July 5, 2019

PHASE ONE | STATEMENT OF QUALIFICATIONS | DESIGN-BUILD

IS-695 from IS-70 to MD 43

Baltimore County, MD

TSMO
MARYLAND TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS

PART-TIME SHOULDER USE | MOBILITY | SAFETY | OPERABILITY / MAINTAINABILITY / ADAPTABILITY

CONTRACT NO. BA0065172
MDOT State Highway Administration

LANE | JMT
A Design-Build Team

Table of Contents

A. Design-Builder Capability

LANE | JMT
A Design-Build Team

Durant Walters, PE, DBIA

Design-Build Project Manager

PROFESSIONAL EXPERIENCE

With nearly three decades of construction experience, Mr. Walters' portfolio features a wide assortment of transportation infrastructure projects. He specializes in the management of challenging highway and interstate projects in urban areas with high-volume traffic. As a DBIA-certified professional, Mr. Walters is proficient in overseeing and coordinating design-build (D-B) projects for state departments of transportation and federal agencies. His responsibilities include thorough oversight of design, construction, and quality management activities; adherence to contract and budget requirements; and providing effective leadership to achieve timely project delivery.

Total Years Experience: 29

License/Certification:

- Professional Engineer (MD #41726, VA #0402049300)
- DBIA Professional
- MDOT SHA MOT Manager
- MDOT SHA E&SCC Yellow Card

Education:

BS, Civil Engineering; University of Maryland

RELEVANT PROJECT EXPERIENCE

VDOT IS-66 Widening Inside the Beltway Design-Build — Design-Build Project Manager (2018 - 2020)

- ***Project Description:*** This innovative $85 million congestion relief project is part of the *Transform 66* program, which seeks to improve travel conditions throughout the busy I-66 corridor (2015 ADT 63,000). Led by Mr. Walters, Lane is adding a through-lane along approximately four miles of eastbound IS-66 in Arlington County. Located adjacent to METRO tracks, the highway expansion requires the widening of five bridges, noise analysis, and construction of more than 200,000 SF of noise barrier, along with permitting, stormwater management (SWM), extensive maintenance of traffic (MOT), electronic tolling coordination, railroad coordination, and public outreach.
- ***Relevance to IS-695:*** The project will alleviate a broad pinch point that snarls interstate traffic during peak periods. Dilapidated noise walls are being replaced, with new sound barrier walls added. Mr. Walters is overseeing project construction that occurs largely within the current right-of-way (ROW), and includes shoulder strengthening, ramp modifications, bridge widening, roadway rehabilitation, and ITS construction and relocations. MOT is a top priority due to heavy traffic volume. Noise and light mitigation efforts have been implemented to reduce impacts to local residents.
- ***Performance:*** Mr. Walters is responsible for the overall design, construction, management, and stakeholder coordination of this highway project. Construction began in 2018 and will achieve timely completion under Mr. Walters' leadership.

MDTA IS-95 Express Lanes/MD 43 Interchange Modification — Project Manager (2012 - 2014)

- ***Project Description:*** Mr. Walters managed this $142.5 million project that involved the reconfiguration and rehabilitation of 1.6 miles of the existing eight-lane divided highway (2012 ADT 165,000) into eight general purpose lanes and four express toll lanes (managed roadway) separated by concrete traffic barriers.
- ***Relevance to IS-695:*** This project enhanced safety and provided reliable travel times within one of the most congested portions of IS-95 in Baltimore through infrastructure improvements and additional through-lanes. The project scope included ITS and tolling coordination for improved operability and vehicle throughput.
- ***Performance:*** Through his design and construction oversight and stakeholder coordination efforts, Mr. Walters maintained mobility and implemented construction techniques to minimize environmental impacts.

