2024 State Planning and Research Program I

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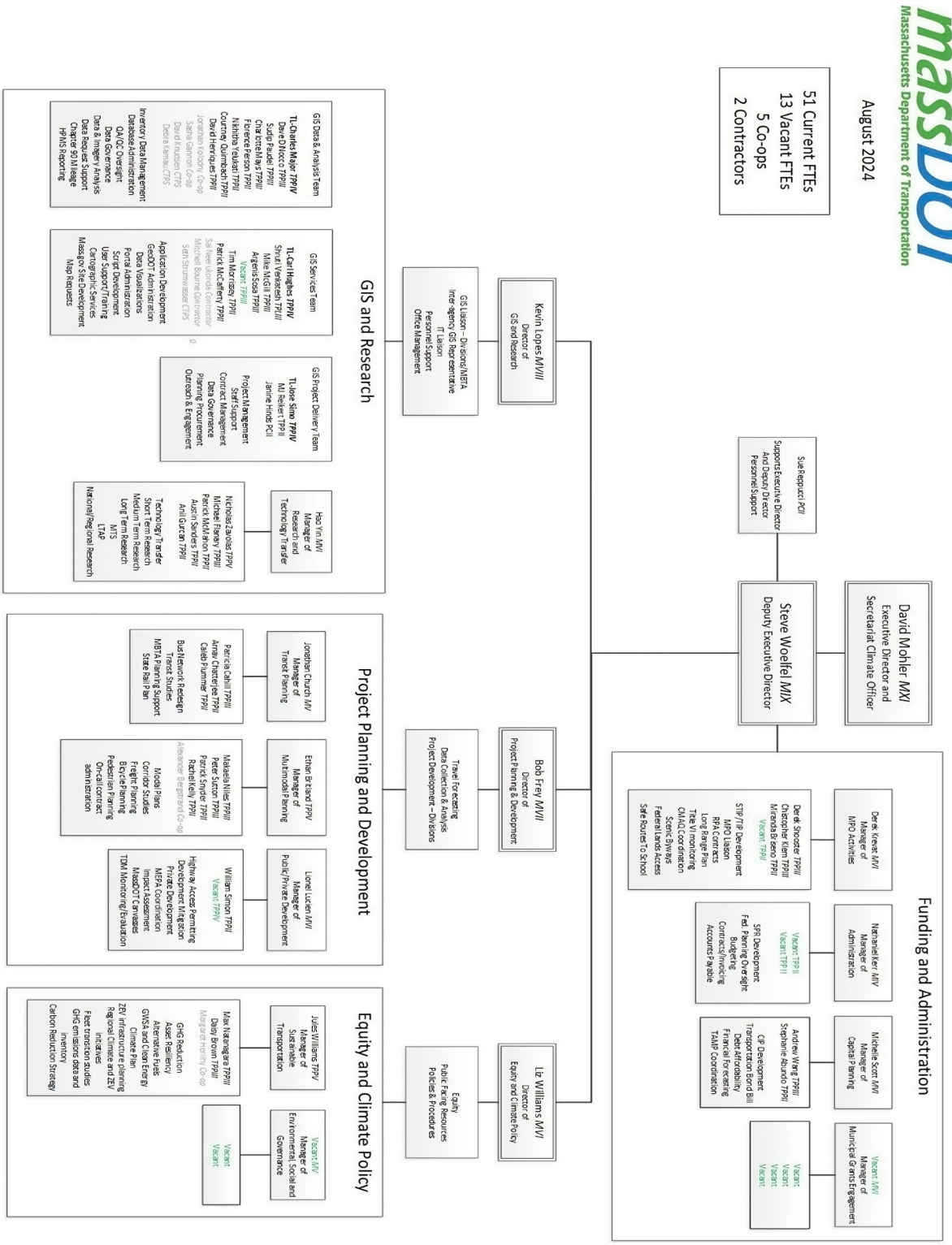
Office of Transportation Planning



Highway Division

Jonathan Gulliver, *Highway Administrator*	**Carrie Lavallee,** *Deputy Administrator and Chief Engineer*	**Jack Moran,** *Deputy Chief Engineer for Performance and Asset Management*	**Ed Naras,** *Pavement Management Engineer*	Jonathan Smith
				Cody Holemo
				William Guttierrez
				Stefan Kargakis
				Patrick Lawlor
				Liz Cruz-Falero
				Subash Shahi
				James Pierce
		John Bechard, *Deputy Chief Engineer for Project Delivery*	**John Anthony,** *Survey Engineer*	Arben Zhuri
				Brian Knowles
				Evanson Browne
				Jeff Bruce
				John Anthony
				John Barnes
				Leo Scanlon
				Michael Chouinard *(reports to John DeLeire)*
				Michael Roberts *(reports to Michael Chouinard)*
				Eugene Tivnan
				Mehdi Sadjady
	Neil Boudreau, *Assistant Administrator for Traffic and Safety*		**John Amato ,** *Interim Manager of Advanced Transportation Technology*	Robert Belcastro
				Tracy DeYoung
				Brian Farrington
				James Groomes
				David Manktelow
				Hector Monet
				Michael Ribeiro
				Wayne Schofield Jr.
				Misrak Sultan
				Lori Suss
				Ian Adams
				Corey O'Connor
				Spencer Cullen
				Zachary Medeiros
				Amy Getchell
				Christopher Falcos
			Bonnie Polin, *State Safety Engineer*	Ana Fill
				Dakota DelSignore
				Jennifer Inzana
				Michelle Deng
				Stacey Schwartz
				Kirsten Johnson
				Rosalynd Scott
				Kevin Fitzgerald
				Kevin Chiang
				Buu Tran
				Noah Thompson
				Emmanuel Gonzalez
				Thao Tran
				Everlyn Galloway
				Zachary Medeiros
				Fang Xi
				Amitai Lipton
				Kylie Braunius
				Transportation Program Planner II (TBH)
				Student Intern
				Student Intern
				Student Intern

SPR I Part A

Administration

A.1 / Administration and SPR Coordination

Task Lead: Maria Ramirez

Task Purpose:

To supervise and direct planning and research staff and projects to maximize State Planning and Research (SPR) funding. The administrative staff includes the Executive Director, Deputy Executive Director, Director of Project-Oriented Planning, Director of Data and Policy, Director of Geospatial Technology, Manager of Administration, the SPR Program Coordinator, and one administrative support staff. The administrative staff oversees all fiscal and administrative activities of the following units:

- Capital Planning
- GIS Services
- MPO Activities
- Multimodal Planning
- Public-Private Development
- Research
- Sustainable Transportation
- Transit Planning

Guidance is also provided to the following units of the MassDOT Highway Division that are authorized for SPR reimbursement:

Pavement Management, Statewide Traffic Data Collection, Traffic Crash Records and Safety Management, and Survey.

Accomplishments in prior year:

Developed standard operating procedures for billing, project closeouts and new project/contract awards and funding to ensure proper billing and consistency with project and contract awards/closeouts.

Proposed activities for next year:

SPR I and II administration, including required reporting, amendments, and scope approvals by FHWA. Submit SPR I and II deliverables to FHWA. Continue onboarding several OTP staff to fill vacancies. Internal working group to continue coordination with FHWA on billing, project closeouts and new contracts/awards consistent with SOP.

Anticipated products:

All activities, tasks, and deliverables identified for completion within FFY 2024.

Finalization of project closeout documentation and Standard Operating Procedure(s) addressing billing and contract closeouts and new contract/project awards.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$817,347.68**

MassDOT staff members	% Time to task
Maria Ramirez	100.0
Nathaniel Kerr	100.0
David Mohler	100.0
Susan Reppucci	100.0
Stephen Woelfel	100.0
Business Management Specialist (TBH)	100.0
Kevin Lopes	50.0
Liz Williams	50.0
Bob Frey	50.0

Estimated Other Costs: **$201,000.00**

Estimated task budget: $1,018,347.68

Other cost notes:

1. American Association of State Highway and Transportation Officials (AASHTO) Annual Membership: $48,000.00

2. Miscellaneous administrative expenses (incl. $650 for Online trainings for Sustainable Transportation team): $10,000.00

3. Northeast Association of State Transportation Officials (NASTO): $2,000.00

4. Newspaper ads for public meetings/announcements: $8,000.00

5. The Eastern Transportation Coalition: $92,000.00

6. Translation Services: $15,000

7. Travel: $26,000.00

Capital Planning

A.2 / Capital Planning Development and Coordination

Task Lead: Michelle Scott

Task Purpose:

This task is necessary for the development and process improvements of the annual Capital Investment Plan (CIP) for MassDOT and the state-funded portion of the MBTA CIP. Work under this task will involve the production of the state fiscal year (SFY) 2025–2029 CIP, a fiscally constrained document that will include MassDOT's capital investments across all Divisions as well as investments for MassDOT's Enterprise Services. In building this plan, staff will work with each MassDOT Division to identify and prioritize projects for funding over this five-year period. Additionally, staff will gather public input following the procedures established in MassDOT's Public Participation Plan. Staff will ensure that the CIP development process is aligned with the development of the STIP and the statewide long-range transportation plan.

The SFY 2025–2029 CIP will account for trends and changing demands on our transportation system and the vision of how our transportation system should evolve to meet the needs of our customers and the changing demographics of the Commonwealth. With input and guidance from the Secretary, Administrators, and the Divisions, staff will revisit goals, strategic objectives, and priorities for the next five years in developing a new capital plan for MassDOT. The 2025–2029 CIP will continue to incorporate process improvements for the planning cycle, including the following:

- Enhancements to tools used to track project information and costs.
- Increased focus on engaging traditionally underrepresented groups during public participation processes.
- Incorporation of objectives from updated asset management and strategic plans (such as the Commonwealth’s Transportation Asset Management Plan, Bicycle and Pedestrian Plans, and the Freight Plan, among others).
- Refinements to project scoring methodologies.
- Improvements to the CIP equity analysis.
- Incorporation of sustainability and resiliency investment considerations in program sizing and project evaluations.

This task also covers staff presentations to and engagement with the MassDOT Board of Directors and its committees. In addition, it covers coordination with MassDOT’s Capital Budget team, the Commonwealth’s Executive Office of Administration and Finance, and other internal and external stakeholders for CIP-related activities over the course of the year. As part of this task, staff may

request consultant support through task A.16 “On Call Contracts” for producing and maintaining the CIP Universe of Projects and producing CIP documents, among other activities.

Accomplishments in prior year:

- Developed and published the SFY 2024–2028 Capital Investment Plan. Provided web-based CIP comment tool and resources to gather public input and worked with staff from metropolitan planning organizations to host virtual public meetings about the draft CIP.
- Utilized on-call consultant support from Cambridge Systematics (CS) under SPR Task A.16, "On Call Contracts," to develop, maintain, and enhance the CIP universe of projects.
- Made presentations to the MassDOT Board of Directors, its committees, external stakeholders, and the public.
- Responded to CIP-related information requests from MassDOT and external stakeholders.
- Continued to refine the Web-based CIP ESRI StoryMap and used Tableau to create interactive data visualizations displaying CIP funding sources and spending.
- Created and maintained a CIP development manual.
- Developed reports for tracking federal competitive grant opportunities for transportation and applications for funds.
- Continued to implement improvements to streamline the CIP development process and minimize manual inputs and analyses.

Proposed activities for next year:

- Coordinate the development of the SFY 2025-2029 Capital Investment Plan.
- Make presentations to the MassDOT Board of Directors, its committees, external stakeholders, and the public.
- Respond to CIP-related information requests.
- Continue to implement improvements to streamline and enhance the CIP development process.
- Support other capital planning-related initiatives, as needed.

Anticipated products:

- SFY 2025-2029 Capital Investment Plan.
- Responses to requests for information from within MassDOT and from external stakeholders.
- Presentations to the MassDOT Board of Directors, its committees, external stakeholders, and the public.
- Updates to the CIP Development Manual.
- Updates to CIP-related Web content.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$225,702.41**

MassDOT staff members	% Time to task
Michelle Scott	100.0
TPP II TBH	100.0
Andrew Wang	70.0

Estimated task budget: $225,702.41

Geospatial Technology

A.3 / GIS Coordination

Task Lead: Kevin Lopes

Task Purpose:

To work closely with each MassDOT Division; other state agencies, including MassGIS; municipalities; and regional agencies, including Metropolitan Planning Organizations (MPOs), to continually improve the delivery of GIS data and applications for all customers of the Commonwealth, ensuring better information and project delivery through a variety of systems and technologies. Work under this task will also involve participating in and contributing to the specialized coordination required to integrate OTP's GIS tools and platforms into agency-wide asset management inventories and processes. We will also represent MassDOT at various state, regional and national GIS user groups.

Accomplishments in prior year:

Continued ongoing GIS coordination through a variety of correspondence and meetings.

- Continued working with Massachusetts Bay Transit Authority (MBTA) on building out the elevator cleaning application and bringing new assets into the tool.
- Began working with the Highway Division to bring Plans and Records into a spatial database.
- Continued to work with the Rail & Transit Division on connecting with the Grants Plus database.
- Continued working with the MBTA to incorporate their projects into the MaPIT application.

Proposed activities for next year:

All coordination activities performed in FFY 2023 are intended to continue throughout FFY 2024. The level of coordination needed will vary throughout the year, based on particular issues or efforts to support all GIS tasks and projects.

- Continue working with the Highway Division on their VueWorks GIS integration.
- Continue working with the Highway Division on replacing the Outdoor Advertising database.
- Continue to work with the Rail & Transit Division on connecting with the Grants Plus database.
- Begin Working with MBTA to bring the Rail Inventory into a Linear Referencing System for track and asset management.

Anticipated products:

- Various products may be initiated through coordination with MassDOT Divisions, the MBTA, and municipal and regional governments.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$274,767.52**

MassDOT staff members	% Time to task
Jose Simo	100.0
Janine Hynds	100.0
Kevin Lopes	50.0

Estimated task budget: $274,767.52

A.4 / GIS Platform Development

Task Lead: Kevin Lopes

Task Purpose:

To support the use of geographic information systems (GIS) for all MassDOT, MBTA, Metropolitan Planning Organization (MPO) and municipal staff. To ensure that there is continuous access to the GeoDOT platform; that users are able to work with all applications; and that GIS technology is kept current and operating efficiently with updated and reliable tools introduced throughout the year.

Accomplishments in prior year:

Provided a variety of support services to the MassDOT Divisions, the MBTA, and municipalities by providing relevant applications for various agency staff.

- Completed and Implemented the Transit module in eSTIP.
- Developed a Mutual Aid application in partnership with MEMA for Cities and Towns.
- Completed the Waze dashboard on the GeoDOT platform that was piloted in EDC6.
- Continued working on the TIP Scoring application for MPOs and hope to complete this in FFY24.
- Completed the new Project Viewer related to the Bond Bill with significant enhancements including funding information.
- Began redesigning the Engage suite of apps and will be building them out in the next FFY.
- Designed and built an interactive year-end report dashboard to supplement the paper report.
- Began building the next generation MaPIT tool in Experience Builder.
- Continued providing training and support to various business units throughout MassDOT, MBTA and various municipalities.

Proposed activities for next year:

- The MaPIT application will be deployed with new functionality on the Experience Builder platform.
- Enhancement of eSTIP will continue this year to advance FMIS integration.
- Development of a TIP scoring tool for the MPOs will be completed.
- Redevelopment of the Engage outreach and equity suite of tools will be completed.
- Update the Road and Bicycle Inventory Report applications.
- Conflation of the Road Inventory to the Regional Integrated Transportation Information System (RITIS) and other road networks will continue.
- Development and maintenance of GeoDOT will continue.
- Using new platforms for enhanced data visualizations and analysis.

- Websites will be created and updated as necessary.
- New applications will continue to be developed throughout the year.
- Existing applications will be updated and improved.
- Continue cloud hosting for our GIS platform.

Anticipated products:

Various applications, web sites and web maps are expected to be created.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$336,317.54**

MassDOT staff members	% Time to task
Shruti Venkatesh	100.0
TPP IV (TBH)	100.0
TPP III (TBH)	100.0
Argenis Cordones Sosa	50.0
Charlotte Mays	25.0

Estimated Other Costs: **$2,795,350.00**

Estimated task budget: $4,031,667.54

Estimated consultant costs: **$900,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MaPIT Development / 110122	$4,636,134.00	$3,636,134.00	$500,000.00	$500,000.00	ESRI	None	09-30-2024
Engage Development and Application Maintenance / 85243	$903,332.00	$703,332.00	$100,000.00	$100,000.00	CDM Smith	None	09-30-2024
eSTIP Enhancements and Supporting Applications / 110641	$1,873,323.00	$1,273,323.00	$300,000.00	$300,000.00	PMG Software	None	09-30-2024

Consultant notes:

Other Cost notes:

- $300 for Mentimeter annual subscription.
- $2,000 for Google licensing.
- $2,500 for STATA annual subscription.

- $3,500 for annual Intersection Manager maintenance.
- $4,800 for annual GeoJobe maintenance.
- $5,000 for annual search engine subscriptions for research program.
- $10,000 for annual Tableau maintenance.
- $12,000 for Plotter annual lease and maintenance.
- $20,000 for Hardware/software purchases.
- $40,000 for annual VertiGIS maintenance.
- $30,000 for annual TransCAD maintenance.
- $30,000 for annual Pictometry maintenance.
- $50,000 for annual Wrike maintenance.
- $68,000 for Voyager Search maintenance.
- $90,000 for PMG Maintenance.
- $102,250 for 1Spatial software and maintenance.
- $110,000 for Conveyal annual software licenses and support.
- $500,000 for annual ROK Technologies for AWS Cloud Hosting.
- $1,715,000 for annual ESRI Enterprise Agreement.

A.5 / GIS Services

Task Lead: Kevin Lopes

Task Purpose:

To provide maintenance and support of the GeoDOT Platform. Also, to provide a wide variety of standard and customized maps in support of MassDOT's operations for customers, maintain annual reports and catalogs, as well as provide post-production support and miscellaneous graphic design.

Accomplishments in prior year:

The GIS Services Team continued to maintain the platform and user accounts of the GeoDOT platform as well as provide a wide variety of standard and customized maps for many internal and external customers on an ongoing basis.

- GeoDOT user accounts were created and maintained.
- Staff responded to over 400 map and data requests.
- Map and data catalogs were maintained and updated on schedule.
- Miscellaneous graphics support tasks performed frequently including the new GeoDOT Local Hub Site.

Proposed activities for next year:

- Continue to maintain and expand the GeoDOT platform including additional content, new Hub sites and additional named user accounts.
- All standard and recurring mapping and data provision activities performed in 2023 are intended to continue throughout 2024, as well as responding to specialized map and data requests as needed.
- Continue to improve the MassDOT map library and increase access to MassDOT data resources and improve provision of transportation information to a larger audience.
- Continue to build and maintain the Mass.gov website for all Planning sections and projects.

Anticipated products:

- GIS Maps.
- Map Catalog.
- Miscellaneous graphic products and reports.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$188,460.35**

MassDOT staff members	% Time to task
Michael McGill	100.0
Argenis Cordones Sosa	50.0
Lin Han	50.0

Estimated task budget: $188,460.35

A.6 / Highway Performance Monitoring System (HPMS)

Task Lead: Kevin Lopes

Task Purpose:

To update and maintain the Highway Performance Monitoring System (HPMS) data files in order to comply with Federal Highway Administration (FHWA) reporting requirements for the National Highway System (NHS) including Surface Transportation Block Grant Program (STBG) route mileage, system condition and performance, vehicle-miles of travel, highway functional classification, and administrative jurisdiction.

Accomplishments in prior year:

Submitted the Certified Public Road Mileage of 2022 to FHWA on May 22, 2023, with an updated letter from Governor Maura Healey authorizing the Secretary of Transportation to approve public roadway mileage.

- The 2022 Interstate submittal was uploaded to the FHWA web site on April 15th, 2023.
- 2022 HPMS full submittal was uploaded to the FHWA web site on June 15, 2023.

Proposed activities for next year:

All activities performed in FFY 2023 are intended to continue throughout FFY 2024, with any additional FHWA requirements added to the process as needed.

- Continue participating in the AEGIST Pooled Fund Study.
- Submit the Interstate HPMS submittal by April 17th.
- Submit the complete HPMS submittal by June 15th.

Anticipated products:

2023 Certification of Public Road Mileage - June 3, 2024.

- 2023 HPMS Interstate Submittal - April 17, 2024.
- 2023 HPMS Full Submittal - June 15, 2024.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$98,563.47**

MassDOT staff members	% Time to task
David DiNocco	50.0

Sudip Paudel	25.0
Charlotte Mays	25.0

Estimated task budget: $98,563.47

A.7 / Inventory Data Management

Task Lead: Kevin Lopes

Task Purpose:

To provide MassDOT Divisions, the MBTA, other state agencies, municipalities and our public customers with comprehensive data and database management, as well as, to ensure that all users can access needed data efficiently. We will also provide data and spatial analysis where needed.

Accomplishments in prior year:

Performed data management tasks and projects supporting MassDOT Divisions, including many spatial databases.

- Completed several analysis projects including the CIP Equity Analysis.
- Processed significant updates to the Bicycle Inventory dataset.
- Performed a major upgrade to the Roads and Highways database schema to allow use of ArcGIS Pro.
- Added several new event layers to the Roads and Highways database including Adopt A Highway and municipal pavement.
- Improved scripting for managing the network including updates to the route priority process.

Proposed activities for next year:

Data management tasks and projects performed in FFY 2023 are intended to continue throughout FFY 2024.

- Incorporate MIRE Data Elements into the data model including interchange type and several others.
- Update several events including bridges, number of lanes and pedestrian facilities.
- Edit the network on all lower ordered routes.
- Increase new data development tasks to enhance our data portfolio.
- Develop and implement data quality control standards.
- Implement metadata standards.

Anticipated products:

New data products and analysis will be completed this year.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$577,038.32**

MassDOT staff members	% Time to task
Charles Major	100.0
Florence Person	100.0
TPP II TBH	100.0
David Henriques	100.0
Nikhitha Yelukati	100.0
Sudip Paudel	75.0
David DiNocco	50.0
Charlotte Mays	50.0
Lin Han	50.0

Estimated task budget: $577,038.32

A.10 / Travel Forecasting, Data Collection and Transportation System Performance

Task Lead: Bob Frey

Task Purpose:

To measure and forecast statewide travel and system performance to meet state and federal planning requirements and provide decision-makers with information to help guide current and future transportation policies and investments. This task has two major components: Travel Data Analyses: Daily and historical travel data are collected and analyzed to measure and monitor performance, conditions, changes and trends in travel patterns, mode use, person movement, behavior and preferences, and Socioeconomic Projections: Changes in population, employment, housing, land use, and development patterns and trends are examined and projected for their effects on the transportation landscape. Periodic full-scale updates are performed to help inform development of regional and state transportation plans. Both of these components are recurring, ongoing activities that provide help to the latest planning assumptions by incorporating updated data collection methods, surveys, and projections.

