1.2b. Develop a communications and outreach strategy and associated training, outreach, and communication products.																
1.2b.I. Document the audiences (internal offices as well as external partners), messages, and strategies used to communicate and market TSM&O in a Communications & Outreach Plan. Capture the roles and responsibilities for individual offices/functional areas as well as a tiered approach for stakeholder outreach																
1.2b.II. Create a concise communication product to showcase the Top 3 things to know about Travel Time Reliability and TSM&O for external audiences																
1.2b.III. Create TSM&O outreach materials to raise the awareness of TSM&O in CTP tours (or pre-tours)																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1.2b.IV. Increase the engagement in TSM&O implementation efforts with the development of a comprehensive TSM&O training program for MDOT employees
1.2b.V. Develop a TSM&O webpage
1.2b.VI. Create a briefing for TSO, TBU, Planning Director, CHART Board, and others.
Strategy: 1.2c. Coordinate TSM&O activities with other modes, MPOs, and local agencies with clear common objectives
1.2c.I. Implement strategies to quantify and increase:
• Park and ride usage,
• ride-sharing, and
• carpooling annually.
1.2c.II. Improve traveler information capabilities annually to ensure reliable information to travelers and stakeholders
Strategy: 1.2.d Develop work zone management plan and committee
1.2.d.I Develop work zone management plan
1.2.d.II Establish work zone management committee
Goal 2: Improve travel time reliability for both people and freight on both freeways and arterials
Objective: 2.1. Develop freeways and arterials master plans (statewide monitoring, measurement, communications, infrastructure/detection technology, evaluation strategies) by April 2018
Strategy: 2.1a. Develop Arterial System Master Plan
2.1.a.I.Develop signal system ConOps & high level requirements (include system communications, detection, timing (local control), and coordination (arterial signal coordination)