FHWA/DDOT 9th Street Bridge Replacement Design-Build — Design-Build Project Manager (2006 - 2011)

- ***Project Description:*** Mr. Walters and JMT designed/constructed a new streamlined, four-span structure spanning New York Avenue and rail yard facilities for this innovative $58 million bridge replacement in Washington, D.C. To accommodate peak rush-hour volumes on New York Avenue (ADT 60,000) and 9th Street (ADT 24,000) during construction, Mr. Walters and JMT developed a detailed seven-phase MOT plan.
- ***Relevance to IS-695:*** Mr. Walters' successes included extensive stakeholder coordination, utility relocations, MOT, public outreach, and compliance with restrictions imposed by multiple railroads.
- ***Performance:*** Mr. Walters ensured that efficient traffic operations on four different roadways in a highly congested area were maintained during construction.

Shawn Reynolds, PE

Design Manager

PROFESSIONAL EXPERIENCE

Mr. Reynolds is a Maryland-registered Professional Engineer with 20 years of experience leading safety/mobility/operations improvement projects on some of our nation's most congested highways. Through his design-build and design-bid-build experience, he has ensured that the overall design of projects is completed utilizing good engineering judgment in developing innovative solutions that meet and exceed project requirements.

Total Years Experience: 20

License/Certification:
- Professional Engineer (MD #32600)

Education:
- BS, Civil Engineering; Pennsylvania State University
- ACEC/MD Leadership Program

RELEVANT PROJECT EXPERIENCE

MDOT SHA IS-695 Widening & Safety Improvements (MD 41 to MD 147) — Project Manager (2014 - 2017)
- ***Project Description:*** Originally a bridge replacement project, Mr. Reynolds utilized good engineering judgment to add value to MDOT SHA by providing innovative, low-cost mobility improvements to maximize vehicle throughput, minimize vehicle travel times, and create a more reliable commuter trip along the inner/outer loops of IS-695 from Perring Parkway (MD 41) to Harford Road (MD 147). The typical section was designed within the existing ROW and noise barrier footprint, and accommodated future lane options. Solutions included auxiliary lanes along IS-695 and partial deconstruction of the cloverleaf configuration at MD 147.
- ***Relevance to IS-695:*** Mr. Reynolds worked closely with MDOT SHA to accomplish not only the initial project goals of mobility and safety, but, with industrious thinking and consideration, also addressed the future transportation network needs of the larger system, while also reducing delays throughout the Beltway itself.
- ***Performance:*** Having recently received an Engineering Award of Excellence from ACEC/MD, the judges' panel stated, *"We're pleased to recognize the IS-695 Project for outstanding achievement, in particular for the application of operational and safety enhancements that made a widespread positive impact to Baltimore-area traffic for a very reasonable cost."*

DDOT 11th Street Corridor Fixed Price/Best Value Design-Build — Deputy Design Manager/Lead Highway Engineer/MOT Engineer (2009 - 2015)
- ***Project Description:*** JMT was the lead designer for this $375 million D-B project in Washington, D.C. Mr. Reynolds led the highway design team that refined the planning documents to complete all freeway connections for regional traffic between IS-695 and DC 295/IS-295. The geometric design refinements included reduction of bridges and reuse of existing facilities, which minimized operations/maintenance activities and allowed for 70% of the roadways to be constructed offline without major interruption to vehicular traffic (ADT 106,000). Traffic design included Active Traffic Management, traffic signals, ITS devices, signing, marking, lighting, and MOT.
- ***Relevance to IS-695:*** The new bridges connected freeways, enabled better accessibility, enhanced safety for residents, and improved regional connections. Design reduced major interruption to traffic, while minimizing community/traveling public inconveniences, and, at the same time, increased design/construction efficiency.
- ***Performance:*** JMT's iterative process saved DDOT $85 million from the original engineer's estimate in part by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need while minimizing project impacts, including design modifications.