Accomplishments in prior year:

- Developed and executed a new four-year MassDOT-wide contract providing historical and real-time traffic data through the Eastern Transportation Coalition's Transportation Data Marketplace (TDM). The contractor is the University of Maryland's agent for the Coalition, CATT Lab, which provides automated data sharing and analyses through the Regional Integrated Transportation Information System (RITIS) platform. Combined with INRIX travel data and other products, RITIS enables MassDOT, its affiliate agencies including regional planning agencies (RPA), and project consultants/contractors to measure and monitor performance, communicate information, and support numerous planning, operations, and research activities.
- Completed the latest round of socioeconomic projections, working with a committee of stakeholders (SEPC) and two contractors (UMass Donahue Institute and Metropolitan Area Planning Council). Updated decennial population, household, and employment projections down to the municipal level and developed them out to the year 2050, consistent with primary land-use scenarios incorporating anticipated development to help inform future long range transportation planning efforts on the regional and state levels.
- Performed various activities related to the statewide travel demand model including data requests and coordination of updates.

- Participated in various RITIS user groups, working groups and committees and provided assistance to RITIS product enhancements.

Proposed activities for next year:

- Continue analyses of real-time and historical travel data through the Transportation Data Marketplace, including measuring and monitoring system performance and supporting planning, operations, and research activities.
- Working with the RPAs, perform follow up activities, including miscellaneous updates and documentation, to the recently completed socioeconomic projections.
- Continue data work and coordination of activities related to the statewide travel demand model.
- Continue funding participation in and review of expanded RITIS products for State DOTs (a pooled fund effort coordinated through The Eastern Transportation Coalition).

Anticipated products:

- Travel patterns, travel time and movement, mobility data and performance reports (including detailed analysis components in transportation studies).
- Follow up activities and miscellaneous additional updates and documentation to latest population, household, and employment projections.
- Data provision to internal and external customers and coordination of travel demand modeling activities.
- Miscellaneous reports and analyses.
- Expanded and improved RITIS reports and applications for travel data analyses.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$61,885.78**

MassDOT staff members	% Time to task
Bob Frey	50.0

Estimated task budget: $61,885.78

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Travel Data Analyses/ 118037	$8,699,474.15	$2,147,120.00	$0.00	$0.00	UMD CATT Lab	TBD	TBD

Consultant cost notes: FFY24 costs of A.10 Subtask "Travel Data Analyses" will be funded using non-SPR funds. FFY24 NFA costs for this contract are $2,444,975.

Data and Policy

A.13 / Next Generation Massachusetts Household Travel Survey - Wave 1

Task Lead: Liz Williams

Task Purpose:

It has been over 10 years since MassDOT collected information to support the statewide travel demand model, and much has changed in the transportation landscape including the introduction of new modes and services; new commuting patterns and travel behaviors; and new data collection and survey analysis techniques. As a recurring, longitudinal survey, the Next Generation Massachusetts Household Travel Survey will be implemented over 10 years in four (4) waves. The objectives of the Next Generation Massachusetts Household Travel Survey (MTS) Wave 1 are to collect a representative sample of households across Massachusetts to support updates to the statewide travel demand model. Subsequent waves of the survey will focus on specific regions of the Commonwealth.

Accomplishments in prior year:

N/A

Proposed activities for next year:

- Procure consultant support for Next Generation MTS Wave 1
- Collect representative sample of MA households

Anticipated products:

Data, analysis, and visualization reflecting trips, households, vehicles, destinations, and tours. These products would be shared with CTPS, who are responsible for ongoing maintenance of the statewide travel demand model.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$24,000.00**

MassDOT staff members	% Time to task
Liz Williams	20.0

Estimated task budget: $24,000.00

Estimated consultant costs: **$0.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Next Generation Massachusetts Household Travel Survey- Wave 1/ TBD	$2,000,000.00	$0.00	$0.00	$0.00	TBD	TBD	TBD

Consultant cost notes: Consultant costs for A.13 will be paid with non-SPR funding. FFY24 NFA consultant costs for A.13 are $1,000,000.00

MPO Activities

A.11 / Implementation of Federal Programs and Regulations

Task Lead: Derek Krevat

Task Purpose:

Activities under this task will include the administration of the following discrete federal programs: Congestion Mitigation Air Quality Improvement Program (CMAQ), Federal Lands Access Program (FLAP), Scenic Byways, and Title VI strategies and compliance. This task will also include the administration of the Safe Routes to School (SRTS) education and infrastructure programs.

Accomplishments in prior year:

- CMAQ was administered successfully with two consultation committee meetings held and a full program of projects was identified for the State Transportation Improvement Program (STIP).
- The annual CMAQ report was completed and sent to FHWA to detail CMAQ obligations from FFY 2022.
- New CMAQ analysis spreadsheets were developed that incorporated new emissions factors from the MOVES Model and these were distributed to regional partners for their use at CMAQ Consultation Committee meetings.
- The MPO Activities section coordinated with MassDOT's Office of Diversity and Civil Rights (ODCR) to distribute Title VI report guidance and Title VI reports were received and reviewed by MPO Activities and ODCR staff.
- FLAP was administered successfully with the obligation of federal funds for previously identified projects. A new solicitation for FLAP projects took place in FFY 2023 and five projects were awarded.
- The SRTS infrastructure program project solicitation was implemented, and eight additional projects were awarded for programming in the 2024-2028 STIP. A process for a new project solicitation in FFY 2024 has been developed.
- MPO Activities staff continued to support regional partners' efforts to pursue funding through the federal Scenic Byways Program.

Proposed activities for next year:

- Distribute CMAQ analysis spreadsheets to each metropolitan planning organization (MPO) for use in determining proposed CMAQ-funded projects' emissions reductions.
- Hold CMAQ Consultation Committee meetings.
- Compile notes from the CMAQ Consultation Committee meeting(s) and record new CMAQ-eligible projects.

- Complete annual CMAQ report submission to FHWA through the User Profile and Access Control System (UPACS).
- Work with the Eastern Federal Lands Highway Division (EFLHD) to coordinate activities related to FLAP project solicitation and selection.
- Work with the Office of Diversity and Civil Rights (ODCR) on any revisions to the Title VI reports from the MPOs.
- Work with ODCR and the MassDOT Office of Public Engagement and Outreach (OPEO) on activities related to MassDOT's Virtual Public Involvement (VPI) initiatives.
- In support of the Highway Statistics 500-series reporting requirements, distribute a survey to all Massachusetts municipalities in order to obtain the information necessary to complete the Local Highway Finance Form (Form 536). Continue work to address discrepancies in MassDOT's Highway Statistics 500-series reporting.
- Develop and distribute a new Request for Proposals (RFP) for a consultant to support the administration of MassDOT's SRTS Program.
- Continue to have a SRTS educational program focused on growing the number of participating schools, especially in underserved communities (staff and consultant).
- Continue to improve the SRTS infrastructure program and undertake a new project solicitation to fill the current FFY 2028 placeholder in the STIP.
- Host and/or lead SRTS pedestrian and bicycle events (e.g., walk/bike to school, safety trainings, etc.).
- Support the Highway Division in the design and construction of SRTS infrastructure projects that have been initiated and approved through the Division's Project Review Committee (PRC).
- Provide grant application assistance and coordination for any new Scenic Byway funding that becomes available.
- Coordinate all Ferry Boat Program (FBP) activities.

Anticipated products:

- A new SRTS program contract.
- The determination of CMAQ-eligible projects.
- The programming of new SRTS infrastructure projects.
- SRTS education and infrastructure program implementation.
- MPO Title VI Reports.
- Programming of awarded FLAP projects in coordination with the Eastern Federal Lands Highway Division (EFLHD).

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$97,438.53**

MassDOT staff members	% Time to task
Miranda Briseno	70.0
Derek Krevat	20.0
Derek Shooster	15.0
Raissah Kouame	10.0
Christopher Klem	10.0

Estimated task budget: $97,438.53

A.12 / Metropolitan Planning Support and Oversight

Task Lead: Derek Krevat

Task Purpose:

Activities under this task include liaisons assisting in the development and oversight of MPO 3C certification documents such as Regional Transportation Plans (RTPs), Transportation Improvement Programs (TIPs), and Unified Planning Work Programs (UPWPs), and coordination and oversight of MPO planning deliverables through their respective UPWPs. Additionally, MPO liaisons will assist regional partners with target setting activities for required federal performance measures. MPO Activities staff will also assist with planning and corridor studies as needed.

Accomplishments in prior year:

- All thirteen regions within the Commonwealth drafted and endorsed UPWPs, TIPs, and RTPs that were submitted to federal partners for approval.
- Multiple amendments to TIPs and UPWPs were drafted and endorsed across all the MPOs, requiring oversight and administration by the MPO Activities Group.
- All thirteen regions adopted statewide safety performance measures (PM1), as required by the Federal Highway Administration (FHWA) for Calendar Year (CY) 2023 as well as federally-required targets in the areas of pavement and bridge condition (PM2) and system performance measures (PM3) for two year (2024) and four year (2026) time horizons.
- The MPO Activities group facilitated the development of contracts providing matching funds for the nine regions receiving Safe Streets and Roads for All (SS4A) planning grants. Additional federal grants received by communities were placed onto UPWPs and TIPs as necessary.
- MPO liaisons coordinated with MPOs that have implemented discretionary TIP funding programs (e.g. CTPS's Community Connections Program and CMRPC's microprojects program) to ensure projects funded through these programs were implemented properly. Other creative ideas for the use of TIP funding were coordinated with applicable regions.
- Various memoranda of understanding (MOUs) were developed and endorsed by applicable stakeholders.
- Managed contracts for regional programs and projects.
- Participated in federal certification reviews.

Proposed activities for next year:

- All thirteen regions within the Commonwealth will draft and endorse 3C documents, including TIPs and UPWPs.

- The MPO Activities group will coordinate the setting of Federal Highway Administration (FHWA) performance targets for Calendar Year (CY) 2024 safety measures (PM1) and will review any relevant federal reporting associated with the PM2 and PM3 measure areas.
- MPO liaisons will work with their respective MPO partners to ensure the development of 3C documents according to schedule.
- MPO liaisons will also work with their respective MPO staffs to continue the delivery of planning activities programmed within UPWPs and look towards ways of improving the utility and quality of MPO staff-produced planning products.
- Work will continue on ensuring that all matching funds for SS4A planning grants are administered properly and that all necessary contracts for projects under discretionary TIP programs are developed.
- Participation in federal certification review processes as needed.
- Participation in regional and state planning studies and working groups as needed.
- Manage contracts for regional programs and projects when necessary.

Anticipated products:

Most activities are ongoing throughout the year; TIPs and UPWPs will be developed by summer 2024 with approval by reviewing partners before the start of FFY 2025.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$158,036.86**

MassDOT staff members	% Time to task
Raissah Kouame	60.0
Christopher Klem	60.0
Derek Krevat	35.0
Derek Shooster	20.0
Miranda Briseno	15.0
Andrew Wang	10.0

Estimated task budget: $158,036.86

A.14 / State Transportation Improvement Program Coordination and Capital Planning Support

Task Lead: Derek Krevat

Task Purpose:

Work under this task involves supporting the development of the annual Capital Investment Plan (CIP) update (see Task A.2 "Capital Planning Development and Coordination," for more details) and leading the development of the Federal Fiscal Year (FFY) 2025 - 2029 State Transportation Improvement Program (STIP) update. Work also includes the oversight and internal/external coordination of an electronic STIP (eSTIP) application (see Task A.4, “GIS Platform Development," for more details). The STIP is a financially constrained document that contains a listing of all federally funded transportation projects in the Commonwealth of Massachusetts. It is a combined effort among MassDOT, Metropolitan Planning Organizations (MPOs), Regional Transit Authorities, and a number of state agencies that work to design and build highways and transit projects.

Accomplishments in prior year:

- Coordinated the maintenance of the FFY 2023-2027 STIP.
- Produced the FFY 2024-2028 STIP accounting for apportionments and programs under the Bipartisan Infrastructure Law (BIL).
- Supported the production of the SFY 2024-2028 CIP Update.
- Continued to implement the electronic STIP (eSTIP) application and initiated a work task with consultant, PMG, and the Rail and Transit Division to begin incorporating transit projects into eSTIP.
- Assisted with the coordination and programming of special federal-aid sources.
- Began efforts to explore the integration of FHWA's FMIS System into eSTIP to better track actual obligations.

Proposed activities for next year:

- Support the State Fiscal Year (SFY) 2025-2029 CIP and associated mapping, analysis, and public engagement activities.
- Lead the development of the FFY 2025-2029 STIP and incorporate any new information and guidance materials coming from the BIL.
- Coordinate the maintenance of the FFY 2024-2028 STIP.
- Coordinate the development and implementation of an eSTIP for the FFY 2025-2029 STIP (see Task A.4, “GIS Platform Development” task for more details).

- Develop and coordinate responses to any federal planning findings on the STIP on a quarterly basis.
- Assist with the coordination and programming of special federal-aid sources.
- Continue incorporating transit projects into eSTIP.
- Serve as the Project Champion for the second phase of the research project, "Measuring Accessibility to Improve Public Health" (see SPR II for more details) and assist with other CIP process improvements.
- Support the evaluation of capital planning projects through activities such as participation in the EconWorks Pooled Fund Studies (more details below under "Other Cost Notes."

Anticipated products:

- FFY 2025-2029 STIP.
- eSTIP application process improvements.
- SFY 2025-2029 CIP Assistance.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$100,635.00**

MassDOT staff members	% Time to task
Derek Shooster	65.0
Christopher Klem	20.0
Derek Krevat	15.0
Raissah Kouame	10.0
Miranda Briseno	10.0

Estimated Other Costs: **$4,000.00**

Estimated task budget: $104,635.00

Other cost notes: This is for the Pooled Fund Study, "EconWorks" (TPF-5(456). The focus of this pooled fund project will be to support transportation planners with a better understanding of the economic impact of transportation projects by continuing the overall operation, maintenance and improvement to the EconWorks website, and completing and adding additional case studies to provide more robust economic analysis.

A.15 / Statewide Long Range Transportation Plan

Task Lead: Derek Krevat

Task Purpose:

MassDOT's 2050 Statewide Long Range Transportation Plan, Beyond Mobility, will articulate MassDOT's vision for the future of transportation and serve as a guidepost for allocating new federal and state funding to advance the Commonwealth's most pressing transportation priorities. Internally, Beyond Mobility will serve as a guide for strategic planning across all modes. As part of the effort, MassDOT is coordinating with a number of both internal and external stakeholders and conducting extensive public engagement activities with a focus on engaging traditionally underrepresented communities through targeted outreach.

The Plan is comprised of the following tasks: Existing Conditions Analysis; Public Engagement Plan; A Statewide Vision for Transportation in Massachusetts; Performance-Based Planning Targets; Value and Policy Problem Statements; Scenario Planning; Site-Specific Needs Assessment; Financial Plan; and Recommendations.

Accomplishments in prior year:

- Implementation of a number of public engagement techniques, including multilingual and multi-ethnic focus groups; external stakeholder engagement and outreach; presentations to all thirteen regions and other stakeholder groups; the development of a project webpage; the distribution of a visioning survey that received over 1,000 responses; the distribution of a budgetary tradeoffs survey that received over 2,500 responses; the use of Meeting-In-A-Box, which involved external stakeholders representing specific stakeholder groups (e.g., people with disabilities, older adults, bicycle and pedestrian advocates, etc.) holding meetings on behalf of MassDOT and reporting back their findings.
- The identification of scenarios based on research of trends impacting transportation.
- Analysis of site-specific needs across Massachusetts based on a compilation of previous MassDOT modal and statewide plans, regional transportation plans, and other transportation planning and policy documents.
- Analysis of transportation equity populations and development of a web map displaying these communities, which will be overlaid with the site-specific needs assessment to ensure that sites in more vulnerable communities are prioritized as part of the Plan.
- Development of a variety of problem statements and corresponding action items for MassDOT Divisions to take that would address identified problems.

Proposed activities for next year:

- The implementation of the task on performance-based planning and programming to articulate performance targets in a number of areas.
- Finalization of the needs assessment work to identify corridors of strategic significance and set up capital programming decisions.
- Continued coordination with external and internal stakeholders.
- Public presentation of the final Plan and solicitation of stakeholder and public input.

Anticipated products:

- Final report and StoryMap showcasing all Beyond Mobility materials.
- Updates to the project website.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$62,771.09**

MassDOT staff members	% Time to task
Derek Krevat	30.0
Raissah Kouame	20.0
Christopher Klem	10.0
Andrew Wang	10.0
Miranda Briseno	5.0

Estimated task budget: $417,474.09

Estimated consultant costs: **$354,703.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Statewide Long Range Transportation Plan, Beyond Mobility / 114869	$1,696,610.00	$1,341,907.00	$354,703.00	$0.00	Cambridge Systematics	08-26-2021	12-31-2023

Consultant notes:

Multimodal Planning

A.16 / Bicycle and Pedestrian Planning

Task Lead: Peter Sutton

Task Purpose:

To provide continued support for bicycle and pedestrian planning activities in Massachusetts in order to promote healthy, safe, and accessible non-motorized transportation options. This task will serve to continue implementation and advancement of the recommendations of the Statewide Pedestrian Plan and the Statewide Bicycle Plan.

Additional work under this task will involve providing assistance to MassDOT Highway District offices, MPOs, local governments, community-based organizations, and advocacy efforts in order to encourage, educate, plan, and design pedestrian and bicycle facilities.

Accomplishments in prior year:

- Organized and participated in Moving Together 2022.
- Organized and attended the Massachusetts Bicycle and Pedestrian Advisory Board Meetings.
- Organized and attended MassTrails Team Meetings.
- Continued implementation of the Bicycle and Pedestrian Plans.

Proposed activities for next year:

- Organize and participate in Moving Together 2023 (hybrid meeting format).
- Organize and participate in Bay State Bike Week 2024 (staff).
- Organize and attend the Massachusetts Bicycle and Pedestrian Advisory Board Meetings (staff).
- Organize and attend the MassTrails Team Meetings (staff).
- Continue to oversee and participate in OTP-specific implementation activities of the Statewide Bicycle and Pedestrian Plans (staff).

Anticipated products:

- Moving Together Conference 2023.
- Bay State Bike Week 2024.
- Continued Implementation of Massachusetts Statewide Bicycle and Pedestrian Plans.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$114,344.95**

MassDOT staff members	% Time to task

Peter Sutton	100.0
Ethan Britland	5.0

Estimated task budget: $114,344.95

A.17 / Corridor Planning Studies

Task Lead: Ethan Britland

Task Purpose:

To perform, participate in, and manage several types of transportation planning studies, conducted either internally or by other entities, such as regional planning agencies and other MassDOT Divisions. The level of involvement is project-specific and includes activities such as study development and analysis, public participation, coordination, technical assistance, and review. Often, these studies are part of the standard planning, design, and environmental processes required to advance a transportation project forward to implementation.

Accomplishments in prior year:

- Completed the Wellington Circle Study (non-SPR Funded for consultant costs).
- Completed the Route 128 Land Use and Transportation Study (split funding of SPR and non-SPR funding for consultant costs).
- Completed the Northern Tier Passenger Rail Study (SPR funded for consultant costs).
- Continued to conduct the Kosciuszko Circle/Morrissey and Day Boulevard Study (non-SPR funded for consultant costs).
- Procured and initiated the Newton Corner Long-Term Planning Study.

Proposed activities for next year:

- Continue to conduct the Newton Corner Long-Term Planning Study.
- Complete the Kosciuszko Circle/Morrissey and Day Boulevard Study (non-SPR funded for consultant costs).
- Complete the Route 1A East Boston Corridor Study (SPR funded for consultant costs).
- Procure and initiate the Route 20 Sturbridge Study.
- Procure and initiate the Tobin Bridge Study.

Anticipated products:

- Kosciuszko Circle/Morrissey and Day Boulevard Study, task deliverables, Draft Report, and Final Report (non-SPR funded for consultant costs).

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$395,784.35**

MassDOT staff members	% Time to task
Patrick Snyder	100.0
TPP II TBH	100.0
Ethan Britland	80.0
Marthinus J. "MJ" Riekert	75.0
Makaela Niles	70.0
Liz Williams	30.0

Estimated task budget: $525,784.35

Estimated consultant costs: **$130,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
People and Transportation Study / None	$500,000.00	$0.00	$0.00	$0.00	TBD	None	None
Route 20 Sturbridge / None	$500,000.00	$0.00	$0.00	$0.00	TBD	None	None
Newton Corner Long-Term Planning Study (SPR funded for consultant costs) / None	$1,000,000.00	$0.00	$0.00	$0.00	Vanasse Hangen Brustlin Inc.	None	None
Kosciuszko Circle and William T. Morrissey Boulevard Study (non-SPR funded) / 116484	$1,026,353.00	$0.00	$0.00	$0.00	AECOM	04-29-2022	12-31-2024
Maurice J. Tobin Bridge	$1,250,000.00	$0.00	$0.00	$0.00	TBD	None	None

Long-Term Strategic Planning Study / None							
Route 1A East Boston Corridor Study (SPR funded for consultant costs) / 114356	$586,291.00	$556,291.00	$30,000.00	$0.00	WSP	07-01-2021	12-31-2023
Northern Tier Passenger Rail Study/ 116404	$999,974.89	$869,974.89	$100,000.00	$0.00	HNTB	10-20-2021	03-31-2024

Consultant notes: Tobin Bridge study FFY24 costs ($400K) funded with Tobin Toll Revenue funding (non-SPR funding); Rte 20 Sturbridge FFY24 costs ($400K) funded with NFA (non-SPR funding); People and Transportation FFY24 costs ($375K) funded with NFA (non-SPR funding); Newton Corner FFY24 costs ($500K) funded with NFA (non-SPR funded).

A.18 / CTPS Annual On-Call Planning Assistance

Task Lead: Bob Frey

Task Purpose:

To expeditiously provide recurring technical and miscellaneous staff support for planning studies, travel modeling, data management, and other related tasks. Tasks assigned to the Central Transportation Planning Staff are intended to support OTP's function as a shared/enterprise service for MassDOT.

Accomplishments in prior year:

Ongoing and recurring tasks including Road Inventory support, travel model assistance, and miscellaneous study support.

Proposed activities for next year:

Ongoing and recurring tasks including Road Inventory support, travel model assistance, and miscellaneous study support.

Anticipated products:

Road Inventory support and maintenance. Statewide Travel Demand Model assistance. Miscellaneous studies and related assistance.

Estimated task completion: 09-30-2024

Estimated task budget: $440,000.00

Estimated consultant costs: **$440,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Statewide Planning Assistance (CTPS) / None	$440,000.00	$0.00	$440,000.00	$0.00	CTPS	None	09-30-2024

Consultant notes:

A.19 / Freight Planning

Task Lead: Makaela Niles

Task Purpose:

To continue to implement immediate infrastructure and policy strategies recommended in the approved Massachusetts Freight Plan. Other annual activities include 1) monitoring and responding as needed to multimodal freight trends, funding opportunities, legislation and rulemaking, and 2) participation in regional and national freight coordination efforts.