2.1.a.II. Develop high-level signal system design including budget (capital and O&M), staffing plan, and plan for CHART system integration
2.1a.III. Develop phased signal system Implementation Plan
Strategy 2.1b: Develop Freeway Master Plan
2.1b.I. Choose performance measures that will assist with systemically identifying freeway hot spots. These hot spots are indicators of inefficient travel at points in the system.
2.1b.II. Evaluate operational improvements' ability to resolve mobility needs at hot spots and record results.

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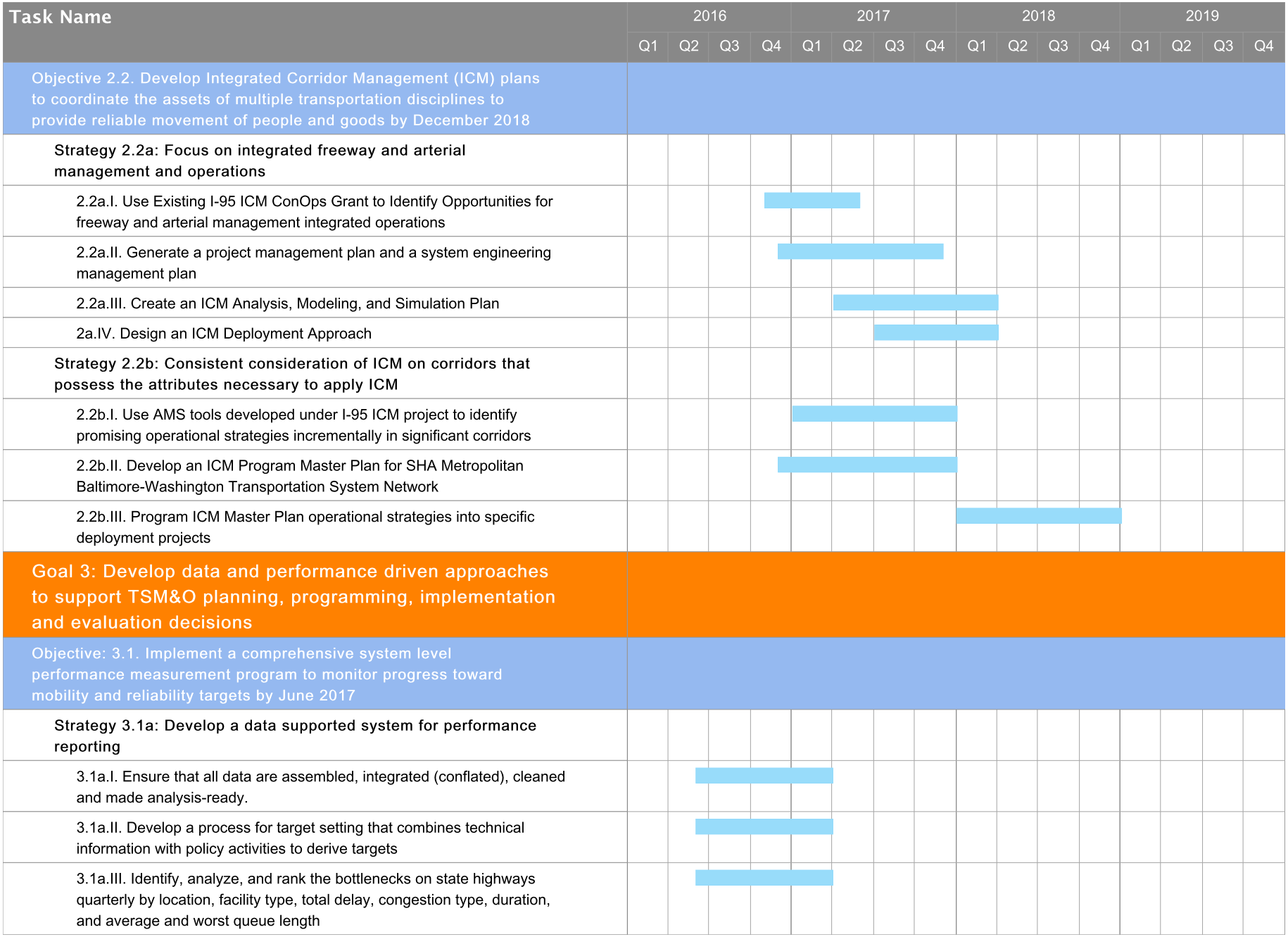
2.1b.III. Create a comprehensive plan including all the operational improvements that were identified as practical solutions to mobility needs identified in 2.2a.II. This document should include freeway improvements planned out five years into the future.																
Strategty 2.1c: Stay apprised of new applications, systems, and technologies and plan to integrate as appropriate																
2.1c.I. Evaluate DOIT and SHA's procurement processes and identify constraints and challenges to technology acquisition and ways to mitigate these constraints and challenges																
2.1.c.II. Evaluate and implement operational strategies such as: ramp metering, advanced traffic management, arterial management, variable speed limits, hard shoulder running, managed lanes, etc.																
Strategty 2.1d: Work with MdTA, MDOT/MVA, and the private sector to develop and implement a connected/automated vehicle program in Maryland																
2.1d.I. Organize a C/AV Taskforce																
2.1d.II. Research C/AV facets that will immediate impact Maryland's transportation system																
2.1d.III. Compose C/AV Program Plan																
2.1.d.IV. Implement Program Plan																
Strategy 2.1e: Establish a framework for an institutionalized approach to support funding and deployment of operational improvements (including those targeting freight movement) on freeways and arterials																
2.1e.I. Document existing funding/programming process for arterial operational and capacity projects																