Accomplishments in prior year:

- Continued to explore implementation strategies from the 2017 Massachusetts Freight Plan as applicable.
- Initiated and completed the 2023 Massachusetts Freight Plan (staff and consultant support)
- Completed the "Understanding the Impacts of COVID-19 on the Massachusetts Freight Network & Freight Planning" study (staff and consultant support).
- Monitored freight trends.
- Monitored Notices of Funding Opportunities, legislation, and rulemaking.
- Participated in regional and national freight coordination efforts, including coordination with the Freight Advisory Committee.
- Supported the MassDOT Rail and Transit Division's freight planning activities.

Proposed activities for next year:

- Continue to explore implementation strategies from the approved Massachusetts Freight Plan as applicable.
- Continue to monitor freight trends.
- Continue to monitor Notices of Funding Opportunities, legislation, and rulemaking.
- Continue to participate in regional and national freight coordination efforts, including coordination with the Freight Advisory Committee.
- Support the freight planning activities of MassDOT Divisions as needed.

Anticipated products:

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$27,132.80**

MassDOT staff members	% Time to task

Makaela Niles	25.0
Ethan Britland	5.0

Estimated task budget: $27,132.80

A.20 / On-Call Contracts

Task Lead: Makaela Niles

Task Purpose:

Continue to employ Five (5) consultant contracts for on-call services in order to expeditiously initiate and conduct planning-level assignments. The time frames of these assignments vary, ranging from short-term assignments, such as technical analysis of transportation data, to long-term efforts, such as conceptual studies that may include a technical component along with coordination and interaction with other state agencies, advisory groups, stakeholders, and/or members of the public.

These assignments are intended to support OTP's function as a shared/enterprise service for MassDOT, and also provide opportunities to examine and implement state of the art practices as part of our statewide transportation planning process.

Accomplishments in prior year:

Scoped and procured five (5) new on-call services consultant contracts.

Proposed activities for next year:

- Issue Notice to Proceed for five (5) new on-call services consultant contracts.
- Scope and initiate new on-call contract assignments.

Anticipated products:

Scope, initiate and conduct various on-call assignments.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$17,128.27**

MassDOT staff members	% Time to task
Ethan Britland	10.0
Makaela Niles	5.0

Estimated task budget: $922,628.27

Estimated consultant costs: **$905,500.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Contract #4 - HNTB / 120250	$500,000.00	$217,000.00	$185,000.00	$98,000.00	HNTB	11-02-2022	09-30-2025
Contract #5 - Nelson Nygaard / 120251	$500,000.00	$90,000.00	$155,000.00	$255,000.00	Nelson Nygaard	11-02-2022	09-30-2025
Contract #1 - Vanasse Hangen Brustlin / 120247	$500,000.00	$190,000.00	$205,500.00	$216,666.00	Vanasse Hangen Brustlin	11-02-2022	09-30-2025
Contract #2 - Cambridge Systematics / 120248	$500,000.00	$88,527.00	$183,000.00	$228,473.00	Cambridge Systematics	11-02-2022	09-30-2025
Contract #3 - ARUP / 120249	$500,000.00	$163,000.00	$177,000.00	$160,000.00	ARUP	11-02-2022	09-30-2025

Consultant notes:

Public Private Development Unit

A.21 / Access Management Through Development Review and Land Disposition

Task Lead: Lionel Lucien

Task Purpose:

To implement access management through the review of private development proposals and the disposition of MassDOT land or railroad right-of-way (ROW).

1. Implement Access Management principles in the review of all private development projects in accordance with the Project Development and Design Guidebook (PDDG).

2. Work with the Highway Division in the revision of the PDDG Chapter on Access Management

3. Review all canvases related to the purchase or lease of MassDOT-owned property.

4. Review all requests for break-in access-controlled lines along state and interstate highways.

5. Review all requests to use, acquire, or dispose of railroad right of way.

6. Ensure that canvassing decisions are consistent with MassDOT policies on safety and mobility.

7. Review of permitted development site access to ensure that management decisions maintain safety and mobility.

Accomplishments in prior year:

- 6 ROW canvases were reviewed by the Public Private Development Unit (PPDU).
- Working with the MBTA, issued a Request for Proposal to develop better methodology to identify impacts to the transit system and make more realistic and implementable mitigation.
- Implemented, in collaboration with Massport and the MBTA, a list of capital improvement projects to keep the Anderson Regional Transportation Center in a state of good repair. Projects to be implemented included: parking lot repairs and repaving, roof repair, and upgrades to parking revenue collection system.

Proposed activities for next year:

All coordination activities performed in FFY 2023 are intended to continue throughout 2024.

Anticipated products:

Internal staff coordination with MassDOT Divisions. External staff coordination with other agencies.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$122,573.43**

MassDOT staff members	% Time to task
TPP III (TBH)	100.0
Lionel Lucien	25.0
William Simon	20.0

Estimated task budget: $122,573.43

A.22 / Coordination and Consultation with Developers and Project Stakeholders

Task Lead: Lionel Lucien

Task Purpose:

To conduct consultation meetings and provide technical guidance to developers and project stakeholders on transportation policies, planning, and design issues during the development of private projects. Work under this task will include the following specific items: 1.) Review all Transportation Scoping Letters (TSL); confirm the assumptions; and provide feedback on the information included in transportation impact assessment studies. 2.) Conduct consultation meetings on all technical issues, transportation analyses and conceptual plans for mitigation. 3.) Coordinate with all appropriate MassDOT Division units and the MBTA to seek inputs into the early development of transportation infrastructure to mitigate project impacts. 4.) Coordinate as necessary with other state agencies, cities, and towns. 5.) Respond to all questions and requests for information regarding the MassDOT permitting process.

Accomplishments in prior year:

- Conducted a significant number of meetings to provide technical support to developers and their consultants as part of their Massachusetts Environmental Policy Act (MEPA) submissions and review processes.
- Provided technical review and support on transportation issues for the environmental permitting of MassDOT/MBTA air rights projects.

Proposed activities for next year:

- All coordination activities performed in FFY 2023 are intended to continue throughout FFY 2024.
- Work with MassDOT's Office of Real Estate and Asset Development (OREAD) and potential developers to provide assistance and guidance on development proposals.

Anticipated products:

- Internal staff coordination with MassDOT Divisions, the Massachusetts Port Authority (Massport), and the MBTA.
- External staff coordination with other agencies, including the Massachusetts Executive Office of Energy and Environmental Affairs and the Executive Office of Housing and Economic Development.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$39,421.30**

MassDOT staff members	% Time to task
William Simon	30.0
Lionel Lucien	15.0

Estimated task budget: $39,421.30

A.23 / Development Review through the MEPA and MassDOT Access Permit Processes

Task Lead: Lionel Lucien

Task Purpose:

To provide timely and thorough technical reviews and evaluations of the anticipated transportation impacts of development projects under the Massachusetts Environmental Policy Act (MEPA) and as part of the approval process for access permits issued by MassDOT. Work under this task will include the following specific items:

1. Review and issue comments on behalf of MassDOT and the MBTA on all Environmental Notification Forms, Environmental Impact Reports, and Notices of Project Change to ensure consistency with MassDOT policies, regulations, and design standards.

2. Adequately review all environmental documents attached to transportation studies for consistency with the latest transportation impact assessment guidelines.

3. Ensure the coordination of transportation-related comments between all MassDOT Divisions and the MBTA, cities, towns, and stakeholders as appropriate.

4. Coordinate with the MEPA Office to address outstanding issues on projects and timely submission of all MEPA comments.

5. Review and submit comments on all Requests for Determination and Requests for Advisory Opinion when asked by the MEPA Office.

6. Provide technical assistance to the MEPA Office and/or project stakeholders on all transportation-related issues.

Accomplishments in prior year:

- Coordinated throughout the year with all MassDOT Divisions, the MBTA, Massport, and cities and towns on technical reviews for development projects and responded to several public inquiries.
- Reviewed projects' commitments to provide pedestrian, bicycle, and/or transit accommodations.
- Reviewed all conceptual plans or permitted projects for Complete Streets accommodations.

Proposed activities for next year:

- All coordination activities performed in FFY 2023 are intended to continue throughout FFY 2024.
- Reviews of major developments include: Dorchester Bay City, Union Point, Encore Boston Harbor, Route 20 corridor in Charlton.
- Continue to work with the City of Boston to establish mitigation bank and to collect funds as mitigation toward addressing transportation impacts in the Dorchester Bay City area.

Anticipated products:

- Internal staff coordination with MassDOT Divisions and the MBTA.
- External staff coordination with other agencies including MEPA, Massport, and the Massachusetts Department of Conservation and Recreation (DCR).
- Timely reviews and submissions of all MassDOT comments on environmental documents.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$38,342.96**

MassDOT staff members	% Time to task
Lionel Lucien	20.0
William Simon	20.0

Estimated task budget: $38,342.96

A.24 / MassDOT Policies Supported and Incorporated in Inter-Agency Objectives

Task Lead: Lionel Lucien

Task Purpose:

1) Represent MassDOT on the Interagency Permitting Board. Attend all meetings and review submissions from cities and towns for Priority Development Site Designations; review and approve requests for 43D Expedited Permitting designations; and participate in all activities to expedite the permitting process at the state level.

2) Work with MassDOT Divisions to review the overall permitting and approval process for developments with an emphasis on reviewing MassDOT/MBTA's approach to implementing transportation mitigation.

3) Represent MassDOT on the Woburn Anderson Regional Transportation Center (RTC) Executive Committee. Participate in the management and oversight of the facility to promote multimodal objectives and fiscal solvency.

Accomplishments in prior year:

- Reviewed 18 transportation-related grant applications for the Massachusetts Gaming Commission's grant mitigation program.
- Assisted with the management of the Anderson Regional Transportation Center. The ARTC has started to generate revenues based on increased airport ridership.
- Provided technical support on permitting and economic development issues to five cities and towns that have adopted 43D Expedited Permitting.

Proposed activities for next year:

- All activities performed in FFY 2023 are intended to continue throughout FFY 2024.
- Planning and delivery of the 4th International TRB Access Management Conference in Boston on June 24-26, 2024. Conduct internal and external planning coordination with local, national, international stakeholders to ensure participation.
- Review of transportation-related grant applications for the Massachusetts Gaming Commission's grant mitigation program.
- Update the 2014 Transportation Impact Assessment Guidelines for consistency with MassDOT policies and regulations.

Anticipated products:

- Internal staff coordination with MassDOT Divisions and the MBTA.
- External staff coordination with Massport, the Massachusetts Department of Housing and Economic Development (HED), the Massachusetts Department of Conservation and Recreation (DCR) and other agencies.
- Successful TRB conference to continue to promote Access Management in agency actions.
- Draft of new MassDOT/EEA Transportation Impact Assessment Guidelines.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$24,124.18**

MassDOT staff members	% Time to task
Lionel Lucien	20.0

Estimated task budget: $24,124.18

A.25 / Mitigation, Transportation Demand Management, and Monitoring Programs for Development Projects

Task Lead: Lionel Lucien

Task Purpose:

Secure appropriate multimodal mitigation benefits consistent with MassDOT policies and to ensure that developers implement and follow up on their mitigation commitments. Work under this task will include the following specific items:

- Negotiate appropriate multimodal mitigation measures with private developers in the form of both capital and operational improvements.
- Prepare and issue Section 61 Findings on behalf of MassDOT to formalize mitigation measures.
- Ensure the timely issuance of needed MassDOT permits in accordance with State Highway Access Regulations.
- Ensure that project proponents meet all commitments to implement mitigation required as part of their Section 61 Findings.
- Review all submitted Transportation Monitoring Reports.
- Additionally, consultant support will be procured to assist MassDOT to revise the existing MassDOT/EEA Transportation Impact Assessment Guidelines to address a number of issues raised by consultants and the reviewers and also to incorporate the latest MassDOT policies, regulations, and engineering directives.
- Implement the TIA Monitoring Report tool for electronic submission of TIA monitoring reports and analysis of the data from those reports.

Accomplishments in prior year:

- Issued 10 Section 61 Findings for projects previously reviewed.
- Provided support to developers in designing and implementing transportation demand management (TDM) programs.
- Monitored recently built projects that received a Section 61 Finding from MassDOT using the Transportation Impact Assessment Monitoring Report (TIAMR) tool.
- Worked with IT to make the TIAMR more user-friendly.

Proposed activities for next year:

- Coordinate on activities performed in FFY 2023 will continue throughout FFY 2024.

- Collect developers' commitments to mitigation funds and monitor implementation of targeted study/improvements.

Anticipated products:

- Internal staff coordination with MassDOT Divisions and the MBTA.
- External staff coordination with Massport, HED, DCR and other agencies.
- Approved research proposal and contracts for the Update of MassDOT/EEA Transportation Impact Assessment Guidelines.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$45,452.34**

MassDOT staff members	% Time to task
William Simon	30.0
Lionel Lucien	20.0

Estimated task budget: $95,452.34

Estimated consultant costs: **$50,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MassDOT/EEA Transportation Impact Assessment Guidelines Revision / None	$150,000.00	$0.00	$50,000.00	$100,000.00	TBD	None	None

Consultant notes:

Sustainable Transportation

A.26 / Climate Adaptation Vulnerability Assessment

Task Lead: Jules Williams

Task Purpose:

To identify a prioritized set of high-risk climate hazards and associated high-risk transportation assets throughout the state using a rigorous methodology that integrates GIS tools, climate projections, and hydrologic and hydraulic models. In a second phase, the project will provide recommendations about how project results could be integrated into planning, asset management, operations, and maintenance activities. This task also includes coordination with adaptation initiatives by MassDOT Divisions, other state agencies, and Metropolitan Planning Organizations (MPOs). This task supports compliance with Executive Order 569, which requires state agencies to assess vulnerability to climate change and extreme weather events and identify adaptation options for assets. This work has been identified as one of the inputs to MassDOT's Resiliency Improvement Plan in the latest State Hazard Mitigation Plan.

Accomplishments in prior year:

- WRF Hydro model runs completed for developing floodplains in the second hydrological domain.
- Second iteration of floodplain maps of flooding depth and extent maps of erosive potential (critical shear stress ratio) and maps of erosive potential (critical shear stress ratio) produced for first HU8 watershed.
- Initial results identifying exposed transportation assets and quantification of these assets completed.
- Draft Scope for implementation in Domain A completed.
- Application for PROTECT discretionary grant submitted- Generation of additional coastal data.

Proposed activities for next year:

Continuing the development of floodplains, maps of erosive levels of concern, asset exposure and applying risk analysis.

Anticipated products:

- Floodplain maps of flooding depth and extent.
- Maps of erosive potential.
- Exposure identified for multimodal transportation assets.
- Risk quantified for multimodal transportation assets.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$117,017.08**

MassDOT staff members	% Time to task
Jules Williams	90.0

Estimated task budget: $719,019.08

Estimated consultant costs: **$602,002.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Climate Adaptation Vulnerability Assessment / 106882	$3,885,002.00	$3,283,000.00	$602,002.00	$0.00	WSP	01-01-2020	12-31-2023

Consultant notes:

A.27 / GHG Mitigation Analysis, Research, Guidance & Regulatory Requirements

Task Lead: Jules Williams

Task Purpose:

To support the Commonwealth's efforts to meet ambitious greenhouse gas (GHG) reduction goals. The scope of OTP's work under this task includes undertaking studies of GHG mitigation opportunities in Massachusetts; providing transportation planning input into state government efforts to develop, monitor and update the Commonwealth's Climate Policies; offering feedback on MassDOT's role in reducing statewide emissions; supporting Metropolitan Planning Organizations' (MPO) GHG impact estimation and reporting; continuing to collect data related to on-road GHG emissions as well as MassDOT and MBTA emissions.

The Commonwealth's new climate law established a GHG emissions limit for the transportation sector as part of requirements designed to reach specified emissions targets. The Federal Government's Infrastructure Investment and Jobs Act (IIJA) required a carbon reduction strategy to be developed by State DOTs by November 2023 and FHWA issued guidance on the development of this strategy.

A new federal performance measure on GHG emissions from vehicles operating on the National Highway System is expected to be finalized in FFY 24 which could require MassDOT to set a performance target for GHG emissions that is consistent with the Biden Administration's net zero target.

Accomplishments in prior year:

- OTP staff coordinated with relevant MassDOT and MBTA personnel to acquire and consolidate data necessary for annual tracking of MassDOT-MBTA GHG emissions.
- Completed Carbon Reduction Strategy and submitted this to FHWA as an integral part of the FY24-28 STIP.
- Completed draft scope for LBS data-based project on GHG impacts.
- Initiated work on a legislatively required analysis regarding the transition to zero-emission school buses.

Proposed activities for next year:

- Continue work on legislatively required study regarding the transition to zero-emission school buses.
- Review and respond to FHWA comments on MassDOT's Carbon Reduction Strategy.

- Make updates to the Carbon Reduction Strategy to reflect use of Carbon Reduction Program funds.
- Support MassDOT implementation of the GHG performance measure being proposed by FHWA.
- Provide analysis and advice on transportation sector GHG reduction policy.
- Collect data from MassDOT Divisions and calculate annual GHG emissions estimate.
- Participate in NCHRP 08-184 Framework for Assessing Induced Demand Effects of Various Roadway Investments.

Anticipated products:

- Response to FHWA comments on Carbon Reduction Strategy.
- Updated Carbon Reduction Strategy, as appropriate.
- Advice and analysis relating to implementation of FHWA's anticipated GHG performance measure on transportation sector modeling.
- Annual GHG emissions estimates.
- Report on legislatively required analysis regarding the transition to zero-emission school buses.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$85,847.57**

MassDOT staff members	% Time to task
Daisy Brown	100.0
Max Natanagara	10.0
Jules Williams	5.0

Estimated task budget: $85,847.57

Consultant cost notes: Consultant support is being provided under an OTP on call contract (A.20).

A.28 / Low Emissions Vehicles, Fuels and Infrastructure

Task Lead: Max Natanagara

Task Purpose:

To provide planning studies and other analyses on issues related to low-emission vehicles and infrastructure. Increased adoption of low emissions vehicles and fuels is targeted as part of Massachusetts' efforts to reduce emissions. A range of policies are in place that seek to increase adoption of these technologies. This impacts MassDOT and the transportation system in a number of ways: changes in motor fuel excise revenues; demand for new kinds of refueling in different locations; changes in the kinds of signage needed on highways; changes in vehicle operating costs and associated incentives to drive and changes in the amount, types and locations of pollutants emitted; and requests for how the transportation network can support increased uptake of these technologies.

Accomplishments in prior year:

- Developed model NEVI contracting approach and submitted to FHWA for review.
- Completed handover to NEVI implementation team.
- Completed review of draft NEVI RFI.
- Prepared application to federal CFI grant program.

Proposed activities for next year:

- Continue to support the Highway Division in implementation of the five year MassDOT NEVI Plan, including integration with CFI program award if MassDOT application is successful.
- Undertake a survey on access to garaging/parking for drivers in Massachusetts and relation to EV charging provision.
- Repeat statistical survey conducted as part of NEVI Plan analysis.

Anticipated products:

- Report on findings of garaging analysis.
- Report on findings of statistical survey on EV driver long distance trip-making survey.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$65,846.95**

MassDOT staff members	% Time to task
Max Natanagara	70.0

Jules Williams	5.0

Estimated task budget: $65,846.95

Consultant cost notes: Consultant support does not utilize SPR funding.

A.29 / Post-COVID-19 Teleworking Study

Task Lead: Max Natanagara

Task Purpose:

This study will assess the impact of teleworking on the Commonwealth's transportation system post-COVID-19. The different teleworking scenarios to be modeled and the resulting estimations of how future trips will change will have important implications for the public services that MassDOT provides in the future. Employer-resident surveys and a thorough literature review are shaping the inputs for both transportation modeling and economic modeling. A strategy will also be developed for continuing to monitor shifts in teleworking.

Accomplishments in prior year:

- Developed, fielded, and analyzed an online survey of Massachusetts residents.
- Developed, fielded, and analyzed a survey to employers in Massachusetts.
- Calibrated transportation and economic modeling tools.
- Refined initial round of scenarios via workshop and began modeling initial scenarios.

Proposed activities for next year:

- Finish modeling initial and second round of scenarios.
- Review MassDOT planning processes and investments.
- Develop teleworking monitoring strategy.
- Prepare final report.

Anticipated products:

- Presentation, map interface, and all data from trip/economic modeling of different scenarios.
- Strategy for continuing to monitor changes in telework.
- Final report and summary incorporating all prior deliverables.

Estimated task completion: 12-31-2023

Estimated staff salaries and benefits: **$16,956.00**

MassDOT staff members	% Time to task
Max Natanagara	20.0

Estimated task budget: $188,583.85

Estimated consultant costs: **$171,627.85**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Post-COVID-19 Teleworking Study / 113996	$896,504.00	$633,876.15	$171,627.85	$0.00	RSG	02-23-2021	12-30-2023

Consultant cost notes: Contract #113996 contains an optional task (task 10) to be carried out at the sole discretion of MassDOT. The FFY24 amount of $171,627.85 is reserved for this purpose.

Transit Planning

A.30 / Transit Planning Studies

Task Lead: Jonathan Church

Task Purpose:

To perform, participate in, and manage several types of transit planning studies, conducted either internally or by other entities, such as regional planning agencies and other MassDOT Divisions. The level of involvement is project-specific and includes activities such as study development and analysis, public participation, coordination, technical assistance, and review. Often, these studies are part of the standard planning, design, and environmental processes required to advance a transportation project forward to implementation.

Accomplishments in prior year:

N/A (new task for FFY2024)

Proposed activities for next year:

- Procure and initiate the RIDE Electric Vehicle Feasibility Study (non-SPR Funded for consultant costs).
- Procure and initiate Regional Rail Demand and Revenue Forecasting Tool (non-SPR Funded for consultant costs).
- Procure and initiate Bus Priority Emergency Response Impact Study (non-SPR Funded for consultant costs).
- Initiate/conduct the Gilmore Bridge Mobility Improvements Study (non-SPR Funded for consultant costs).

Anticipated products:

- RIDE Electric Vehicle Feasibility Study, task deliverables, Draft Report, and Final Report (non-SPR Funded for consultant costs).
- Procure and initiate Regional Rail Demand and Revenue Forecasting Tool, task deliverables (non-SPR Funded for consultant costs).
- Procure and initiate Bus Priority Emergency Response Impact Study, task deliverables, Draft Report, and Final Report (non-SPR Funded for consultant costs).
- Initiate/conduct the Gilmore Bridge Mobility Improvements Study, task deliverables (non-SPR Funded for consultant costs).