2.1e.II. Develop specific case studies/scenarios to show how the arterial funding process could work																
2.1e.III. Capture performance measures that provide clear indicators																
2.1e.IV. Evaluate mobility performance measure tools																
2.1e.V. Document system requirements for the program																
2.1e.VI. Determine short-term and long-term phasing of freeway, truck parking, and arterial monitoring system																
2.1e.VII. Define roles and responsibilities for system deployment, operations and maintenance																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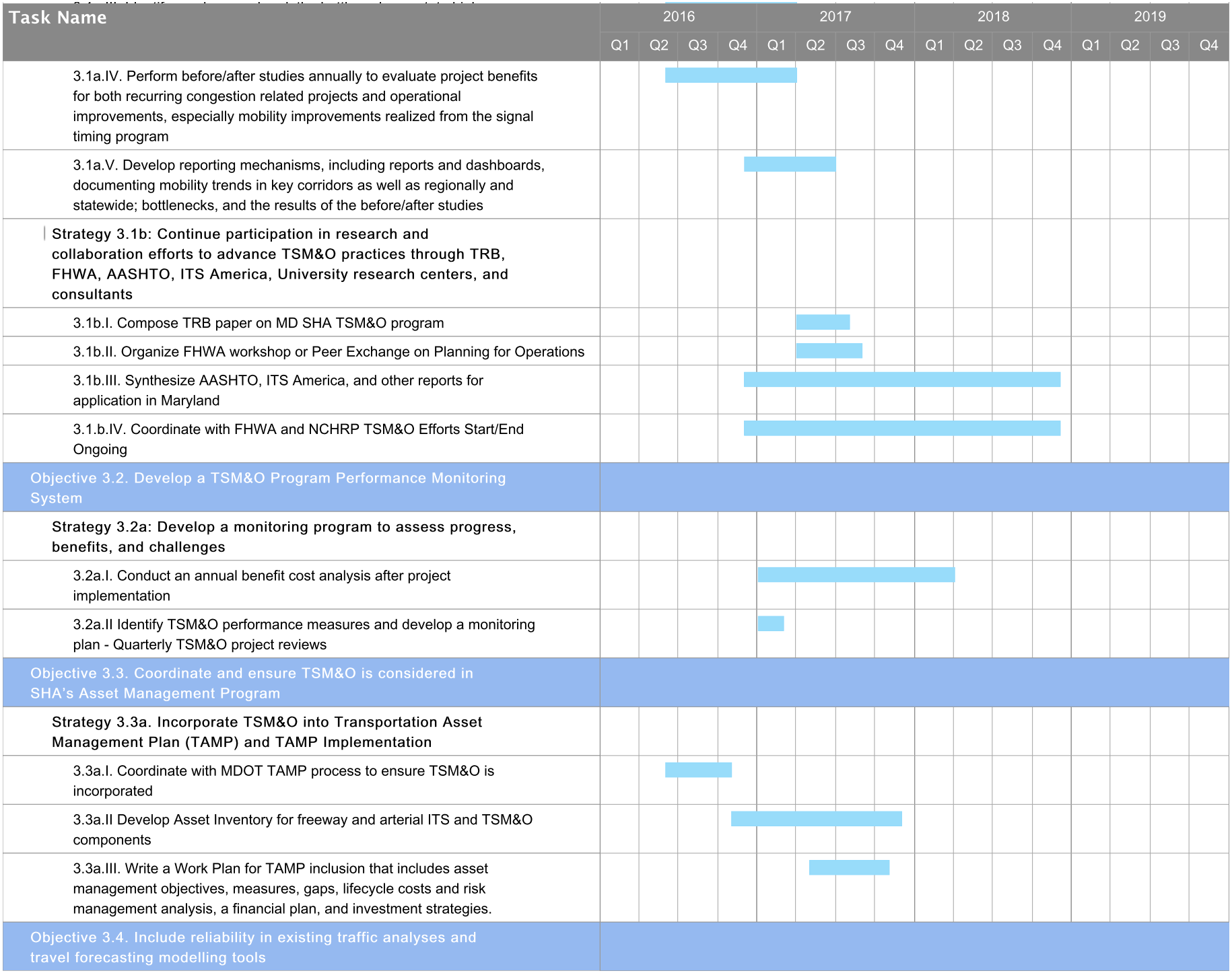
Objective 2.2. Develop Integrated Corridor Management (ICM) plans to coordinate the assets of multiple transportation disciplines to provide reliable movement of people and goods by December 2018
Strategy 2.2a: Focus on integrated freeway and arterial management and operations
2.2a.I. Use Existing I-95 ICM ConOps Grant to Identify Opportunities for freeway and arterial management integrated operations
2.2a.II. Generate a project management plan and a system engineering management plan
2.2a.III. Create an ICM Analysis, Modeling, and Simulation Plan
2a.IV. Design an ICM Deployment Approach
Strategy 2.2b: Consistent consideration of ICM on corridors that possess the attributes necessary to apply ICM
2.2b.I. Use AMS tools developed under I-95 ICM project to identify promising operational strategies incrementally in significant corridors
2.2b.II. Develop an ICM Program Master Plan for SHA Metropolitan Baltimore-Washington Transportation System Network
2.2b.III. Program ICM Master Plan operational strategies into specific deployment projects
Goal 3: Develop data and performance driven approaches to support TSM&O planning, programming, implementation and evaluation decisions
Objective: 3.1. Implement a comprehensive system level performance measurement program to monitor progress toward mobility and reliability targets by June 2017
Strategy 3.1a: Develop a data supported system for performance reporting
3.1a.I. Ensure that all data are assembled, integrated (conflated), cleaned and made analysis-ready.