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$380,460.86**

MassDOT staff members	% Time to task
Jonathan Church	100.0
TPP II TBH	100.0
TPP II TBH	100.0
TPP III (TBH)	100.0
Patricia Cahill	50.0
Andrew Wang	10.0

Estimated task budget: $380,460.86

Estimated consultant costs: $0

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
RIDE Electric Vehicle Feasibility Modeling/ TBD	$100,000.00	$0.00	$0.00	$0.00	TBD	TBD	TBD
Regional Rail Demand and Revenue Forecasting Tool / TBD	$1,400,000.00	$0.00	$0.00	$0.00	TBD	TBD	TBD
Bus Priority Emergency Response Impact Study/ TBD	$75,000.00	$0.00	$0.00	$0.00	TBD	TBD	TBD
Gilmore Bridge Mobility Improvements Study/ TBD	$1,250,000.00	$0.00	$0.00	$0.00	HNTB	TBD	TBD

Consultant cost notes: Consultant costs to be paid under 5304 funding in FFY2024: RIDE Electric Vehicle Feasibility Modeling $100,000; Regional Rail Demand Modeling Tool $700,000; Bus Priority Emergency Response Impact Study $75,000;; Gilmore Bridge Mobility Improvements Study $830,000.

A.31 / Developer Mitigation Methodology

Task Lead: Patricia Cahill

Task Purpose:

Although land use developments (both public and private and inclusive of commercial, residential, retail, mixed-use, and other types) can have significant impacts on the delivery of public transportation services, there is no standard methodology to estimate these impacts in the Greater Boston region. Therefore, establishing an equitable and comprehensive strategy for evaluating service impacts is of particular interest to the agency. The deliverables from this project will provide the MBTA with the information needed to inform new strategies and procedures for developer mitigation. They could also inform new strategies and procedures for agencies beyond the MBTA, including MassDOT, Regional Transit Authorities (RTAs) and other transit providers.

Accomplishments in prior year:

- Finalized scope and released Request for Proposals.
- Contracted with consultant, VHB, beginning in November 2022.
- Completed Tasks 1, 2, and 3: peer review, policies & regulation review, and draft and final methodology for determining the impacts of land use developments on the delivery of transit services.
- Began tool development.

Proposed activities for next year:

- Case study research and literature review regarding how other transit agencies calculate system impacts due to commercial, residential, and other developments/land use impacts.
- Development of a guidance document that reviews potential strategies for quantifying service impacts on MBTA services.
- Development of a potential methodology that could be used to estimate the impacts of commercial, retail, residential, and other types of land and property development activities on the throughput and delay of public transportation services.

Anticipated products:

- Final report with recommendations for adoption of a methodology for determining developer mitigation.
- Memorandum/report that summarizes research and literature review findings.
- Quantitative models (and guidance on associated thresholds and metrics) that can be used to estimate service delivery impacts.

- Detailed methodology and guidance regarding the estimation of impacts on public. transportation and strategies for mitigation.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$45,957.34**

MassDOT staff members	% Time to task
Patricia Cahill	50.0

Estimated task budget: $205,957.34

Estimated consultant costs: **$160,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Developer Mitigation Methodology / 120312	$500,000.00	$340,000.00	$160,000.00	$0.00	VHB	11-18-2022	01-31-2024

Consultant notes:

A.34 / MBTA Fare Review

Task Lead: Liz Williams

Task Purpose:

The MBTA has over 100 different price points for a transit ride depending on mode, zone/distance, transfers, product type, and eligibility for reduced fares. This project would provide a comprehensive review of MBTA fare policy and pricing; how pricing currently works; alternative pricing options; public/stakeholder input; impact analysis of alternative pricing options; recommendations for changes to MBTA fares; and potential barriers and strategies for implementing the recommendations.

Accomplishments in prior year:

- This work is currently underway, on-task, and on-budget. We expect this work to be completed by the anticipated deadline of July 31, 2024.
- The consultant team has completed work on Task 1 (Review Existing MBTA Structure), and this deliverable has been reviewed and approved by the MBTA.
- Task 2 (Review Alternative Pricing and Conceptual Fare Alternatives) and Task 4 (Analyze Impacts of Alternative Pricing Options) is currently underway. Much of Task 2 has been completed (with respect to peer agency data collection and alternative packages development) and is being conducted in concert with Task 4.
- Task 3 (Gather Input from MBTA stakeholders) has been pushed off until the fall/winter so as not to conflict with other MBTA outreach priorities.

Proposed activities for next year:

- Case study research and literature review regarding how the MBTA fare tariff compares to other transit agencies, inclusive of contextual factors such as service area, coverage, revenue service hours.
- Data collection (qualitative, quantitative, spatial) regarding MBTA fare policy, including studies conducted by non-state agencies such as advocacy groups and the MBTA Advisory Board
- Model and 'tariff alternatives' development.

Anticipated products:

- Background report and presentation describing how MBTA fares compare to alternative pricing approaches used at other transit agencies around the world.
- Review/synthesis of previous public outreach on MBTA fare policy, supplemental public survey and stakeholder interviews, and a summary report describing findings.

- Modeling analysis of the potential ridership, revenue, and equity implications of alternative pricing options, using existing MBTA modeling tools where applicable.
- Qualitative analysis of the technological, operational, and regulatory implications of alternative pricing options. A final report and presentation of findings, recommendations, potential barriers, and strategies for implementation.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$18,000.00**

MassDOT staff members	% Time to task
Marthinus J. "MJ" Riekert	25.0

Estimated task budget: $278,582.00

Estimated consultant costs: **$260,582.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MBTA Fare Review / 120680	$850,000.00	$589,418.00	$260,582.00	$0.00	Cambridge Systematics	11-30-2022	07-31-2024

Consultant notes:

SPR I Part B

Pavement Management

B.1 / Statewide Pavement Management Activities

Task Lead: Edmund Naras

Task Purpose:

The objective of the Pavement Management Program is to responsibly manage the pavement portion of the highway transportation network. The program provides a rational and uniform system for evaluating roadway conditions in order to improve the effectiveness of pavement preservation and rehabilitation strategies. Additionally, it provides analytical and evaluation tools that assist administrators and project managers with methods to improve the consistency of decision-making and to formulate strategies to optimize pavement network performance and the allocation of resources.

Accomplishments in prior year:

- Collected, processed and analyzed 4,000+ miles of pavement condition data.
- Submitted successfully Interstate and Non-Interstate NHS pavement data for the Highway Performance Management System (HPMS).
- Developed an optimized multi-year program for the Interstate and Non-Interstate NHS. Integrated optimized program into the rolling 5-year STIP.
- Initiated an additional $150 Million in Interstate NHS projects.
- Utilized the MassDOT Pavement Management modeling, forecasting & optimized project selection tool to identify over $330 Million dollars of future NHS pavement projects.
- Conducted scoping meetings with District, Bridge, Environmental and Highway Design staff to screen $175 Million NHS project locations to establish items outside of pavement scope, identify preservation candidates, and prioritize future programming.
- Developed a statewide list of municipal numbered highways in fair and poor condition. Prioritized these sections by condition, NHS status, scope and other factors for rehabilitation over a five-year period.
- Performed correlation and certification for ride quality testing equipment utilized by Contractors\other Northeast states and MassDOT for QC and acceptance testing.
- Performed acceptance testing for ride quality on approximately 900+ lane miles.
- Continued monitoring performance of EDC-2 High Friction Surfacing Projects statewide.
- Continued monitoring SHRP2 (R-26) pavement preservation sections on US Route 3 and evaluated the need for future preservation treatments.
- Reviewed over 290 projects at various stages of design.

- Continued to advance EDC-6 Targeted Overlay Pavement Solutions Initiative for Asphalt Rubber Mixtures, Highly Modified Polymer Mixtures and Stone Matrix Asphalt (SMA) mixtures.
- Completed paving on the pilot project in summer 2023 and monitoring performance.
- Completed two “Higher reclaimed asphalt pavement (RAP)” demonstration projects based on prior SPR research activities and two additional demonstration projects have been identified with future paving to be completed in summer/fall 2023.
- Evaluating proposed criteria from the results of the Balanced Mix Design work done under ISA with HSRC against current MassDOT hot mix asphalt (HMA) design.
- Included a Special Provision for Environmental Product Declarations (EPDs) in the I-93 Medford-Stoneham project as part of EDC-7 requirements.
- Advertised 11 NHS Pavement Preservation\Resurfacing\State of Good Repair Contracts.

Proposed activities for next year:

- Oversee collection of pavement distress, rutting, geometric, GPS, LiDAR and video data for the Interstate System and transition to annual data collection cycle for the remaining NHS, numbered routes and other highways under MassDOT jurisdiction as part of new data collection services contract.
- Utilize MassDOT Automated Pavement Data Collection Vehicle to supplement data collection of pavement distress, rutting, geometric, GPS, LiDAR and video data for roadways paved after collection by the vendor for integration into overall data set.
- Conduct Quality Assurance testing using new Automated Pavement Data Collection Vehicle/Equipment to verify deliverables from Network Pavement Data Collection for the Interstate, Non-Interstate NHS, State Numbered routes as well as other highways under MassDOT Jurisdiction.
- Perform annual maintenance and upgrades on the Automated Pavement Data Collection Vehicle, Pavement Friction Tester and Bumper Mounted Profilers.
- Perform ride quality acceptance testing for all new construction, resurfacing and preservation projects using the Bumper Mounted Profilers.
- Use Pavement Management Data to revise\develop 2025-2029 STIP for Interstate and Non-Interstate NHS projects.
- Facilitate the implementation of Municipal Paving Program, continuing to emphasize rehabilitation and preservation of the municipally owned Non-Interstate NHS roadways.
- Manage consultant efforts to warehouse statewide municipally owned pavement condition data leveraging MassDOT’s GIS online database structure and reporting capabilities.
- Oversee Interdepartmental Service Agreement (ISA) with UMass Dartmouth for continued support of pavement management activities including correlation of data collection equipment,

implementation of new technologies and test methods, develop innovative pavement mixture designs (Superpave 5) and evaluations with existing designs, assist with evaluating Bridge Waterproofing Mixtures (SSC-W), and assess Asphalt Pavement sustainability evaluation methodologies LCA and INVEST for MassDOT implementation.
- Finalize report on Rte. 2 Gill/Erving Targeted Overlay Pavement Solutions (TOPS).
- Pilot Superpave 5 and Balanced Mix Design (BMD) in projects.

Anticipated products:

- Report on pavement condition data for Interstate, State-Maintained and NHS roadways and data required for the Highway Performance Monitoring System (HPMS).
- Optimized multi-year program for the Interstate and Non-Interstate NHS pavement construction and preservation programs.
- Generate list of municipal numbered highways in fair and poor condition for continued support of MassDOT's Municipal Pavement Program for State Numbered Routes.
- Renewed contract for maintenance and software upgrades to the Pavement Management section's pavement management database.
- Improvements to the web-based pavement management database software to improve PMS predictive modeling and project selection tools and integrate tracking of Federal Reporting measures.
- Take delivery of new Automated Pavement Data Collection Vehicle/Equipment.
- Execute contract for annual maintenance and upgrades on the Pavement Friction Tester and Bumper Mounted Profilers.
- Calibration and certification on all equipment used for MassDOT ride quality project acceptance testing.
- Under ISA, Purchase Dynamic Friction Tester and Circular Track Meter to conduct friction evaluation on High Performance Asphalt Overlays (HPOL) to determine acceptable frictional characteristics that can be included in MassDOT's specifications for HPOL's.
- Asphalt binder specifications that incorporate two new binder parameters to address age induced surface distresses.
- Performance testing of different tack coats to determine pavement bond strength.
- Determine performance of High RAP surface mixtures for high volume roads on pilot projects.
- Establish guidance\specifications for mix design and performance assessment of High RAP mixtures on low volume roads.
- Propose mixture design procedure, performance test(s), and pilot specifications for cold central plant recycling (CCPR) and cold in-place recycling (CIR).
- Aging Protocol for a Balanced Mix Design that can be incorporated into MassDOT BMD.

- Implementation of Superpave 5.
- Determine mix performance of Superpave Waterproofing Surface Course on Bridge Mixtures (SSC-W) by conducting Flexural Beam Fatigue and Hamburg performance tests.
- GIS database to serve as a warehouse for incoming municipally owned pavement condition data.
- Data model to create a standardized format to integrate municipal pavement condition data and roadway attributes into MassDOT's online database structure.
- Test version of ArcGIS Online-driven dashboard to allow municipalities and other stakeholders to interact with pavement data more effectively and make better informed decisions when prioritizing roadway improvement projects.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$875,992.52**

MassDOT staff members	% Time to task
Edmund Naras	100.0
Jonathan Smith	100.0
Cody Holemo	100.0
William Gutierrez	100.0
Stefan Kargakis	100.0
Liz Cruz-Falero	100.0
Subash Shahi	100.0
Steven Morin	100.0
James Pierce	100.0

Estimated Other Costs: **$145,000.00**

Estimated task budget: $3,429,657.52

Estimated consultant costs: **$2,408,665.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Warehouse statewide municipally owned pavement condition data / TBD	$190,000.00	$0.00	$190,000.00	$0.00	TBD	TBD	TBD
Pavement management modeling, forecasting & optimized project selection for the Capital Investment Plan (CIP) / 120954	$130,000.00	$130,000.00	$130,000.00	$0.00	Deighton Associates Ltd	12-12-2022	09-30-2024
ISA: MassDOT Pavement Support Service (PS2) / 121943	$1,485,562.00	$113,981.00	$538,665.00	$832,916.00	UMass Dartmouth	04-01-2023	09-30-2026

Network Pavement Data Collection Services and Support / TBD	$4,100,000.00	$850,000.00	$1,550,000.00	$1,700,000.00	TBD	TBD	TBD

Consultant cost notes: ISA UMass Dartmouth-$538,665 ($1,485,562 total over 4 years ISA); TBD Network Pavement Data Collection Services-$1,550,000; Deighton Assoc Ltd. Database Maintenance & Software Upgrades-$130,000; TBD Warehouse Munic. Pavement Data-$190,000

TOTAL: $2,408,665.00 FFY24

Other Cost notes:

- Skid Truck annual maintenance and software upgrades -$25,000
- Bumper Mounted Profilers annual maintenance and software upgrades -$50,000
- Pavement Preservation TSP2 membership -$20,000
- Miscellaneous mechanical & electronic supplies and training -$50,000
- TOTAL $145,000.00

Statewide Traffic Data Collection

B. 2 / Statewide Traffic Data Collection

Task Lead: John Amato

Task Purpose:

The MassDOT Highway Division's Statewide Traffic Data Collection (STDC) group is responsible for the development and maintenance of the Annual Traffic Data Collection Program. The program is designed in accordance with FHWA's Traffic Monitoring Guide (TMG), the AASHTO Guide for Statewide Traffic Data Collection Programs, and the Highway Performance Monitoring System (HPMS) guidelines. Traffic-derived travel data from the HPMS are used in the federal-aid highway fund apportionment formulae. Traffic data are critical to the analyses that support the Condition and Performance Reports to Congress, which are subsequently used for national highway budgeting purposes. HPMS-derived travel data are required to meet Clean Air Act requirements, and travel data are central to estimating several of MassDOT's performance indicators such as vehicle crash and fatality rates and delay. Therefore, a traffic counting program is conducted each year by the Statewide Traffic Data Collection group of the MassDOT Highway Division. The counting program is modeled after FHWA's Traffic Monitoring Guide, AASHTO's Guidelines for Traffic Data Programs and, most importantly, the HPMS Field Manual. The annual program involves the systematic collection of traffic data utilizing automatic traffic recorders located on various roadways throughout the State. In addition, the Statewide Traffic Data Collection group provides traffic data for MassDOT's pavement, highway, and bridge design efforts. This includes pavement rehabilitation, construction, maintenance, and construction staging and traffic management. Data gathered in support of the Department's program varies from single road tube automatic traffic recorder (ATR) counts to intersection turning movement counts (TMC) for traffic signal design and vehicle type classification for pavement design and environmental analyses (air quality and noise levels). Due to MassDOT's desire and interest to accommodate all road users and measure the performance of safety and mobility, continuing this year, there will be a focus on expanding the newly created pedestrian and bicyclist counter program and increasing the pedestrian and bicyclist counts available. In 2021, MassDOT purchased and installed twelve bicycle and pedestrian counters at eight locations across the state, including intersections, roadways, and shared-use trails. MassDOT will build upon the success of the bicycle and pedestrian pilot program initiated in the FFY21 SPR cycle and increase the bicycle and pedestrian count stations across the state. The goal is to standardize the collection of bicyclist and pedestrian count data; expand the scope of data collection to other parts of the state; and to continue populating to collect and populate our statewide traffic portal to create a more comprehensive network of counting sites. MassDOT will also work with Regional Planning Agencies (RPA) to upload their bicycle and pedestrian count data into the newly purchased Non-Motorized Database System. Likewise, MassDOT's desire to improve upon Weigh-In-Motion (WIM) data and technology to further assist the

Commercial Vehicle Enforcement Section and improve safety is being evaluated. This technology should also assist with pavement management and bridge evaluations and design. We understand MassDOT needs to improve upon commercial motor vehicle inspection and weight data and will work towards meeting the goal of obtaining WIM data and providing FHWA and the Federal Motor Carrier Safety Administration (FMCSA) with necessary information. The intention is to develop requirements and obtain assistance with vendor solicitations, proposal evaluations, deployment, testing and acceptance of a multi-purpose virtual weigh station pilot. The intent of a new WIM Program would be to identify the proper technology applications for additional WIM sensors in pavement.

Accomplishments in prior year:

The STDC program supported and monitored continuous count activities monthly, capturing class, volume, and speed data to support FHWA requirements. The maintenance of special counts was performed by request in which data is used by MassDOT staff on various levels (e.g., Design, Project, Pavement, Traffic Engineering, etc.) for planning and evaluation of highway conditions. All operational, continuous count sites (438 out of 584) were monitored monthly. Monthly volume, classification, & WIM data were uploaded to FHWA's web-based QC software, "Travel Monitoring Analysis System (TMAS) 2.8 for TVT, VMT and vehicle type reports.

- 47 special request studies were completed during FFY23 Q1, Q2 and Q3 which included 222 volume, 152 classification and 146 speed studies.
- 216 turning movement count (TMC) studies were completed.
- Additional continuous count sites were configured and are using telemetry for a total of 438 out of the 584 sites.
- Counted 391 out of 436 2022 Coverage Program count locations over the course of calendar year 2022. The overall combined total counted in FFY23 Q1, Q2 and Q3 is 268.
- Counted a total of 484 ramps in calendar year 2022.

The overall combined total counted in FFY23 Q1, Q2 and Q3 is 363. There are a total of 459 locations in the Ramp Count Program per calendar year.

- Regional Planning Agencies (RPA) counted 201 of 216 assigned 2022 coverage program counts. In addition, they completed 449 additional (special) counts and 131 turning movement counts (TMC) in 2022.
- Ordered short-term, portable counters for bicycle and pedestrian counts.
- Installed new permanent bicycle and pedestrian counters
- In support of HPMS requirements:
    - Submitted short term coverage program counts.

- Submitted continuous count station data.
- Submitted the updated FAADT per MS2 average daily traffic (ADT) calculations.
- Submitted updated 2022 percentage peak single units (SU) and combination units (CU) data for all samples per MS2 calculations.
- Submitted corrected K factor data for those samples where they are less than 4.5 and improved the K factors reported for future years and reviewed with MS2.
- Submitted data for all ramps for 2022 and completed 2022 ramp data submittal.
- Submitted travel summary table, including rural interstates in the SU and CU.

- Bicycle/Pedestrian Count Program:

  - In Q3 and the start of Q4, MassDOT began installations for this year's permanent count stations, with four new locations including a new facility type with a pedestrian railroad underpass in Springfield. This expansion will be focused on counting in key locations around Boston, expanding to areas of the state without any counters in the network, counting in areas with projected bicycle infrastructure expansion, and building out groups of similar locations for seasonal comparison. MassDOT has begun initial pilot deployments of short-term portable counters. In collaboration with the Massachusetts Department of Conservation and Recreation, MassDOT deployed three counters on the Southwest Corridor Park, a major urban shared-use path in Boston. In Q3, MassDOT plans to begin training Traffic Data Collection field staff to install these counters for the purposes of future projects. In addition to counter installations, in Q3 MassDOT began discussions with regional planning agencies to utilize the state's MS2 public database to host short-term counts from these agencies. Many RPAs conduct regular micro mobility counts but do not have the resources to make these counts publicly available. In turn, the larger and more regionally varied data these counts can provide will help to calibrate and examine seasonal use patterns for counters already in MassDOT's network.

Proposed activities for next year:

The focus of the STDC department is to continue telemetry upgrades to eligible, continuous permanent count stations, in which daily data studies of class, volume, and speed will be uploaded and processed through MS2, the application used to process all traffic studies by month. This approach will significantly reduce the delay in delivering the data to TMAS and the annual HPMS reports. Staff will include proper class portable counts on all functionally classified roadways including rural interstate roadways, which is a requirement of FHWA. In supporting HPMS requirements:

- Submit the 2023 FAADT data.

- Submit the 2023 percentage peak SU and CU data for all samples.
- Submit data for collected ramp counts for 2023.
- Vehicle miles traveled (VMT) weight HPMS summary data for future year's submittal.
- Class factor portable class counts to properly annualize them.
- Class factor from year to year for any non-current year data so the HPMS data for SU and CU.
- AADT is properly part of the current year with each year's submittal.
- Run all data through MS2 and quality control it before sending the data into TMAS.
- Begin conducting short-term bicycle and pedestrian counts to support statewide planning needs.
- Expand permanent bicycle and pedestrian counter network with 6-8 new permanent count stations.
- Continue development of the statewide FREEVAL model.
- Conduct technology assessment and develop formal plan for expanding WIM stations for each functional class of roadway as recommended in DAT Review and include enforcement capabilities to support MSP truck team activities.

Anticipated products:

- Clustering Analysis - Seasonal, axle and growth factor grouping.
- Short Count Assignment - Factor group assignment for all short count stations.
- HPMS Traffic Data Reporting: a. HPMS Segment Traffic Table b. HPMS Ramp Count Table c. HPMS Traffic Meta Data d. HPMS State Summary - Vehicle Type Table.
- Travel Time Database System (TTDS): a. 2023 Travel Time Metric HPMS Reports.
- FREEVAL interim model results.
- Bicycle and Pedestrian count program accuracy assessments.
- Bicycle and Pedestrian count program permanent counter expansion
- Bicycle and Pedestrian count program short-term counts
- WIM technology assessment report with expansion capabilities.
- Continue development of Statewide TDC Strategic Plan Report.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$1,007,207.64**

MassDOT staff members	% Time to task
John Amato	100.0
Brian Farrington	100.0
Michael Ribeiro	100.0

Misrak Sultan	100.0
Lori Suss	100.0
Ian Adams	100.0
Robert Belcastro	100.0
Tracy DeYoung	100.0
James Groomes	100.0
Hector Monet	100.0
Wayne Schofield Jr.	100.0
Zachary Medeiros	50.0
Spencer Cullen	50.0
Corey O'Connor	20.0
Neil Boudreau	5.0
Amy Getchell	5.0

Estimated Other Costs: **$1,676,000.00**

Estimated task budget: $3,178,207.64

Estimated consultant costs: **$495,000.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
TrafInfo Consultant Contract / 116428	$1,097,000.00	$560,000.00	$395,000.00	$142,000.00	TrafInfo	None	03-06-2025
Development of Statewide FREEVAL model / 117018	$350,000.00	$250,000.00	$100,000.00	$0.00	Kittleson & Associates	None	06-01-2026

Consultant cost notes: Requested and received approval from FHWA for an additional $40,500.00 in funding for bike and ped counting program for Contract # 116428 Statewide Telemetry Program Support Services with TrafInfo Communications Inc. This will increase the total contract amount from $1,057,000.00 to $1,097,500.00. Existing TrafInfo Consultant Contract (Contract #116248)- estimated at $345,000 for FFY24 - total remaining contract amount of $598,000 divided by 21 remaining months multiplied by 12 months and rounded up a bit for even number). MassDOT executed the contract with Kittleson Associates (Contract # 117018) on May 9, 2022, to develop a statewide Freeval model. A portion of the $350,000 contract value is funded through SPR funds. Through the end of FY23, $197,100.80 of the $350,000 has been paid out.

Other Cost notes:

- Midwestern Software Solutions (MS2) Traffic Count Database/Portal - Annual Vendor Support: --$435,000

- Miovision (through PDI) Turning Movement Counts Support Services - Annual Vendor Support Services (Billed Quarterly): --$145,000
- State Police Details to support counter installations: --State Police details needed for traffic control and safety ($120,000).
- Miscellaneous Equipment/Spare Parts:
    - Road tube clamps ($10,000).
    - Road Tube ($100,000).
    - Road Tube Tape ($10,000).
    - Miscellaneous supplies from Home Depot ($5,000).
    - Miscellaneous supplies from Grainger ($5,000).
    - Automatic Traffic Recorders (ATRs) upgrades/replacement ($200,000).
    - Verizon Wireless service for HERE Sensors, Co-located Stations and Telemetry Stations ($150,000).
    - Solar Panels 60 Watt, 12V ($20,000).
    - 15 AMP MPPT Charge Controller Prewired Assembly with Surge Option ($25,000).
    - Batteries for Telemetry Stations (Boston Battery) ($15,000).
    - Posts for solar panels (RoadSafe Traffic Systems) ($5,000).
    - Utilities ($15,000).
    - Modems and Antennas ($35,000)
    - Hilti Automatic Powder-Actuated Fastening Nail Gun Package, supply of shot and nails ($10,000)
- New Equipment Purchases to support continuous data needs:
    - Proposed purchase of TIRTL Light Based Non-Invasive Sensor for counting, vehicle classification and speed ($15,000 ea.) ($60,000)
- New Bike/Ped/Micromobility program:
    - Data storage, batteries and subscription fees: $16,000

    - New permanent and portable counters : $45,000

- New Vehicle Purchases to support TDC field activities:

    - Two (2) Ford F150 4X4 SuperCrew XLT (G), White, sliding internal bed shelves with sliding weatherproof bed cover, $45k each, ($90,000)
    - One (1) Ford Escape SE AWD, White, ($35,000)
    - One (1) Ford Transit T350 (W1Y) Cargo Van, LR, Yellow, ($40,000)
    - One (1) Ford F150 4X4 SuperCrew XL, 5.5 Bed, Traffic Spec, Yellow, sliding internal bed shelves with sliding weatherproof bed cover ($45,000)

- Training and Conference Travel Budget for ongoing education for TMG requirements, AASHTO best practices, peer to peer knowledge transfer for staff: Conference Travel and Training ($20,000)
- Training and Conference Travel Budget for regional meetings in NH or other NE States, peer to peer knowledge transfer for staff: Conference Travel and Training ($20,000).

Survey

B.3 / CORS Network Operation and Expansion

Task Lead: John Anthony

Task Purpose:

Work under this task will involve managing the Continuously Operating Reference Station (CORS) Network and accompanying website as well as supporting MassDOT departments, other state agencies, municipalities, planners, GIS users, and the architectural and engineering community on the use of the CORS Network. The Survey Section endeavors to expand the MaCORS Network by identifying suitable locations for the construction of additional CORS stations to expand and enhance the network.

Accomplishments in prior year:

- Registered approximately 160 new subscribers for the CORS network in Q3 of FFY2023. We have so far registered approximately 485 new subscribers for FFY2023.
- In Q1 of FFY2023 a full network adjustment was made to all stations. This included the newly constructed Martha's Vineyard CORS as well as a station owned and operated by the University of Rhode Island.

Proposed activities for next year:

Continue to register new subscribers to the CORS Network and perform equipment updates as may be necessary.

Anticipated products:

- The CORS network will receive all pertinent upgrades for the next three years.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$136,796.64**

MassDOT staff members	% Time to task
Evanson Browne	60.0
John Anthony	15.0
John Barnes	15.0
Jeffrey Bruce	10.0
Mehdi Sadjady	10.0

Estimated Other Costs: **$26,000.00**

Estimated task budget: $162,796.64

Other cost notes: Cable/Internet bills

B.4 / Development and Training

Task Lead: John Anthony

Task Purpose:

To participate in national, regional, and statewide boards and conferences that promote continued professional development and training relative to GPS and the use of MassDOT's CORS Network. Attendance at these meetings will promote and help develop the statewide geodetic control network for statewide spatial data.

Accomplishments in prior year:

The MassDOT Survey section did not attend any conferences or seminars relating to geospatial or location functions that required SPR funding.

Proposed activities for next year:

Seek out and attend conferences and seminars relative to geospatial and location technologies that would be beneficial to MassDOT staff.

Anticipated products:

N/A

Estimated task completion: 09-30-2024

Estimated Other Costs: **$5,000.00**

Estimated task budget: $5,000.00

Other cost notes: Other costs include travel expenses to attend development and training events.

B.5 / Geodetic Surveys for Statewide Project Control

Task Lead: John Anthony

Task Purpose:

The MassDOT Survey Section maintains a statewide network of permanent geodetic control markers that provide public and private surveyors access to the NAD 83/NAVD 88 horizontal and vertical geodetic survey control datums. The Survey Section utilizes these markers, in conjunction with the MassDOT CORS Network, to establish semi-permanent survey control stations on MassDOT bridge and roadway projects throughout the Commonwealth. NAD 83 and NAVD 88 are common and widely recognized geodetic datums. Their use for project control is essential to maintain consistency throughout the various phases of project planning, design, and construction. The network is also used by MassDOT's Office of Transportation Planning, MassGIS, private surveyors, and numerous municipal and state agencies for various engineering, surveying, and GIS applications.

Accomplishments in prior year:

- Performed GPS observations and electronic bar-code leveling to establish NAD 83 and NAVD 88 project survey control for eighty-three (83) bridge rehabilitation/reconstruction and highway reconstruction/improvement projects.
- Performed second order electronic bar-coded leveling to establish five (5) new NAVD 88 benchmarks and re-establish two (2) existing benchmarks that were disturbed from construction projects in the vicinity of the benchmarks.
- Performed twenty-three (23) GNSS observations as part of the National Geodetic Survey's (NGS) GPS on Priority NGS Benchmarks program. The results from five (5) were published by NGS.

Proposed activities for next year:

- Continue ongoing surveys to maintain and densify the statewide network of horizontal and vertical control stations.
- Continue to set project controls for various bridge rehabilitation/reconstruction, highway reconstruction/improvement, and photogrammetric mapping projects.
- Coordinate survey efforts and work with NGS as we prepare for the future adoption of new horizontal and vertical survey datums.

Anticipated products:

- Updated control point database and data card file enabling the MassDOT survey control point website to publish newly established controls to the public.
- Individual control reports for each MassDOT project to be distributed to end users.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$507,333.98**

MassDOT staff members	% Time to task
Arben Zhuri	60.0
Brian Knowles	60.0
Leo Scanlon	60.0
Michael Roberts	60.0
Eugene Tivnan	60.0
Jeffrey Bruce	40.0
Mehdi Sadjady	40.0
John Anthony	25.0
John Barnes	25.0
Michael Chouinard	20.0

Estimated task budget: $507,333.98

B.6 / GPS and Conventional Survey Equipment

Task Lead: John Anthony

Task Purpose:

To maintain and service MassDOT's GPS and conventional survey equipment to ensure accurate data collection and efficient data transmission to users.

Accomplishments in prior year:

Procured survey field supplies and mark setting equipment; extensions to the service/maintenance plans on our data collection and GNSS processing software; and repairs to one of our GNSS receivers.

Proposed activities for next year:

Procure new contract(s) with vendor(s) that will allow the Survey Section to purchase field equipment and supplies, and service equipment as necessary.

Anticipated products:

Incidental survey supplies such as batteries, cables, prisms, nails, markers, and other survey and CORS Network equipment as needed.

Estimated task completion: 09-30-2024

Estimated Other Costs: **$50,000.00**

Estimated task budget: $50,000.00

Other cost notes: This is an allocated amount for the purchase field equipment (batteries, cables, prisims, etc.) and supplies (stakes, nails, markers, paint, etc.), and service equipment as necessary.

Traffic Crash Records and Safety Management

B.7 / Improved Crash Data and Safety on Massachusetts Roadways

Task Lead: Bonnie Polin

Task Purpose:

This work consists of improving data collection and dissemination through working with police, the Registry of Motor Vehicles (RMV), MassDOT's Office of Transportation Planning, and others to improve distribution efforts. MassDOT will work with consultants and MassDOT Information Technology (IT) to upgrade and improve data dissemination and assist with the development of an updated crash system so that an enhanced data-driven approach to safety can be utilized.

Data-driven safety analysis will be required to reach the goal areas related to zero deaths and serious injuries.

The data will then be used to develop and enhance a Safety Management System where effective and efficient programs and projects are identified, programmed and implemented.

We then apply highway safety methodologies to define and refine projects and programs to reduce fatalities and serious injuries. This will all be identified through the Strategic Highway Safety Plan (SHSP) and the Highway Safety Improvement Program.

Accomplishments in prior year:

- Total users of IMPACT crash data portal = 14,820 users during this FFY year through July 12, 2023. Also, 27,807 page views.
- Used the IMPACT geocoding tool for crash location validation, editing, automated and operator-assisted geocoding, and roadway inventory matching (From October 1, 2022 through July 12, 2023 when this report was prepared – 106,821 crashes were geocoded, of those, 13,139 were manually geocoded by MassDOT Highway Safety staff) and 93,682 were automatically geocoded. In total, 96% of crashes are geocoded.
- SHSP plan was updated and approved in December 2022. The Vulnerable Road User Assessment and Action Plan related to the 2023 SHSP was started.
- Provided data quality information to the RMV, including monthly rejection reports, police agency reporting levels, etc., in an effort to improve the data quality of the crash system.
- Began development of calibration for SPFs for ramp termini, urban arterials and rural arterials.
- Assisted RMV's Merit Rating Board with the new public facing data portal (to go live in September 2023) as well as provided input and feedback on development of the RMV's new Crash Data System. (The new RMV crash data system went live in February 2023)

- Continued collecting and overseeing intersection data collection for Model Inventory of Roadway Elements (MIRE) Fundamental Data Elements (FDE) and collected nearly 99% of the eligible intersections. The remaining intersections waiting to be inventoried are those that have issues with the road file and are awaiting corrections before the intersection data can be entered.
- Provided data information, maps and reports for all MPOs and local communities so that they can prepare local safety plans and/or apply for IIJA/BIl grants like Safe Streets for All as well as develop Local Road Safety Action Plans.
- Participated in meetings and activities of the Traffic Records Coordinating Committee (TRCC), Executive TRCC and subcommittees.

Proposed activities for next year:

- Additional trainings on IMPACT and begin collecting feedback on additional needs to further enhance the MA Safety Management System.
- Continue geocoding crashes and bringing them up to real time geocoding so that we can follow up with the police who prepared the crash report. This should also help to improve data quality.
- Continue providing data quality information to the RMV, including monthly rejection reports, police agency reporting levels, etc., in an effort to improve the data quality of the crash system. Finalize input on RMV's Request for Quotes (RFQ) for a new Crash data System so that a new contractor is procured.
- Complete the collection of the intersection data collection for Model Inventory of Roadway Elements (MIRE) Fundamental Data Elements (FDE).
- Prepare and disseminate the updated risk models and network screening models so that top intersections and segments can be identified, visualized and disseminated.
- Continue participating in meetings and activities of the Traffic Records Coordinating Committee (TRCC), Executive TRCC and subcommittees.
- Continue developing SPFs so that HSM methodologies can be utilized.
- Conduct road safety audits (RSAs) throughout the Commonwealth to identify issues and propose recommendations so that data driven safety improvements can be made, whether in person or remote. We anticipate conducting over 60 RSAs.
- Put in place and publicize guidance on HSIP eligibility.
- Develop several systemic type projects where MassDOT procures materials and provides to the locals.
- Complete the Action Plan of the Strategic Highway Safety Plan based on a Safe System approach.
- Complete the Vulnerable Road User Assessment.

- Roll out the 2024 HSIP program to include infrastructure projects and non-infrastructure projects and focus on systemic approaches (like the EDC initiatives for FoRRRwD and Nighttime Visibility for Pedestrian Safety) based on the results of the soon-to-be-completed HSIP Implementation Plan.
- Assist with Safe Street and Roads For All Grants and other grants from IIJA / BIL and Local Road Safety Action Plans.
- Prepare the HSIP annual report.
- Continue to assist with raising awareness of safety messaging.
- Assist with Every Day Counts (EDC) Nighttime Visibility to Improve Pedestrian Safety Initiative and other EDC initiatives.
- Continue working with Safe System Intersection analyses and other Safe System methods to quantify safety.
- Work with RMV to finalize the updated crash form with 19 fields to improve reporting of vulnerable user crashes.

Anticipated products:

- Listing/plan to further enhance IMPACT Data quality reports for the RMV.
- Completed network screening to identify top crash and risk based locations.
- Additional MA-specific SPFs.
- VRU Assessment.
- SHSP Action Plan.
- Linked road attributes for automatically- and manually geocoded crashes.
- Completed SHSP.
- Completed Road Safety Audits.
- Guidance on HSIP eligibility.

Estimated staff salaries and benefits: **$1,360,314.77**

MassDOT staff members	% Time to task
Rosalynd Scott	90.0
Darryl Valovcin	90.0
TPP II TBH	90.0
Dakota DelSignore	88.0
Michelle Deng	88.0

Ana Fill	88.0
Kevin Fitzgerald	88.0
Jennifer Inzana	88.0
Kirsten Johnson	88.0
Bonnie Polin	88.0
Stacey Schwartz	88.0
James Terlizzi	88.0
Kylie Braunius	88.0
Evelyn Densmore	88.0
Justin Meade	88.0
intern 2 co-op 2	85.0
Intern-1 co-op-1	85.0
intern 3 co-op 3	85.0

Estimated task budget: $2,076,632.77

Estimated consultant costs: **$716,318.00**

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Visualizing and Linking Corrected Speed Regulation Data / 119636 / 119636	$50,976.00	$10,000.00	$40,476.00	$0.00	Framingham State	09-04-2022	03-01-2024
SPF Ramp Termini / 119204	$276,600.00	$60,000.00	$216,000.00	$0.00	UMASS Lowell	09-01-2022	06-30-2024
Design Level MA-Specific SPR Development (Rural) / 121595	$150,000.00	$25,000.00	$120,000.00	$5,000.00	VHB	08-10-2023	02-10-2025
Design Level MA-Specific SPR Development (Urban) / 121596	$250,000.00	$25,000.00	$200,000.00	$25,000.00	Jacobs Engineering	08-01-2023	02-01-2025

MA CRISS / TBD	$370,338.00	$0.00	$139,842.00	$230,496.00	MA Department of Public Health	10-01-2023	04-01-2026

B.8 / Prevent and Minimize Risks to MassDOT Staff and Workers on the Roadways

Task Lead: Bonnie Polin

Task Purpose:

Work is required to manage known and preventable risks to MassDOT employees and those working on the roadways by setting, communicating, and following safety standards to achieve our goal of zero fatalities and injuries.

Accomplishments in prior year:

- As of the date of this preparation (July 12th), work was just beginning on the assessment (2 per each district) preparations. The bulk of the work will take place in the end of July, August and early September. But the previous 2022 assessments were completed in December 2022 (Q1 FFY2023)

Proposed activities for next year:

- Continue to research and support work zone safety initiatives through participation in the Work Zone Technical Committee as part of the AASHTO Subcommittee on Traffic Engineering (SCOTE) and National Committee on Uniform Traffic Control Devices (NCUTCD).
- Continue involvement in the Strategic Highway Safety Plan (SHSP) emphasis area of Safety of Workers on the Roadways.
- Work with Highway Operations Center and FHWA on the Every Day Counts (EDC) crowdsourcing initiative. This will help with incident response and minimize exposure for workers on roadways.
- Continue work at the national level on work zone safety and integration of technology
- Perform work zone safety assessments (two per MassDOT district). This is anticipated to take place in the end of July, August, and September 2024.

The reports will then be completed in Q1 of 2025.

Anticipated products:

12 Work Zone Safety Assessments. By end of FFY2024 the assessments will be completed; reports will be finalized during Q1 of FFY25.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$36,362.71**

MassDOT staff members	% Time to task
Zachary Medeiros	5.0
Fangyun Xi Goncalves	5.0
Thao Tran	5.0
Emmanuel Gonzalez	5.0
Buu Tran	5.0
Kevin Chiang	5.0
Noah Thompson	5.0
Everlyn Galloway	5.0

Estimated task budget: $36,362.71

B.9 / Training of MassDOT Staff to Keep Current and Cutting Edge

Task Lead: Bonnie Polin

Task Purpose:

This task includes training for MassDOT Traffic and Safety staff with the intention of keeping up with the latest practices in highway safety to effectively reduce fatalities and injuries on Massachusetts' roadways.

Accomplishments in prior year:

- Attended the Transportation Research Board (TRB) Annual Meeting, FHWA Peer Exchanges, and the AASHTO Committee on Safety and other AASHTO related meetings.
- Served as panel members for National Cooperative Highway Research Program (NCHRP) studies.
- Trained other staff members on HSM methodologies and data driven safety analyses and other trainings to further the efforts to reduce fatalities and injuries.

Proposed activities for next year:

- Attend the TRB Annual Meeting, FHWA Peer Exchanges, and the AASHTO Committee on Safety, NCUTCD, and other meetings.
- Participate in NCHRP panels on safety research.
- Attend webinars on best practices and latest findings of enhancing and incorporating safety.
- MassDOT staff will avail themselves of training (May be virtual or in person).

Anticipated products:

Better trained employees who can push new methodologies to reduce fatalities and injuries.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$66,248.89**

MassDOT staff members	% Time to task
Dakota DelSignore	4.0
Michelle Deng	4.0
Ana Fill	4.0
Kevin Fitzgerald	4.0
Jennifer Inzana	4.0
Kirsten Johnson	4.0

Bonnie Polin	4.0
Stacey Schwartz	4.0
Neil Boudreau	4.0
Amitai Lipton	4.0
James Terlizzi	4.0
James Danila	4.0
Kylie Braunius	4.0
Evelyn Densmore	4.0
Justin Meade	4.0
Rosalynd Scott	2.0

Estimated Other Costs: **$22,000.00**

Estimated task budget: $88,248.89

Other cost notes: Travel costs (airfare, mileage, hotel, registrations, per diems, etc.) to attend conferences, meetings, etc. by staff so that they can be trained. MassDOT leadership signaled this will be encouraged and more conferences, meetings and trainings will be approved.

SPR I Parts A and B Financial Table

Totals

Task	Staff cost	Consultant cost	Other cost	Total task cost
SPR I Part A	$4,943,543.32	$3,974,414.85	$3,000,350.00	$11,918,308.17
SPR I Part B	$4,309,477.72	$3,619,983.00	$1,924,000.00	$9,853,460.72
SPR I Parts A and B totals	$9,253,021.05	$7,594,397.85	$4,924,350.00	$21,771,768.90

The SPR will be monitored throughout the year to determine if an amendment to the STIP is necessary to ensure adequate funding. The SPR II is 25% of the overall program, meeting the 25% minimum threshold.

2024 State Planning and Research Program II

Table of Contents

Office of Transportation Planning

David Mohler, Executive Director	**Steve Woelfel**, Deputy Executive Director	**Bob Frey**, Director of Project-Oriented Planning	**Ethan Britland**, Manager of Multimodal Planning	Peter Sutton
				Makaela Niles
				Patrick Snyder
				TPP II (to be filled)
			Lionel Lucien, Manager of Public Private Development	William Simon
				TPP III (to be filled)
		Kevin Lopes, Director of Geospatial Technology		David Dinocco
				Janine Hynds
				Michael McGill
				Jose Simo
				Argenis Sosa
				TPP II (to be filled)
				Sudip Paudel
				Lin Han
				Shruti Venkatesh
				TPP III (to be filled)
				Florence Person
				TPP IV (to be filled)
				Charlotte Mays
				David Henriques
				Nikhitha Yelukati
				Charles Major
		Derek Krevat, Manager of MPO Activities		Derek Shooster
				Christopher Klem
				Miranda Briseno
				Raissah A. Kouame
		Jules Williams, Manager of Sustainable Transportation		Max Natanagara
				Daisy Brown
		Manager of Research (to be filled)		Nicholas Zavolas
				Patrick McMahon
				Michael Flanary
				Anil Gurcan
				Austin Sanders
		Jonathan Church, Manager of Transit Planning		Patricia Cahill
				Arnav Chatterjee
				Caleb Plummer
				TPP III (to be filled)
		Liz Williams, Director of Data and Policy		Marthinus J. "MJ" Riekert
				TPP II (to be filled)
		Michelle Scott, Manager of Capital Planning		Andrew Wang
				TPP II (to be filled)
		Maria Ramirez, Manager of Administration		Nathaniel Kerr
				Vacant (to be filled)
		Susan Reppucci		

Research

A. Research Program Development, Administration, and Implementation

Task Lead: Steve Woelfel

Task Purpose:

To provide oversight and administration of the research program, conduct internal and external outreach activities, and manage associated contracts. The Research Section's work includes conducting research problem statement (RPS) solicitations; organizing RPS evaluation and selection; procuring and administering research contracts; and tracking project performance and implementation efforts and impacts.