3.1a.II. Develop a process for target setting that combines technical information with policy activities to derive targets
3.1a.III. Identify, analyze, and rank the bottlenecks on state highways quarterly by location, facility type, total delay, congestion type, duration, and average and worst queue length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3.1a.IV. Perform before/after studies annually to evaluate project benefits for both recurring congestion related projects and operational improvements, especially mobility improvements realized from the signal timing program
3.1a.V. Develop reporting mechanisms, including reports and dashboards, documenting mobility trends in key corridors as well as regionally and statewide; bottlenecks, and the results of the before/after studies
Strategy 3.1b: Continue participation in research and collaboration efforts to advance TSM&O practices through TRB, FHWA, AASHTO, ITS America, University research centers, and consultants
3.1b.I. Compose TRB paper on MD SHA TSM&O program
3.1b.II. Organize FHWA workshop or Peer Exchange on Planning for Operations
3.1b.III. Synthesize AASHTO, ITS America, and other reports for application in Maryland
3.1.b.IV. Coordinate with FHWA and NCHRP TSM&O Efforts Start/End Ongoing
Objective 3.2. Develop a TSM&O Program Performance Monitoring System
Strategy 3.2a: Develop a monitoring program to assess progress, benefits, and challenges
3.2a.I. Conduct an annual benefit cost analysis after project implementation
3.2a.II Identify TSM&O performance measures and develop a monitoring plan - Quarterly TSM&O project reviews
Objective 3.3. Coordinate and ensure TSM&O is considered in SHA's Asset Management Program
Strategy 3.3a. Incorporate TSM&O into Transportation Asset Management Plan (TAMP) and TAMP Implementation
3.3a.I. Coordinate with MDOT TAMP process to ensure TSM&O is incorporated
3.3a.II Develop Asset Inventory for freeway and arterial ITS and TSM&O components
3.3a.III. Write a Work Plan for TAMP inclusion that includes asset management objectives, measures, gaps, lifecycle costs and risk management analysis, a financial plan, and investment strategies.
Objective 3.4. Include reliability in existing traffic analyses and travel forecasting modelling tools

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Strategy 3.4a. Develop modeling tools that effectively incorporate travel time reliability and can be used to provide a framework for evaluating tradeoffs of various TSM&O operational strategies																
3.4a.I. Assess existing and available travel time reliability models for their use in planning for operations.																
3.4a.II. Create new predictive models to fill any gaps identified in the assessment.																
Goal 4: Improve the travelling public's experience on Maryland highways by enabling customers with information and choices																
Objective 4.1: Achieve a user cost savings of at least $1 billion annually by effective congestion management and TSM&O																
Strategy: 4.1a. Provide reliable and accessible real-time modal choice information to travelers and other stakeholders at all times																
4.1a.I. Continue to improve CHART's capabilities for providing traffic information to regional integrated transportation data collection and distribution systems annually																
4.1a.II. Provide enhancements to the 511 service annually																
4.1a.III. Improve traveler information capabilities annually to ensure reliable information to travelers and stakeholders. Examine use of private sector in collection/distribution capabilities.																
4.1a.IV. Investigate role of MDOT (vs. SHA) in leading this strategy from multi-modal perspective																
4.1a.V. Enhance capture of traffic incident location data																
4.1a.VI. Employ new technologies to improve coordination during incident management																
Objective 4.2: Enhance travelling public's knowledge and understanding of TSM&O operational strategies and their respective benefits																
Strategy: 4.2a. Develop education and outreach tools, including use of web-based and social media applications, targeted to the travelling public																
4.2a.I. Create a transportation website focused on the operations of the users																

Task Name	2016				2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4.2a.II. Create a traffic operations Twitter account and assign staff to regularly provide updates																
4.2a.III. Create YouTube videos highlighting the benefits of various operational strategies																
Strategy: 4.2b. Conduct regular surveys targeted towards the traveling public to determine level of customer satisfaction with SHA's application of TSM&O operational strategies																
4.2b.I. Create survey questions evaluating satisfaction with TSM&O operational strategies																
4.2b.II. Prepare a plan for outreach and administering the survey																
4.2b.III. Proctor the survey																
4.2b.IV. Analyze the results																

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