Accomplishments in prior year:

- Engaged in scoping and contracting coordination efforts between research project principal investigators (PI) and project champions (PC).
- Procured and/or administered all SPRII-funded research agreements (and/or contracts) with research entities.
- Performed project development and management for all SPRII-funded research projects.
- Conducted three research roundtables to connect MassDOT personnel with researchers during the 2023 problem statement solicitation period.
- Conducted a "Lunch & Learn" session to inform and engage MassDOT and MBTA staff on research activities.
- Received 28 new research problem statements.
- Coordinated the review and prioritization of statements for new FFY24 projects.
- Coordinated initial scope discussion and PI identification approach with agency technical leads for the FFY24 research projects.
- Produced FFY22 Research & Tech Transfer Annual Report.
- Produced four MassDOT Research Quarterly Newsletters.
- Updated MassDOT research website with new contents regularly.
- Conducted web-based project completion survey with project champions, principal investigators and project managers for thirteen projects completed in 2022 to collect feedback and information on how the research process can be improved and research results have been/are to be utilized and implemented.
- Prepared quarterly reports on the status of research and training programs.

Proposed activities for next year:

- Continue oversight of research contracts and agreements.
- Continue research project management.
- Prepare quarterly reports on the status of research and training programs.
- Update MassDOT Research Section website regularly.
- Produce FFY23 Research & Tech Transfer Annual Report.
- Produce MassDOT Research Quarterly Newsletters.
- Continue tracking research project performance, implementation and impacts.

Anticipated products:

- Executed ISAs and contracts.
- Quarterly reports.
- Regular updating of the Research & Technology Transfer website.
- FFY23 Research & Tech Transfer Annual Report.
- Research Quarterly Newsletters.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$116,095.15**

MassDOT staff members	% Time to task
Michael Flanary	20.0
Patrick McMahon	20.0
Nicholas Zavolas	20.0
Anil Gurcan	20.0
Austin Sanders	20.0
Research Manager (TBH)	20.0

Estimated task budget: $116,095.15

MassDOT holds a multi-year Interdepartmental Service Agreements (ISA) with the University of Massachusetts Amherst for UMass Transportation Center (UMTC) services in assisting MassDOT with transportation research, training, and technology transfer activities for FFY20-25. There are four components in the ISA Amendment executed in August 2022: Massachusetts Cooperative Research Program (Task B), Local Technical Assistance Program (Task C), MassDOT Technical Services (Task D) and MassDOT Conference Services (Task J).

B. Massachusetts Cooperative Research Program (MCRP)

Task Lead: Steve Woelfel

Task Purpose:

Through the MCRP component, the Research Section directs, coordinates, and oversees UMTC to provide research support and conducting tasks as requested.

MCRP's services fall into five categories:

a) Literature searches and reviews: Perform literature and information searches and syntheses at the Research Section's request.

b) Research subtasks: Perform quick-turnaround subtasks to address MassDOT's imminent research needs. These subtasks can typically be completed in under 12 months (including a 3-month final product review and acceptance period) with a cost less than $100,000, and carried out by researchers with matching expertise (principal investigators) within the UMass system, but not by UMTC staff directly funded under the ISA.

c) Research project support: Assist MassDOT during the annual problem statement solicitation process; plan and support research roundtables; assist with identification of potential principal investigators (PI) with expertise matching specific research needs; assist with initial scopes of work descriptions; ensure quality control (final copy-editing and 508 compliance of all research final reports and cut sheets); and submit final reports to Transportation Research International Documentation (TRID), National Transportation Library and other national transportation research record repositories.

d) Research collaboration and outreach support: Maintain the UMTC associated transportation researcher network, curate and host MassDOT transportation research and innovation webinar series, assist MassDOT with the National Cooperative Highway Research Program (NCHRP) problem statement review process, compile contents for MassDOT Research Annual Report, and other activities as needed.

e) Research project administration: Provide fiscal and procedural administration for all research projects with UMass Amherst, including budget preparation, invoicing backup preparation, template developments/updating, accounting, orientation/training, and on-demand activities. Provide advice to other state universities on how to administer ISAs with MassDOT.

Under Category B, MassDOT intends to conduct up to 3 research subtasks during FFY24 through the UMTC ISA to address research problems and needs. Some of the subtasks are generated from the annual research problem statement solicitation process and some may be selected outside of that

process. The second types of research subtasks will depend on the emerging agency needs and may include technical assistance in implementing completed research. The Research Section works with MassDOT project champions to identify the suitable principal investigators for each of the subtasks based on researcher expertise and anticipated completion dates, and assists with the development of scopes, budgets, and schedules for these projects. MassDOT will coordinate with and request FHWA's approval of scopes and budgets prior to the issuance of any research subtasks.

Accomplishments in prior year:

- Completed two research subtask (FYA Phase II and Concrete Sidewalks Phase II)
- Initiated and administrated two research subtasks (Speed Management and Emergency Response Synthesis, Using AI Algorithms to Auto Detect Crosswalks.)
- Assisted with 2023 MassDOT Research Problem Statement solicitation (for FFY24 SPR Work Program).
- Assisted with research solicitation outreach materials and hosted the outreach sessions.
- Assisted with research project completion survey.
- Drafted and delivered the 2022 Research and Tech Transfer annual report.
- Conducted literature searches for 28 received problem statements.
- Drafted brief project statements for the final list of FFY23 projects to initiate PI identification process.
- Assisted with PI Interest Statement solicitation.
- Facilitated dialogues between the Affiliate network/academic researchers and MassDOT practitioners.
- Maintained the network of the transportation affiliated researchers.
- Obtained copies of research publications at MassDOT staff's request.

Proposed activities for next year:

Subtasks:

Research subtasks to be completed during FFY24 include:

B.3. Speed Management and Emergency Response (continued Research Subtask) This is a synthesis of state-of-the-practice and stakeholder engagement for identifying the suitable speed management countermeasures and strategies for potential field experiments. The total amount is $119,989 and the duration is 12 months, with a start date of April 15, 2023. The draft final report is expected to be submitted in FFY24 Q2.

B.4. Artificial Intelligence Framework for Midblock Crosswalk Detection across Massachusetts (continued research subtask) Non-intersection or midblock crosswalks are critical to safety, as over half of non-intersection pedestrian-involved crashes occur within the roadway as opposed to the sidewalk. The goal of this project is to provide MassDOT with a GIS layer of crosswalks across the state using computer A.I. and 2020 and 2021 satellite images; this deliverable can be immediately harnessed for vulnerable road user safety assessment and planning purposes. The estimated total cost is $99,998 and the duration is 10 months, with a start date of May 1, 2023. The draft final report is expected to be submitted in FFY24 Q1.

Additional subtasks will be developed based on emerging needs and be issued with FHWA's approval; such subtasks may include technical assistance in implementing completed research.

- Continue to provide research services in the categories listed above.
- Complete the two existing research subtasks listed above.
- Initiate and perform up to 2 new research subtasks under MCRP's Services (Category B above).
- Assist Research Section in preparing FY23 Research & Tech Transfer Annual Report.
- Assist Research Section in preparing FY24 quarterly updates.

Anticipated products:

- Delivery of research subtask interim and final reports.
- Delivery of monthly and quarterly reports.
- Delivery of 2023 Research & Tech Transfer Annual Report.
- Delivery of other research services as requested by the MassDOT Research Section.
- Delivery of logistical support for the annual NCHRP problem statement review.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$48,074.00**

MassDOT staff members	% Time to task
Michael Flanary	10.0
Nicholas Zavolas	10.0
Anil Gurcan	10.0
Austin Sanders	10.0
Research Manager (TBH)	10.0

Estimated task budget: $698,074.00

Estimated consultant costs: $650,000.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MCRP / 109600	$5,381,241.00	$3,422,241.16	$650,000.00	$1,308,999.84	UMass Amherst	10-01-2022	None

Consultant notes: This is the MCRP component of the MassDOT-UMA UMTC ISA Amendment for FFY23-25. The duration of the whole ISA, after being amended, is 72 months.

C. Local Technical Assistance Program (LTAP)

Task Lead: Steve Woelfel

Task Purpose:

Baystate Roads is the longstanding program name for Massachusetts LTAP, and it serves as a conduit for information transfer on technologies, best practices, and methodologies for operating, maintaining, and managing municipal departments of public works and highway departments throughout the Commonwealth. The program also serves as an efficient communications network, by which MassDOT transfers policy information, engineering directives, program funding, and other updates to the 351 municipalities in Massachusetts. Please see Appendix B for FFY24 LTAP Training Plan.

Accomplishments in prior year:

The Local Technical Assistance Program (LTAP) resumed in-person training in 2023 while also providing a variety of remote options including virtual classes, blended learning, webinars and self-paced virtual courses. Major accomplishments to date, with estimated Quarter 4 trainings scheduled, provided over 150 training events attended by about over 2,500 participants in total. Below shows the list of trainings provided:

- All About Liquids
- Complete Street 201 Design your Streets for People
- Backhoe Maintenance Essential
- Basics of a Good Road
- Class 2 and 4G Hoisting
- Chainsaw Maintenance
- Chainsaw Skills & Safety – 2 Day
- Chainsaw Storm Debris Cleanup
- Complete Streets 302: Safety Countermeasures
- Complete Streets 303: Bicycle/Pedestrian Network Planning
- Confined Space Hazard Awareness
- Design of ADA Curb Ramps & Pedestrian Access Routes
- Driving your Asphalt Pavement Maintenance Program
- Essential Supervisory Skills (WFD: Management Focus)
- FAA Remote Pilot Certification Test Preparation
- FHWA NHI-133121V Traffic Signal Design and Operation
- Flagger/First Aid/CPR Certification

- Gravel Roads: When the Dust Settles
- Illicit Discharge Detection & Elimination (IDDE) Training for MS4 Permitting
- Installation of Pre-cast Catch Basins
- Large Mower Operations & Safety
- Load Securement & Rigging
- MAPIT
- Municipal DPW Budgeting and Financing
- OSHA 10hr. Construction Training
- Pavement Markings – Use, Application, Compliance and Materials
- Rigging and Load Securement Virtual Minisode
- Snow & Ice Operations for Front Line Employees
- Snow & Ice Operations for Supervisors
- Spreader Calibration
- Stormwater Regulations, Erosion and Sediment Control
- Street Tree Essentials
- Stump the Instructor: All Things Hoisting
- Stump the Instructor: New year, New Stump & Anything Winter Operations Related
- Stump the Instructor: The Power of GISA in the DPW
- Stump the Instructor: Understanding Asset Management Systems Utilized by Municipalities
- Traffic Signal Warrants How to Perform, Assess, and Satisfy the Requirements of Each
- Trenching and Excavating Safety
- Backhoe Maintenance Essentials
- Using 460 Specs to Help Bid Your Next Paving Contract Welding Equipment Safety & Operation
- Wood Chipper Operations & Safety
- Work Zone Safety
- Work Zone Design for Pedestrian and Bicycle Safety
- Workforce Development: Management Focus (communication, retention, team building)
- Various AASHTO TC3 web-based self-pace classes

LTAP supporting staff also performed below activities:

- Conducted a training feedback survey at end of each class.
- Conducted training impact evaluations on selected classes.
- Hosted one hybrid LTAP Advisory Board meeting.
- Developed job-aids on selected topics for municipal DPWs.
- Provided monthly and quarterly reports.
- Published quarterly LTAP M3 newsletters.

- Updated LTAP website frequently to disseminate information.
- Conducted and evaluated FFY24 LTAP training needs survey.
- Developed draft FFY24 LTAP Training Plan.

Proposed activities for next year:

- Continue to prepare, coordinate, and deliver training classes to municipalities per the FFY24 training plan (Appendix B), and yet be flexible to accommodate evolving, critical municipal needs and to follow MassDOT's guidance.
- Continue to expand and deliver online training and information sharing videos.
- Continue to develop and implement suitable approaches to evaluate training effectiveness.
- Continue to provide monthly and quarterly updates.

Anticipated products:

- Delivery of at least 100 virtual or in-person training sessions throughout the state.
- Quarterly M3 newsletters.
- Updates to and maintenance of LTAP website.
- Training and conference feedback surveys and summaries.
- Monthly and quarterly reports on LTAP training activities.
- Draft FFY25 LTAP Training Plan.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$12,000.00**

MassDOT staff members	% Time to task
Research Manager (TBH)	10.0
Michael Flanary	5.0

Estimated task budget: $912,000.00

Estimated consultant costs: $900,000.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
LTAP / 109600	$7,420,807.00	$4,512,846.45	$900,000.00	$2,007,960.55	UMass Amherst	10-01-2022	None

Consultant notes: This is LTAP component of the four components of the MassDOT- UMTC services ISA Amendment for FFY23-25. The duration of the whole ISA, after being amended, is 72 months.

D. MassDOT Training Services (MTS)

Task Lead: Steve Woelfel

Task Purpose:

MassDOT Training Services (MTS) assist MassDOT in developing and implementing an annual plan to provide essential and high-quality technical training to MassDOT employees with a focus on the Highway Division. Through this component, MassDOT coordinates, directs, and oversees the UMTC training team as it provides training classes requested by MassDOT's Highway Division to its staff throughout the state. Please see Appendix C for FFY24 MTS Training Plan.

Accomplishments in prior year:

MassDOT Training Services resumed in-person training while also offering trainings through several other formats including blended learning approaches; combining self-paced online modules and live streamed sessions; webinars; and on-demand video options.

MTS provided over 100 classes for over 2,000 attendees. Individual classes are listed below:

- ACI Certifications
- Amtrak Contractor Orientation
- Annual Safety Fresher
- Asphalt 101
- AutoCAD Essentials
- AutoCAD Civil 3D Essentials
- AWS WPS & PQR Explained
- Bucket Truck Operations & Safety
- Chainsaw Safety and Storm Damage Awareness Training
- Chainsaw Operation & Safety -2 Day
- Confined Space Refresher
- Construction Supervisor License Renewal Course
- Design of ADA Curb Ramps and Pedestrian Access Routes
- Drainage – Roadway Maintenance and Reconstruction
- Fall Protection – Ladders
- FHWA-NHI-120053 Bridge Inspection Refresher
- FHWA-NHI-130087-Inspection and Maintenance of Ancillary Highway Structures – BSCES
- FHWA NHI 132034 – Ground Modification Methods

- FHWA-NHI-132094B – LRFD Seismic Analysis and Design of Structural Foundations and Earth Retaining Structures
- FHWA-NHI-133121 – Traffic signal Design and Operation
- FHWA-NHI-135027-Urban Drainage Design
- FHWA NHI-135048 - Countermeasure Design for Bridge Scour and Stream Instability
- FHWA-NHI-310110V-Federal-Aid Highways – 101
- FHWA-NHI-380070 - Highway Safety Manual Practitioners Guide Geometric Design
- Highway Construction Survey
- Hoisting initial License Test Prep
- How to Read Construction Drawings
- Keolis Safety Compliancy Training
- Large Mower Operations & Safety
- Load Securement and Rigging
- Mass Costal Safety Compliance
- MassDOT Project Manager Certification Training
- MA Hoisting License Exam Prep 2A, 1C, 4G
- MBTA ROW training
- NETTCP Certifications
- OSHA 10 Construction Training
- Public Speaking and Presentation Skills
- Professional Engineer Refresher Course
- Scaffolder User Training
- Stormwater Regulations, Erosion and Sediment Control
- School of PE – FE Prep Course
- Trenching and Excavation Safety
- Slips, Trips and Falls, Lifting Ergonomics
- Traffic Signal Warrants How to Perform, Assess, and Satisfy the Requirements of Each
- Welding Workshop for Highway Structures
- Virtual Presentation and Meeting Best Practices Training
- Woodchipper Operations & Safety
- Work Zone Safety for Construction Personnel
- Work Zone Safety for Maintenance Field Personnel

MTS support staff also performed the followings:

- Procured, coordinated, and administered 3-party training and certification services to meet Highway Division needs.

- Worked on streamlining MTS processes to improve training effectiveness and quality including needed coordination, registration, evaluation, and customized contents to reflect MassDOT's technical requirements.
- Conducted FFY24-25 training needs survey.
- Coordinated with the Highway Division to develop FFY24 training plan.
- Submitted monthly and quarterly reports.

Proposed activities for next year:

- Prepare, coordinate, and deliver MTS training classes per the FFY24 Training Plan (Attachment C), which will be updated quarterly based on availability and schedule of external training classes and to accommodate critical, emerging Highway training needs.
- Coordinate with the Highway Division to accommodate on-demand training needs.
- Record training attendance to inform future plans.
- Conduct training needs and effectiveness surveys.
- Develop FFY25 annual training plan.
- Prepare and submit monthly and quarterly reports.

Anticipated products:

- Implementation of the FFY24 Training Plan.
- Accommodation of Highway Division urgent training needs.
- Training attendance records.
- Training feedback surveys and summaries.
- Development of FFY25 MTS annual plan.
- Monthly and quarterly reports.

Estimated task completion: 09-30-2024

Timeline for new consultant support: MTS

Consultant name: UMass Amherst
Scope development and FHWA review/approval: 08-15-2022
Contract negotiations and FHWA review/approval: 08-31-2022
Total duration of task: 72 months

Estimated staff salaries and benefits: **$12,000.00**

MassDOT staff members	% Time to task
Research Manager (TBH)	10.0
Michael Flanary	5.0

Estimated task budget: $1,712,000.00

Estimated consultant costs: $1,700,000.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MTS / 109600	$8,106,771.00	$4,007,988.28	$1,700,000.00	$2,398,782.72	UMass Amherst	10-01-2022	09-30-2025

Consultant notes: This is the MTS component of the four components of the MassDOT- UMTC Services ISA Amendment for FFY23-25. The duration of the whole ISA, after being amended, is 72 months.

E. Short-Term Research Projects

Task Lead: Michael Flanary

Task Purpose:

To perform the research contained within this task, MassDOT contracts directly with universities, research institutes and/or private companies. The respective anticipated duration of active investigation and report writing efforts for short-term, medium-term and long-term projects are, respectively: less than 15 months, 15-21 months, and longer than 21 months (including 3 months of final report review, approval and 508 compliance process). There may be occasions when a project actual duration doesn't align with the anticipated duration due to challenges arising during research investigation and beyond the project team's control. Under such circumstances, additional time may be granted pending FHWA's approval, and the project shall remain within the original category for fiscal tracking purpose. The Research Section conducts annual research problem statement (RPS) solicitations to collect research needs from agency staff. The submitted problem statements are then prioritized based on MassDOT Division/Shared-Service Office Senior Leaders' rankings, MassDOT overall priorities, and research funding eligibility and availability. The Research Section assists MassDOT project champions with literature searches; the drafting of scopes of work; identification and selection of principal investigators, and the administration of project agreements/contracts, deliverables, final report reviews and publication, and coordination with FHWA.

The purpose of "Task E. Short-Term Research Project" is to perform research projects that are less than 15 months in duration.

Subtasks:

1. Implementing the AASHTO Mechanistic-Empirical Pavement Design Guide Phase III (Continuing Project)

A four-phased approach was planned to complete this research effort. Phase I (Literature Review and State of Practice Assessment) was completed in June 2021 and Phase II (Develop an AASHTOWare Pavement ME User Manual and the Local Experimental Plan and Sampling Template) deliverables are being reviewed. Phase III (Sample and Test Mixtures for Local Calibration and Field Data Collection) will be based on the local experimental plan and sampling template developed under Phase 2, and a larger volume of mixtures will be tested to have the best local calibration possible for Massachusetts.

Additionally, field data needed for calibration will be collected. All this lab and field data will be used in Phase IV (Calibrate and Validate the M-E Prediction Models). Phase III started in FFY23 Q1. Continuing with field sampling and lab testing.

2. Methods to Identify Problematic Carriers and Prevent Infrastructure Damage (Continuing Project)

This project aims to develop methods to connect and harmonize various Massachusetts datasets on carriers, permits, citations, road accidents, road infrastructure inventory, freight restrictions to improve the use and availability of relevant datasets. Following a compilation of state-of-the-practice from other states, the available datasets are examined to determine consistency and usability on mirrored or relational fields. Specific datasets and their fields are being categorized by relevancy to formulate data canisters for analysis across multiple enterprise platforms. Thresholds will be determined to identify overrepresented carriers and resulting trigger points on a rolling basis at which further investigation should be conducted. Additionally, experimentation of a comprehensive scoring system will assign individual factors a weight to best accommodate incomplete data in determining overall carrier risk to road and infrastructure safety. Research results will provide a solid foundation for conducting risk assessments of overweight/oversize use and flagging problematic use of existing weight-permit practices to further protect roadway assets and sensitive bridge structures. NTP was issued in June 2022; literature review and data collection have been completed; structure and content analyzing and correlating of multiple data sources are in process. FHWA approved a 4-month No Cost Time Extension in July 2023, extending the project end date to March 30, 2024.

3. Feasibility Study of 3D Printing Applications for Bridge Elements in MA (Continuing Project)

Building on the promising experimental results of Phase I, i.e., additive repair of real corroded steel plates in the lab, the current project aims at exploring the onsite feasibility of additive repair technology for corroded steel beam ends. Cold spray solutions as well as other applicable onsite technologies will be studied and tested. The project will further connect the interested MassDOT bridge engineers with additive manufacturing facilities to explore potential collaborative opportunities around implementation of candidate objects identified during Phase I. Additionally, the project will further characterize the cost and value of implementing these candidate components by using specific econometric models and will contextualize that cost within MassDOT-specific operational models and planning. NTP was issued in April 2022. Sample preparation and equipment testing are in process. Expecting a no-cost-time-extension in Q1 of FFY24, extending project to August 2024.

4. Data-Driven Approach for Transit Capital Planning (Continuing Project)

This research aims to develop new approaches and identify best practices by peer State-level agencies for MassDOT to compile, aggregate and understand data that enables better decision making. It will also work to define a standard operating procedure, focusing on what data is currently being collected and the existing collection methods used at MassDOT, and how this data is ultimately integrated into or used to validate MassDOT's forecast of need. This research could eventually serve as the framework

for a solution that will help to streamline time-consuming data collection efforts while ensuring the accuracy of the predicted need across MassDOT's grantees. Research investigation is expected to be predominately completed by FFY23 and the draft final report is expected in FFY24 Q1. Expect project to advance to full completion by 12/31/2023.

6. Using Traffic Signals to Limit Speeding Opportunities on Arterial Roads (Continuing Project)

This project will provide guidance and case studies for developing traffic signal timing plans in Massachusetts that limit the number of speeding opportunities, while addressing other signal control objectives such as capacity and delay. This will be achieved by creating a method for determining the number of speeding opportunities afforded by a signal timing plan on an arterial with the similar inputs used in traffic signal timing design and developing an easy-to-use, no-cost tool that implements this method. This project will include alternative signal timing plans (task 3), a guidebook (task 4), collecting “after” speed and speeding opportunities data and case studies (task 5), and a final report (task 6).

Accomplishments in prior year:

- Managed "Implementing the AASHTO Mechanistic-Empirical Pavement Design Guide Phase III” project. 30% completed.
- Managed “Methods to Identify Problematic Carriers and Prevent Infrastructure Damage” project. 55% completed.
- Managed “Feasibility Study of 3D Printing Applications for Bridge Elements in MA” project. 50% completed.
- Managed “Data-Driven Approach for Transit Capital Planning” project. 60% completed.
- Completed “BIM for Transit Infrastructure: A Feasibility and gap assessment with current practices and systems at the MBTA” project.
- Managed “Using Traffic Signals to Limit Speeding Opportunities on Arterial Roads” project. 65% completed.
- Completed "Uncovering the Root Causes for Truck Rollover Crashes on Ramps" project.
- Completed "Microfiltration Treatment and Design Options" synthesis project.
- Identified FFY24 short-term research projects.

Proposed activities for next year:

- Complete "Implementing the AASHTO Mechanistic-Empirical Pavement Design Guide Phase III” project.
- Complete “Methods to Identify Problematic Carriers and Prevent Infrastructure Damage” project.

- Complete “Feasibility Study of 3D Printing Applications for Bridge Elements in MA” project.
- Complete “Data-Driven Approach for Transit Capital Planning” project.
- Complete “Using Traffic Signals to Limit Speeding Opportunities on Arterial Roads” project.
- Identify FFY25 short-term research projects.

Anticipated products:

- Interim deliverables and final reports for all short-term research projects.
- List of short-term projects for FFY25.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$52,047.57**

MassDOT staff members	% Time to task
Michael Flanary	10.0
Patrick McMahon	10.0
Nicholas Zavolas	10.0
Anil Gurcan	10.0
Austin Sanders	10.0
Research Manager (TBH)	5.0

Estimated task budget: $577,414.57

Estimated consultant costs: $525,367.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
1. Implementing the AASHTO Mechanistic-Empirical Pavement Design Guide Phase III (Continuing Project) / 120714	$400,167.00	$40,000.00	$360,167.00	$0.00	UMass Dartmouth	11-22-2022	05-31-2024
2. Methods to Identify Problematic Carriers and Prevent Infrastructure Damage (Continuing Project) / 117649	$126,200.00	$65,000.00	$61,200.00	$0.00	UMass Amherst	06-02-2022	03-30-2024
3.Feasibility Study of 3D Printing Applications for Bridge Elements in MA (Continuing Project) / 117646	$150,000.00	$88,000.00	$62,000.00	$0.00	UMass Amherst	04-25-2022	11-30-2023

4. Data-Driven Approach for Transit Capital Planning (Continuing Project) / 119829	$100,000.00	$78,000.00	$22,000.00	$0.00	UMass Amherst	08-31-2022	12-31-2023
6. Using Traffic Signals to Limit Speeding Opportunities on Arterial Roads (Continuing Project) / 114372	$140,000.00	$120,000.00	$20,000.00	$0.00	Northeast University	07-01-2021	02-28-2024

F. Medium-term Research Projects

Task Lead: Michael Flanary

Task Purpose:

To perform the research contained within this task, MassDOT contracts directly with universities, research institutes and/or private companies. The respective anticipated duration of active investigation and report writing efforts for short-term, medium-term and long-term projects are, respectively: less than 15 months, 15-21 months, and longer than 21 months (including 3 months of final report review, approval and 508 compliance process). There may be occasions when a project's actual duration doesn't align with the anticipated duration due to challenges arising during research investigation and beyond the project team's control. Under such circumstances, additional time may be granted pending FHWA's approval, and the project shall remain within the original category for fiscal tracking purpose. The Research Section conducts annual research problem statement (RPS) solicitations to collect research needs from agency staff. The submitted problem statements are then prioritized based on MassDOT Division/Shared-Service Office Senior Leaders' rankings, MassDOT overall priorities, and research funding eligibility and availability. The Research Section assists MassDOT project champions with literature searches; the drafting of scopes of work; identification and selection of principal investigators, and the administration of project agreements/contracts, deliverables, final report reviews and publication, and coordination with FHWA.

The purpose of "Task F. Medium-term Research Projects" is to perform research projects that are between 15 and 21 months in duration.

Subtasks:

2. Energy-Focused Decision-making Framework for MBTA Operations and Planning (Continuing Project)

This project aims to develop an enhanced system-wide energy model for MBTA urban rail transit building on prior efforts and harnessing network-specific substation energy data and to calibrate train-specific energy models for all the lines in the MBTA in order to evaluate high-resolution trajectory and ridership impacts on energy consumption. It will eventually build a decision-support tool to provide system-wide energy and cost predictions for given input operational strategies in order to enable robust planning by the MBTA.

3. Accessible Bus Stop Design in the Presence of Bike Lanes (Continuing Project)

The MBTA has been upgrading its bus stops for better accessibility, especially for wheelchair users and visually impaired individuals. While these accessible bus stops are integrated with complete street

designs and other multi-modal accommodations, the impact of other modes and related infrastructure on transit user safety (e.g., conflicts between bicycles traveling on adjacent bike lanes and transit riders), has not been fully investigated. There is a pressing need for a better understanding of the impacts of bicycle infrastructure on bus stop accessibility and the exploration of mitigation plans that will ensure an accessible, equitable, and safe travel experience for all travelers. The objectives of this research are to: 1) investigate interactions of bus riders and bicyclists when bicycle infrastructure is adjacent to bus stops, and 2) propose design improvements to mitigate conflicts between bus riders of all abilities and bicyclists. Characterization of bus rider and bicyclist interactions (task 2) expected to be completed by December, 2023. Design recommendations submitted by April, 2023. Project set to close in August, 2024.

4. Developing a Salt Spreader Control Program based on Grip Sensor (Continuing Project)

Deicing material conservation makes fiscal sense and is also critical to protecting environmental resources while engaged in combating wintry precipitation on our roadways. There is growing interest in the design and utilization of systems that automatically adjust a salt spreader's deicing material (salt) dispensation rate based on observed grip levels in real time. The project aims to develop a prototypical technology and equip it onto one or more of MassDOT's salt spreaders to calibrate a salter's material dispensation rate to observed grip levels.

5. Cross-Modal Impact Assessment for Sustainable Transportation Networks (Continuing Project)

State agencies must make large investments into the transportation system which should be environmentally friendly, equitable and cost-effective which defines the three pillars of sustainable development. Therefore, when investing in a multi-mode transportation system, the following questions are crucial for defining the sustainability of the system: 1) What is the best way to quantify complex impacts across multiple domains (i.e., social, economic, and environmental)? 2) How does an agency quantify the impact of taking different transportation modes? 3) How can policy decisions about mode choice be evaluated through an equity lens? This project has three objectives: 1) introducing normalized metrics that can be used for cross-modal comparisons; 2) quantifying impacts in social, economic, and environmental dimensions; and 3) analyzing investment decisions with respect to equity.

6. Speed Management and Emergency Personnel (Continuing Project)

Emergency Personnel are frequently cited as reason not to implement speed management roadway treatments. The objective of this research is to learn more about specific concerns, how communities have overcome them, and share back exemplary case studies from Massachusetts for our new mass.gov/safe-speeds site. Additionally, research could include pilot and testing of treatments. The

resulting data will be used to inform standards and specifications on speed management treatments that are workable for emergency personnel while still controlling speed.

During the scoping process in early Q2, it became apparent that a synthesis of state-of-the-practice and stakeholder engagement are necessary to identify the suitable speed management countermeasures and strategies for successful field experiments. With FHWA's approval, a synthesis study has been issued under Task B MCRP, and F.6. is put on hold until the synthesis study findings are delivered.

7. LIMMS Gap Analysis and Development Plan (Continuing Project)

The Laboratory Information Materials Management System (LIMMS) was designed as a secure platform to streamline and centralize materials data collection and provide tools to analyze patterns and trends statewide. The current design of LIMMS limits the expected benefits of the system. Through this project, MassDOT will investigate alternative software that can meet or exceed MassDOT's technical and design requirements. The purpose of this project is to conduct a gap analysis that will examine the needs of LIMMS users from system design to functionality. Findings will be used to inform the selection of future LIMMS software vendors. LIMMS Vendor Analysis (task 2) is expected to be completed by FFY23. The remaining tasks are expected to be completed in FFY24 include a Gap Analysis Report, Vendor List, and Final Report.

8. Smart work zone control and performance evaluation based on trajectory data (Continuing Project)

The goal of this study is to develop computer vision technologies to extract trajectories of vehicles approaching work zones, and use the results to analyze driver behavior, identify safety hazards, and develop effective control strategies. The findings can be integrated into the existing MassDOT smart work zone systems for dynamic traffic control and can also be used to analyze and improve traffic operations at on-ramps and entrances of managed lane facilities. Work Zone experiments are continuing, and data is being reviewed. Experiment design is being refined.

14. Post-Fire Damage Inspection of Concrete Structures Phase III – Field Verification Phase (Continuing Project)

Built upon efforts of previous phases, this project addresses site conditions through in-situ heat testing of structural elements scheduled for demolition and evaluation of concrete patching materials subjected to high thermal load. This will allow for field results (including moisture content and thermal conductivity) to verify results from the laboratory tests, as well as proof of concept for using the heating set up in field testing. Testing will only be completed on components that are scheduled for demolition or removal and are expected to include both tunnel (wall or panel elements) and bridge components (deck, abutment or pier). In addition, Phase III will also evaluate the performance of

concrete patches under extreme fire temperatures and test new materials which are currently proposed as protection methods for future tunnel structures in MassDOT. A no-cost-time-extension is expected in early Q1.

15. Measuring Fare Payment Compliance on MBTA Buses and Light Rails (Continuing Project)

Fare collection is a critical revenue stream for transit agencies, and evasion or underpayment reduces these needed revenues.

Most MBTA riders are required to pay fares either on a pre-trip basis or by purchasing a pass, although some riders are eligible to use the system for free. Faregates in MBTA heavy rail stations provide reliable measures of fare non-payment but it is more difficult to understand who is evading payment and how often on buses and light rail vehicles without direct manual observations. As the MBTA implements new fare and proof of payment policies, it is important to track any changes in fare-evasion over time. This project has two objectives: 1) use existing data from infrequent manual observations and from continuous AFC and APC devices to estimate rates of fare evasion on buses and light rail vehicles, and 2) develop a method to identify when and where manual spot checks of fare payment/evasion behaviors are most valuable.

16. Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes (Continuing Project)

A recently completed MassDOT study investigated both motorist and bicyclist behavior at single-stage bike box locations using field data from Massachusetts, and this project will assess the effectiveness of two-stage turn queue boxes. Results will be compared with the completed study to develop a design and implementation guideline for these two treatments. Data of interest that will be collected from field studies include how bicyclists are using these treatments (e.g., turning maneuvers, use of bike lane upstream) and how drivers behave when encountering these treatments, conflicts between bicycles and cars, as well as design characteristics. Design characteristics of specific bike box and two-stage turn queue box implementations, e.g., dimensions, the existence of green pavement markings vs. plain markings, and their impact on bicyclist and driver behavior and conflicts, will also be studied to inform design guidelines. Final report to be submitted by the end of November 2023. Project is set to close out in February 2024.

17. Developing a Visualization, Sharing and Processing Platform for Large-Scale Highway Asset Point Cloud Data (Continuing Project)

MassDOT initiated procurement of a Mobile LiDAR unit this year. Due to the large size and the complex format, the utilization of the data has been burdened with expensive hardware, proprietary software, extensive training, and inflexible workflow. The point cloud data is only beneficial if MassDOT has the means to extract, process, access and visualize the information. There is a great

need for a convenient platform that can maximize the utilization of the valuable point cloud data. The objectives of this study include 1) to develop a convenient data platform to enable visualization, sharing and processing of large-scale point cloud dataset; 2) to integrate the platform with the existing data sources and analysis tools in MassDOT; and 3) to customize processing pipelines using the platform for several MassDOT's critical highway applications and demonstrate the feasibility and benefits of the platform. Researchers have developed and continue refining the prototype Data Viewer.

Accomplishments in prior year:

- Completed the "Measuring Accessibility to Improve Public Health" project.
- Completed the "Developing Massachusetts Specific Trip Generation Rates for Land Use Projects" project.
- Completed the "Multisource Data Fusion for Real-Time and Accurate Traffic Incident Detection" project.
- Completed the "Post-Fire Damage Inspection of Concrete Structures in Tunnels Phase II" project.
- Completed the "Massachusetts Depth to Bedrock Project" project.
- Completed the "Outdoor Information Panels to Convey Real-Time Travel Information for Ridership Recovery" project.
- Managed the "Using Grip Sensors to Control a Salt Spreader Application Rate" project. 50% completed.
- Managed the "Smart work zone control and performance evaluation based on trajectory data" project. 58% completed.
- Managed the "Post-Fire Damage Inspection of Concrete Structures Phase III Field Verification Phase" project. 25% completed.
- Managed the "Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes" project. 45% completed.
- Scoped, contracted, kicked off and managed the "Energy-Focused Decision-making Framework for MBTA Operations and Planning" project. 33% Completion.
- Scoped, contracted, kicked off and managed the "Accessible Bus Stop Design in the Presence of Bike Lanes" project. 20% completed.
- Scoped, contracted, kicked off and managed the "Cross-Modal Impact Assessment for Sustainable Transportation Networks " project. 20% completed.
- Scoped, contracted, kicked off and managed the "LIMMS Gap Analysis and Development Plan" project. 30% completed.

- Scoped, contracted, kicked off and managed the "Measuring Fare Payment Compliance on MBTA Buses and Light Rails" project. 10% completed.
- Scoped, contracted, kicked off and managed the "Developing a Visualization, Sharing and Processing Platform for Large-Scale Highway Asset Point Cloud Data" project. 20% completed.
- Solicited and selected FFY24 medium-term research projects.

Proposed activities for next year:

- Identify PIs, develop amplified work plans, and establish ISAs and contracts for FFY24 new medium-term research projects.
- Complete the “Smart Work Zone Control and Performance Evaluation Based on Trajectory Data” project.
- Complete the “Using Grip Sensors to Control a Salt Spreader Application Rate” project.
- Complete the “Post-Fire Damage Inspection of Concrete Structures Phase III Field Verification Phase” project.
- Complete the “Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes” project.
- Complete the "Energy-Focused Decision-making Framework for MBTA Operations and Planning" project.
- Complete the "Accessible Bus Stop Design in the Presence of Bike Lanes" project.
- Complete the "Developing a Salt Spreader Control Program based on Grip Sensor" project.
- Complete the "Cross-Modal Impact Assessment for Sustainable Transportation Networks " project.
- Complete the "Speed Management and Emergency Personnel" project.
- Complete the "LIMMS Gap Analysis and Development Plan" project.
- Advance the "Measuring Fare Payment Compliance on MBTA Buses and Light Rails" project to 90% completed.
- Advance the "Developing a Visualization, Sharing and Processing Platform for Large-Scale Highway Asset Point Cloud Data" project to 85% completed.
- Scope, contract, and kick off all seven FFY24 new medium-term research projects.
- Solicit and identify the list of FFY25 medium-term research projects.

Anticipated products:

- Contracts/ISAs for FFY24 medium-term projects.
- Initiation of FFY24 medium-term projects.
- Interim deliverables and final reports for medium-term research projects that are scheduled to be completed in FFY24.

- Identification of FFY25 medium-term research projects.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$122,992.54**

MassDOT staff members	% Time to task
Patrick McMahon	25.0
Nicholas Zavolas	25.0
Anil Gurcan	25.0
Austin Sanders	25.0
Michael Flanary	20.0
Research Manager (TBH)	10.0

Estimated task budget: $1,194,390.16

Estimated consultant costs: $1,071,397.62

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
2. Energy-Focused Decision-making Framework for MBTA Operations and Planning (Continuing Project) / 121534	$125,499.00	$28,000.00	$97,999.00	$0.00	UMass Amherst	02-28-2023	09-30-2024
3. Accessible Bus Stop Design in the Presence of Bike Lanes (Continuing Project) / 121272	$199,915.00	$44,000.00	$155,915.00	$0.00	UMass Amherst	02-28-2023	08-31-2024
4. Developing a Salt Spreader Control Program based on Grip Sensor (Continuing Project) / 117740	$125,000.00	$88,000.00	$37,000.00	$0.00	UMass Amherst	04-25-2022	04-30-2024
5. Cross-Modal Impact Assessment for Sustainable Transportation	$99,997.62	$28,300.00	$71,697.62	$0.00	UMass Amherst	04-30-2022	09-30-2024

Networks (Continuing Project) / 121271							
6. Speed Management and Emergency Personnel (Continuing Project) / 109600	$300,000.00	$0.00	$180,000.00	$120,000.00	UMass Amherst	04-25-2023	04-25-2024
7. LIMMS Gap Analysis and Development Plan (Continuing Project) / 121179	$300,000.00	$115,000.00	$185,000.00	$0.00	UMass Amherst	05-31-2023	07-31-2024
8. Smart work zone control and performance evaluation based on trajectory data (Continuing Project) / 117478	$150,000.00	$128,991.00	$21,009.00	$0.00	UMass Lowell	04-12-2022	05-31-2024
14. Post-Fire Damage Inspection of Concrete Structures Phase III – Field Verification Phase	$180,000.00	$105,000.00	$75,000.00	$0.00	UMass Amherst	04-25-2022	02-28-2024

(Continuing Project) / 117741							
15. Measuring Fare Payment Compliance on MBTA Buses and Light Rails (Continuing Project) / 121858	$150,000.00	$32,000.00	$113,000.00	$5,000.00	UMass Amherst	04-28-2023	10-31-2024
16. Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes (Continuing Project) / 118671	$149,778.00	$118,000.00	$31,778.00	$0.00	UMass Amherst	08-19-2022	02-28-2024
17. Developing a Visualization, Sharing and Processing Platform for Large-Scale Highway Asset Point Cloud Data (Continuing Project) / 121410	$174,999.00	$50,000.00	$102,999.00	$22,000.00	UMass Amherst	02-15-2023	12-31-2024

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G. Long-term Research Projects

Task Lead: Michael Flanary

Task Purpose:

To perform the studies contained within this task, MassDOT contracts directly with universities, research institutes and/or private companies. The respective anticipated duration of active investigation and report writing efforts for short-term, medium-term and long-term projects are, respectively: less than 15 months, 15-21 months, and longer than 21 months (including 3 months of final report review, approval and 508 compliance process). There may be occasion when a project actual duration doesn't align with the anticipated duration due to challenges arising during research investigation and beyond the project team's control. Under such circumstances, additional time may be granted pending FHWA's approval, and the project shall remain within the original category for fiscal tracking purpose. The Research Section conducts annual research problem statement (RPS) solicitations to collect research needs from agency staff. The submitted problem statements are then prioritized based on MassDOT Division/Shared-Service Office Senior Leaders' rankings, MassDOT overall priorities, and research funding eligibility and availability. The Research Section assists MassDOT project champions with literature searches; the drafting of scopes of work; identification and selection of principal investigators, and the administration of project agreements/contracts, deliverables, final report reviews and publication, and coordination with FHWA.

The purpose of "Task G. Long-term Research Projects" is to perform research projects that are longer than 21 months.

Subtasks:

1. Ultra-High Performance Concrete Reinforced with Multi-Scale Hybrid Fibers and Its Durability-Related Properties (Continuing Project)

The study is to develop a novel UHPC reinforced with Multi-Scale Hybrid Fibers (MSHF) and nano-scale additives with enhancements in both early-age properties and long-term performance such as high early-age strength, low volume change, low permeability and extended service life in the presence of environmental threats in Massachusetts. The project will also develop a comprehensive understanding of the roles of MSHF, additives, and cement chemistry in improving durability-related properties of UHPC. The draft final report is now expected in FFY24 Q1 since a 2-month NCTE is in the process of being formally requested. Expect project to advance to full completion by 12/31/2023.

2. Complete Street and Urban Trees (Continuing Project)

Focusing on soil impacts and root systems, the research will bring a much-needed arboricultural perspective to early project development, as well as design and construction, when it can most effectively anticipate, minimize, and mitigate impacts to trees, at the same time identifying strategies for both restoration and enhancement of the urban forest.

This research includes a multifaceted approach to surveying the state of the practice, including: a literature search of related professional journals; input from a cross-disciplinary panel of experts; an on-line survey of practicing professionals responsible for health of urban forest at select DOTs and cities.

These information resources will yield guidance documentation for preliminary corridor tree-health evaluation and general impact analysis for engineers, planners, and landscape architects, as well as consulting arborists. Research will also provide guidance for soil area planting requirements for new trees, as well as best management practices for soil protection during construction. The Online Survey (Task 3) of practicing professionals associated with select DOTs and cities responsible for the health of the urban forest and transportation corridor improvement projects, was completed in May. A ZOOM meeting with panel of experts, Project Champions was conducted on May 22, 2023 to discuss the survey results. Additional discussions were held with members of Transportation Group in the Department of Civil and Environmental Engineering to identify additional interest groups to share survey results. The PI continues to revise and enhance sections of MassDOT's Project Development & Design Guide.

3. Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete (Continuing Project)

Cement concrete is the most critical building material used in the construction of our infrastructure.

However, hydraulic cement, the key ingredient of cement concrete, produces an immense amount of heat and carbon dioxide during the manufacturing process.

Recycled ground-glass pozzolan (RGGP) is a new type of material that has the potential to greatly reduce the amount of hydraulic cement (up to 50% reduction) needed in the mix design formulation.

Additionally, other hydraulic cement replacement materials used in today's cement concrete, such as fly ash and slag, are becoming more and more scarce, resulting in a problematic supply crunch and increases in cost.

The objectives of this research project include validation of the efficacy of RGGP and development of new mix design formulations with RGGP, which will lead to decreasing our carbon footprint, while increasing the quality and long-term durability of cement concrete used in MassDOT projects.

Literature Search is continuing. Samples are being produced and testing will start in the next Quarter (FFY24 Q1).

4. Revised Load Rating Procedures for Deteriorated Prestressed Concrete Beams (Continuing Project)

The project is to develop an approach to determine a safe working capacity realistically and reliably for existing precast, prestressed concrete bridges which exhibit deterioration to avoid unnecessary bridge closures while also keeping the public safe. This project is being carried out through a combination of computer model simulations and full-scale testing of actual deteriorated beams in the laboratory. Project scheduled for completion on 11/30/2023.

5. Field Study to Determine Salt Usage Efficiency on Two Pavement Types (Continuing Project)

Winter maintenance activities are a high priority to MassDOT in order to ensure its roadways are safe for the motoring public during winter events. MassDOT concerns that certain pavement surface types may have been over-treated during winter maintenance. As such, there is a need to collect and analyze field data to understand if the current treatment applications and frequencies are correct, deficient or excessive. Through field study, the project will quantify the minimum safe level of salt application for typical pavement surface types and compare the results to the current application rates and frequency. The study will also investigate both safety and environmental aspects of the current salt treatment rate and those of the determined efficient rate. Project will continue with data collection in winter 2023 (task 2) and data analysis in a technical memorandum in July 2024 (task 3).

6. Evaluating Driver Education Modules on Safety (Continuing Project)

This project intends to conduct a comprehensive examination of the contents of current Massachusetts driver’s education modules and their delivery methods to determine which, if any, modules of the program positively influence novice driver behavior and improve roadway safety. Additionally, there are numerous new technologies affecting drivers, such as advanced driving assistance systems, that are not yet covered under any drivers' education modules. The project will yield data and an associated report detailing the effectiveness of drivers’ education on improving safety and reducing drivers' citations, guidelines/standards for driver’s education components, delivery methods, etc. that lead to optimal effectiveness. It will also provide guidance on the creation and implementation of new modules covering emerging technologies affecting drivers. Project technical panel will be comprised of RMV and relevant Highway Division Sections. The PIs are focused on Task 1 activities involving (1) the identification of stakeholder invitees and (2) developing the interview protocol for stakeholder interaction. Stakeholders will include 5 groups (drivers education instructors, MassDOT employees, law enforcement, academicians, and vehicle dealerships). Task 2 activities will focus the training program on one the implementation of ADAS - adaptive cruise control.

8. Development of Improved Inspection Techniques using LiDAR for Deteriorated Steel Beam Ends (Continuing Project)

Through recently completed research, MassDOT has developed new improved procedures to accurately describe the remaining load carrying capacity of deteriorated steel beams, and has also explored using LiDAR scanning technology for acquiring crucial data for load rating in the lab environment. This project employs the LiDAR scanner for a field verification of the methodology. This will produce field results reflecting challenges faced by bridge inspectors in the field, a comparison with lab results from Phase II, and verification of using the 3D scanning technology for bridge inspection in reality. More specifically, the study will collect data using the LiDAR in the field, develop appropriate methods to process the data (filter noise, scale the problem, etc.) and use the output to provide important information for the estimation of the residual capacity.

LIDARs continue being tested in the lab. Researchers have continued using additional LiDars and trying to find out which ones are better for scanning deteriorated beam ends. They are investigating the Artec Leo. Researchers are using the beams that they have in the lab for testing and have acquired the first point clouds. Researchers are currently studying the new Leo Technology. Data on Beams in lab continues being loaded into the Cloud Point.

9. Measuring Accessibility to Improve Public Health Phase II (Continuing Project)

Efforts have been made to quantify the access that communities across Massachusetts have to opportunities like jobs, food, healthcare, and education.

The first phase accounted for different modes but did not consider the built environment and transportation infrastructure’s impact on accessibility. This research expands on current work on the measurement of accessibility to focus on the data and metrics needed to adequately account for access by bicycling, walking, microtransit, and ridesource/ridesharing services. This research has two objectives: 1) develop measures of accessibility for alternative modes of transportation that account for relevant characteristics of infrastructure, built environment, and hours and area of service, and 2) identify gaps and inequities in accessibility that can be addressed by improving transportation access. Expected to be kicked off in Q1 of FFY24.

10. 3D-Printed Lattice-based Structures for Next Gen Bridge Bearings (Continuing Project)

Bridge bearings are installed between the bridge substructure and the superstructure to transfer loads and allow controlled translations to reduce stresses in the structure. Recent progress in 3D printing applications through the MassDOT research program examined promising customizable designs for typical bridge bearing and isolation bearings. This project will develop a prototype architected bearing system and manufacture and test the 3D printing bearing systems, and will involve the design of architected lattices which will serve as the reinforcement of the rubber elastomer

intended to replace the undesirable lead core in the traditional isolation bearings. The main research efforts including the manufacturing of the prototype and testing of the composite bearings for a variety of loading conditions. There is a proposed 12.8% increase ($25,600) of the originally envisioned project amount, which can be accommodated within the SPRII Task G total amount. Manufacturing of a prototype bridge bearing and testing (task 2) and a survey of the key factors related to the newly developed bridge bearings and necessary equipment, or an on-site repair of a deteriorated bearing (task 4) will be started in October 2023 and completed by September 2024. Survey existing and emerging lattice architectures that can be applicable to deteriorated bearings (task 1) will be completed in August 2023 and task 4 will be started.

11. A Method for Pavement Marking Inventory and Retroreflectivity Condition Assessment Using Mobile Lidar - Phase II (Continuing Project)

FHWA's minimum pavement marking retroreflectivity level requirement in the forthcoming MUTCD creates a pressing need for MassDOT to implement an effective and efficient means for pavement marking inventory and retroreflectivity assessment. Phase 1 of this project successfully developed an automated methodology for identifying pavement marking, evaluating retroreflectivity condition and surface condition.

The objective of Phase 2 of this project is in two fold: 1) to continue monitoring the existing testing sections and include more sections with waterborne and preformed tape, and to investigate the effects of wet marking, recessed marking and skip sections on the retroreflectivity. 2) to investigate the feasibility of using a LiDAR-based methodology for the QA/QC processes of newly installed pavement markings. Task 1 - Literature Review is complete. The Research team is engaged in Task 2 Data Acquisition activities. A total of 17 testing roadway sections have been finalized.

12. Effect of Asphalt Binder Source in Asphalt Mixture Performance (Continuing Project)

There is a need to understand how asphalt binder source affects the asphalt mixture's overall performance between laboratory and paving settings. The research will investigate how binder source affects mixture performance by determining properties with significant variation, determining the mixture changes that significantly affect performance, analyzing the lifecycle cost based on binder properties, establishing specifications for allowable tolerances, and providing guidance on updating MassDOT pavement specifications to include new testing protocols. Binder tests are continuing.

Researchers are continuing to obtain additional Binder specimens for testing.

Accomplishments in prior year:

- Completed the "Ultra-High-Performance Concrete Reinforced with Multi-Scale Hybrid Fibers and Its Durability-Related Properties" project.

- Completed the "Revised Load Rating Procedures for Deteriorated Prestressed Concrete Beams" project.
- Completed the "Optimization of MassDOT's High Performance Thin Lift Mixtures" project.
- Completed the “Complete Streets v.2: Respecting the Roots” project.
- Completed the “Development of Improved Inspection Techniques using LiDAR for Deteriorated Steel Beam Ends” project.
- Managed the “Field Study to Determine Salt Usage Efficiency on Two Pavement Types” project to 50% completion.
- Scoped, contracted, kicked off and managed the “3D-Printed Lattice-based Structures for Next Gen Bridge Bearings" project to 10% completion.
- Scoped, contracted, kicked off and managed the “Effect of Asphalt Binder Source in Asphalt Mixture Performance" project to 30% completion.
- Scoped, contracted, kicked off and managed the “Evaluating Driver Education Modules on Safety" project to 15% completion.
- Scoped, contracted, kicked off and managed the "Method for Pavement Marking Inventory and Retroreflectivity Condition Assessment Using Mobile Lidar (Phase II)" project to 40% completion.
- Scoped, contracted, and kicked off the "Measuring Accessibility to Improve Public Health Phase II" project. 2% completion.
- Scoped, contracted, and kicked off the "Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete" project. 2% completion.
- Solicited and selected FFY24 long-term research projects.

Proposed activities for next year:

- Complete the "Field Study to Determine Salt Usage Efficiency on Two Pavement Types” project.
- Complete the "3D-Printed Lattice-based Structures for Next Gen Bridge Bearings" project.
- Complete the "Method for Pavement Marking Inventory and Retroreflectivity Condition Assessment Using Mobile Lidar (Phase II)" project.
- Complete the “Effects of Asphalt Binder Source in Asphalt Mixture Performance" project.
- Advance the “Field Study to Determine Salt Usage Efficiency on Two Pavement Types” project to 70% completion.
- Advance the "Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete" project to 50% completion.
- Advance the “Evaluating Driver Education Modules on Safety" project to 50% completion.
- Advance the “Measuring Accessibility to Improve Public Health Phase II" project to 50% completion.

- Scope, contract, and kick off all FFY24 new long-term research projects.
- Solicit and identify FFY25 long-term research projects.

Anticipated products:

- Contracts/ISAs for FFY24 long-term projects.
- Initiation of FFY24 long-term projects.
- Interim deliverables and final reports for long-term research projects that are scheduled to be completed during FFY24.
- Identification of FFY25 long-term projects.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$111,002.54**

MassDOT staff members	% Time to task
Patrick McMahon	25.0
Nicholas Zavolas	25.0
Anil Gurcan	25.0
Austin Sanders	25.0
Michael Flanary	20.0
Research Manager (TBH)	10.0

Estimated task budget: $1,316,939.54

Estimated consultant costs: $1,205,937.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
1. Ultra-High Performance Concrete Reinforced with Multi-Scale Hybrid Fibers and Its Durability-Related Properties (Continuing Project) / 115287	$197,402.00	$192,402.00	$5,000.00	$0.00	UMass Lowell	08-05-2021	10-30-2023
2. Complete Street and Urban Trees (Continuing Project) / 117524	$89,897.00	$62,345.00	$27,552.00	$0.00	UMass Amherst	04-01-2022	08-31-2024
3. Recycled Ground-Glass Pozzolan (RGGP) for Use in Cement Concrete (Continuing Project / 122821	$250,000.00	$18,638.00	$160,000.00	$71,362.00	UMass Lowell	08-29-2023	05-31-2025
4. Revised Load Rating Procedures for Deteriorated	$224,676.00	$221,000.00	$3,676.00	$0.00	UMass Amherst	04-27-2021	11-30-2023

Prestressed Concrete Beams (Continuing Project) / 114071							
5. Field Study to Determine Salt Usage Efficiency on Two Pavement Types (Continuing Project) / 119609	$450,000.00	$103,983.00	$225,000.00	$121,017.00	UMass Dartmouth	08-30-2022	09-30-2025
6. Evaluating Driver Education Modules on Safety (Continuing Project) / 121727	$369,999.00	$20,000.00	$188,000.00	$161,999.00	UMass Amherst	04-04-2023	09-30-2025
8. Development of Improved Inspection Techniques using LiDAR for Deteriorated Steel Beam Ends (Continuing Project) / 117416	$199,998.00	$135,000.00	$64,998.00	$0.00	UMass Amherst	03-21-2022	03-31-2024
9. Measuring Accessibility to Improve Public Health Phase II	$200,000.00	$7,000.00	$103,000.00	$90,000.00	UMass Amherst	None	None

(Continuing Project) / None							
10. 3D-Printed Lattice-based Structures for Next Gen Bridge Bearings (Continuing Project) / 121135	$225,599.00	$30,000.00	$123,000.00	$72,599.00	UMass Amherst	03-03-2023	05-31-2025
11. A Method for Pavement Marking Inventory and Retroreflectivity Condition Assessment Using Mobile Lidar - Phase II (Continuing Project) / 121137	$200,000.00	$38,000.00	$130,000.00	$32,000.00	UMass Amherst	01-26-2023	02-28-2025
12. Effect of Asphalt Binder Source in Asphalt Mixture Performance (Continuing Project) / 121136	$400,000.00	$51,023.00	$175,711.00	$173,266.00	UMass Dartmouth	02-02-2023	09-30-2025

H. National RD&T2 Collaboration

Task Lead: Steve Woelfel

Task Purpose:

To coordinate MassDOT's participation in national and regional transportation research activities, including the research committees, research statement submission and reviews, project panels, technical working groups, and task forces; to disseminate MassDOT's research efforts, products, program management and delivery approaches both nationally and regionally; and to distribute research results and activities of the Transportation Research Board (TRB), American Association of State Highway and Transportation Officials (AASHTO) and other state DOTs within MassDOT.

Accomplishments in prior year:

- Coordinated with MassDOT Highway Divisions and Planning Office to establish participation in transportation pooled fund (TPF) projects funded through SPRII.
- Participated in and contributed to AASHTO RAC activities.
- Coordinated the TRB National Cooperative Highway Research Program (NCHRP) problem statement review process.
- Disseminated TRB research reports, technical webinars and NCHRP project panel member solicitations to appropriate MassDOT staff.
- Participated in and contributed to New England Transportation Consortium (NETC) program management and technical activities.
- Participated in and contributed to AASHTO's RAC Regional 1 activities including preparation activities for the RAC 2023 winter meeting.
- Applied for AASHTO RAC Committee High Value Research Projects Award and received Maintenance Supplemental Category Award.
- Updated MassDOT research projects in the TRB Research-In-Progress database.
- Disseminated MassDOT research reports through the TRB E-Newsletter.

Proposed activities for next year:

- Coordinate within MassDOT to establish participation in pooled fund programs, and support AASHTO RAC activities, NCHRP research statement reviews, NCHRP technical panel participation, and TRB representative's visit.
- Participate in the remaining NETC project activities in FFY24.
- Participate in other State DOT’s Research Peer Exchanges when appropriate.
- Plan for the next MassDOT Research Peer Exchange.

Anticipated products:

- Distribution of research products and information from TRB, TPF and other state DOTs.
- Communication of MassDOT research reports through TRB E-Newsletter.
- Participation in AASHTO RAC activities.
- Next Research Peer Exchange scheduled, agenda drafted, and invitations sent.
- Identification of MassDOT's position on problem statements for the annual NCHRP project cycle.
- Coordination of MassDOT subject matter experts' participation in NETC projects.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$68,021.15**

MassDOT staff members	% Time to task
Patrick McMahon	20.0
Michael Flanary	10.0
Nicholas Zavolas	10.0
Anil Gurcan	10.0
Austin Sanders	10.0
Research Manager (TBH)	10.0

Estimated task budget: $68,021.15

Other costs: $1,245,154

Transportation Pooled Fund Projects

Below is a list of Transportation Pooled Fund projects with a total cost of $1,245,154 (eligible for 100% federal SPRII funds and not included in the FFY24 SPR financial table but will be included in the FFY24 STIP as its own line item).

They are noted here for informational purposes:

5(422)* National Cooperative Highway Research Program, $826,802

5(437) Tech Transfer Concrete Consortium, $12,000

5(447) Traffic Control Device (TCD) Consortium, $10,000

5(455) National Accessibility Evaluation Phase II, $38,000

5(464) H&H software updates, $10,000

5(479) Clear Roads Phase III, $25,000

5(481) In-Service Performance Evaluation (ISPE) of Roadside Safety Features, $30,000

5(482) Development and Evaluation of Roadside Safety Systems for Motorcyclists, $40,000

5(501) Roadside Safety Research for MASH Implementation Phase III, $65,000

5(511) TRB Core Support Services $157,352

5(516) Highway Safety Manual 2nd Edition (HSM2) Implementation Phase III $16,000

S 1591** 2nd International Roadside Safety Conference and Peer Exchange Conference, $5,000

Contingency for FFY 24: $10,000 (for the variation of NCHRP amount)

* Exact amount will be determined by FHWA headquarters based on 5.5% of SPR total for Massachusetts

** TPF project number yet to be assigned.

I. Construction Management Certificate Program (Delivered by MassDOT HR Training)

Task Lead: Penny Nickle

Task Purpose:

To support MassDOT HR Training Program activities that provide oversight and administration of the MassDOT/Wentworth Construction Management Certificate Program (CMCP) for employees of the MassDOT Highway Division.

Construction Management Certificate Program

Implement year three of the 3-year partnership agreement with the Wentworth Institute of Technology (WIT).

Deliver the Construction Management Certification Program to 30 participants representing all Highway districts. The annual expense is $60,000. This annual expense covers the delivery of the previously approved 7-week curriculum (the module contents had been jointly developed by WIT and MassDOT in FFY18 and approved by FHWA in FFY19).

It is anticipated that about thirty (30) MassDOT Highway construction staff will attend the 7-week training program each year. The third annual training to be delivered under this contract will be January - March 2023:

- January 23, 2024
- January 25, 2024
- February 6, 2024
- February 8, 2024
- February 13, 2024
- February 15, 2024
- February 27, 2024
- February 29, 2024
- March 5, 2024
- March 7, 2024
- March 12, 2024
- March 14, 2024
- March 19, 2024
- March 21, 2024

Subtasks:

Construction Management Certificate Program

Continue implementing the 3-year partnership agreement with the Wentworth Institute of Technology (WIT).

Deliver the Construction Management Certification Program to 30 participants representing all Highway districts. The annual expense is set at $60,000, which covers the delivery of the 7-week curriculum (the module contents had been jointly developed by WIT and MassDOT in FFY18 and approved by FHWA in FFY19).

It is anticipated that about thirty (30) MassDOT Highway construction staff will attend the 7-week training program each year. The third annual training to be delivered under this contract will be January - March 2024. No training was conducted in FFY21 due to COVID restrictions.

Accomplishments in prior year:

- Worked with Wentworth Institute to Management Certificate Program in January – March 2023.

Proposed activities for next year:

- Implement year three of the 3-year partnership agreement with the Wentworth Institute of Technology.
- Deliver the Construction Management Certification Program to 30 participants representing all Highway districts. The annual expense is $60,000 to pay for the delivery of the previously approved 7-week curriculum.

Anticipated products:

- Administration of the Mass DOT/Wentworth Construction Management Certificate Program

Estimated task completion: 09-30-2024

Estimated task budget: $60,000.00

Estimated consultant costs: $60,000.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
Construction Management Certificate Program / 113551	$180,000.00	$60,000.00	$60,000.00	$60,000.00	Wentworth	01-15-2021	None

Consultant notes: $180,000 for 3 years ($60,000 per year).

J. MassDOT Moving Together and Innovation Conferences

Task Lead: Steve Woelfel

Task Purpose:

MassDOT convenes two transportation technology transfer conferences each year: a one-day Moving Together Conference in the fall and a two-day Transportation Innovation Conference in the spring.

Through the comprehensive MassDOT-UMass Amherst Interdepartmental Service Agreement (ISA #109600), UMTC provides services to MassDOT including conference program planning, coordinating with speakers and moderators, managing event registration and exhibitors, contracting with venue and event support services, managing conference logistics, and delivering the conferences.

Subtasks:

MassDOT Conferences

Conference supporting efforts and expenses were previously embedded in other UMTC ISA components (mostly LTAP); they are separated from those components and included in SPRII Work Program Task J for FY23-FY25 through the ISA Amendment.

Accomplishments in prior year:

- Delivered the 2022 Moving Together conference.
- Delivered the 2023 Innovation Conference.

Proposed activities for next year:

- Coordinate in-person and partial virtual delivery of conference content and host the annual conference.
- Explore equitable delivery options for future conferences.
- Support the conference organizing committee by coordinating logistics both for the UMTC conference planning committee as well as those involved on the MassDOT event planning team. UMTC will also support conference planning logistics between any vendors or consultants providing services for the conference.
- Manage initiatives to secure sponsors, vendors, and exhibitors.
- Manage conference content including presenters, moderators and facilitators, abstracts, agenda items, schedule, and accompanying projects including video creation and editing.
- Provide day-of support relating to registration, troubleshooting any issues or concerns, managing flow of the conference, providing support for featured speakers and session speakers.

- Manage temporary conference student workers, including advertising, interviewing, training, scheduling and day-of coordination.
- Work with MassDOT to provide talking points and press release content as needed.
- Prepare marketing materials prior to and for day-of conference activities including email marketing campaigns, website information, virtual platform needs (if virtual), agenda, social media messaging, conference app preparation (if using an app), posters, day-of signage, evaluation collection materials, final reports, etc.
- Manage and secure all vendor contracts, billing, invoices, expense reports, payroll and reimbursements

Anticipated products:

Delivery of 2023 Moving Together Conference.

Delivery of 2024 Innovation Conference.

Estimated task completion: 09-30-2024

Estimated staff salaries and benefits: **$22,126.40**

MassDOT staff members	% Time to task
Research Manager (TBH)	15.0
Michael Flanary	None

Estimated task budget: $872,126.40

Estimated consultant costs: $850,000.00

Subtask / contract #	Total cost:	Pre-FFY 2024:	FFY 2024:	Post-FFY 2024:	Consultant/Contractor Name:	Consultant NTP:	Contract End Date:
MassDOT Conferences / 109600	$2,553,823.00	$858,260.22	$850,000.00	$845,562.78	UMass Amherst	10-01-2022	09-30-2025

Consultant notes: This Task is to be separated from other UMTC services through the ISA Amendment for FFY23-25. Thus, the duration is 36 months.

K. Activities with non-Federal-Match Waivers -- AASHTO TSP

Task Lead: Maria Ramirez

Task Purpose:

This task will allow MassDOT subscribes to a list of AASHTO Technical Services Programs which are approved for SPRII non-federal match waivers. 100% federal funds will be used to pay for these services.

Accomplishments in prior year:

Coordinated with Highway on programs to subscribe for FFY24.

Proposed activities for next year:

Pay for the subscribed services.

Anticipated products:

AASHTO TSP invoices are paid.

Estimated task completion: 09-30-2024

Estimated task budget: $205,000.00

Estimated other costs: **$205,000.00**

In FFY24, MassDOT intends to participate in the following AASHTO TSP programs with a total cost of $205,000; and they are eligible for 100% federal share for SPR funds per FHWA guidance:

- AASHTO Design Guidelines - (Formerly Design Publications Maintenance Technical Service Program, DPM) $15,000
- AASHTO Innovation Management - (Formerly AASHTO Innovative Initiative, A.I.I.) $6,000
- AASHTO Materials Guidelines - (Formerly Development of AASHTO Materials Standards, DAMS) $10,000
- AASHTO Environmental Management - (Formerly Environmental Technical Assistance Program, ETAP) $10,000
- AASHTO Equipment Management - (Formerly Equipment Management Technical Service Program, EMTSP) $5,000
- AASHTO Safety Management - (Formerly Highway Safety Policy and Management Technical Service Program, SAFETY) $10,000

- AASHTO Structures Guidelines, $15,000 - (Formerly LRFD Bridges and Structures Specifications Maintenance, LRFDSM) $15,000
- AASHTO Safety Hardware Management, $10,000 - (Formerly Manual for Assessing Safety Hardware Technical Support, MASH) $10,000
- AASHTO Performance Management - (Formerly Transportation Performance Management Technical Service Program, TPM) $15,000
- AASHTO Preservation Management - (Formerly Transportation System Preservation Technical Service Program, TSP2) $20,000
- AASHTO Product Evaluation and Audit Solutions - (Formerly National Transportation Product Evaluation Program, NTPEP) $25,000
- AASHTO Resilient and Sustainability Management - (Formerly Resilient and Sustainable Transportation Systems Technical Assistance Program, RSTS) $10,000
- AASHTO Technical Training Solutions - (Formerly Transportation Curriculum Coordination Council,TC3) $20,000
- AASHTO Winter Weather Management - (Formerly Snow and Ice Cooperative Program, SICOP) $4,000
- National Operations Center of Excellence Technical Service Program (NOCoE) $15,000
- AASHTO Operations Technical Services Program (Ops TSP) $15,000

SPR II Financial Table

Totals

Task	Staff cost	Consultant cost	Other cost	Total task cost
SPR II Totals	$609,508.10	$6,962,701.62	$605,000.00	$8,177,209.72

The SPR will be monitored throughout the year to determine if an amendment to the STIP is necessary to ensure adequate funding. The SPR II is 27% of the overall program, meeting the 25% minimum threshold.