SCDOT Port Access Road (IS-26 to Port Terminal) Design-Build — Lead Highway Engineer (2016 - 2018)
- ***Project Description:*** JMT was the lead designer to Lane for this $220.7 million D-B project in Charleston, SC. Mr. Reynolds led all highway design services for this new, fully directional interchange, including six new bridges, a connector road, and improvements to railroad tracks and local roadways. Additional design included geotechnical, drainage/ECS/SWM, utility relocation/coordination, tie-ins to IS-26, environmental permitting/compliance, traffic, and public outreach.
- ***Relevance to IS-695:*** Mr. Reynolds supported local/regional planning policies and strategies and minimized negative impacts on nearby communities and the environment, such as noise mitigation.
- ***Performance:*** Many iterative, intensive design changes were performed by Mr. Reynolds efficiently and accurately to minimize ROW impacts and safely integrate container terminal vehicles with existing traffic.

Brian Basnight

Construction Manager

LANE

PROFESSIONAL EXPERIENCE

Mr. Basnight has nearly 30 years of experience in the construction industry. He has managed activities, maintained schedules, and provided coordination for numerous highway construction projects. Mr. Basnight is a skilled leader in delivering urban interstate projects in high-volume traffic areas. He has a demonstrated history of safely completing high-quality design-build projects on time and within budget. His portfolio includes high-value projects that have added highway capacity, incorporated technological advancements, alleviated congestion, rehabilitated pavement, and provided mobility improvements to facilitate safer and more efficient traffic operations.

Total Years Experience: 29

License/Certification:
- OSHA 30-Hour
- USACE Construction Quality Management for Contractors
- VDOT E&SC, Traffic Control, & Flagging Certifications

Education:
BS, Civil Engineering; University of North Carolina

RELEVANT PROJECT EXPERIENCE

Transurban IS-395 Express Lanes Extension Design-Build/P3 — Project Manager (2019 - 2020)

- ***Project Description:*** This $336 million D-B project extends the IS-395 Express Lanes for eight miles from Fairfax County, VA, to the Washington, D.C. line. Led by Mr. Basnight, the two existing High Occupancy Vehicle (HOV) lanes are being converted to Express Lanes and a third lane will be added, providing three reversible Express Lanes. The innovative Express Lanes offer a smoother and more predictable trip for drivers.
- ***Relevance to IS-695:*** The project will provide faster and more reliable travel in one of the most heavily traveled corridors in the country and expand the region's network of express lanes. Mr. Basnight is managing project construction occurring largely within the current ROW, and includes shoulder strengthening, ITS, ramp modifications, bridge widening, roadway rehabilitation, stormwater management, and noise studies. Extensive MOT and public outreach efforts are required to promote traveler safety due to heavy volume.
- ***Performance:*** Mr. Basnight is responsible for managing construction, maintaining the schedule, ensuring quality, and meeting all contract requirements. The new lanes are on schedule to open to traffic this fall.

VDOT IS-95 Express Lanes Design-Build/P3 — Construction Manager, Area 1/Bridge (2012 - 2014)

- ***Project Description:*** Mr. Basnight helped lead construction of this $726 million project, which created approximately 29 miles of reversible Express Lanes on IS-95 from Alexandria to Stafford (ADT 250,000).
- ***Relevance to IS-695:*** This project added capacity to the existing HOV lanes through the addition of a third lane, improved the existing two HOV lanes for six miles, and provided a nine-mile reversible two-lane extension of the existing HOV lanes to help alleviate the worst traffic bottleneck in the region. More than 700 miles of cable and wire and more than 1,000 tolling and traffic management devices were installed. The project involved stormwater management, noise studies, and comprehensive public outreach.
- ***Performance:*** Mr. Basnight's leadership helped achieve more than 3.8 million safe work hours without a lost-time incident, making this project one of the safest ever completed in the country. He was responsible for the management of the construction process, which included the QC program, project schedules, cost control, subcontractor coordination, and work plans. Mr. Basnight had extensive involvement with the complex MOT plans and implementation, coordination of utilities, and addressing environmental concerns.

VDOT IS-64/IS-264 Pavement Rehabilitation Design-Build — Construction Manager (2014 - 2015)

- ***Project Description:*** This $33.4 million project involved rehabilitation of 10.2 miles of Interstates 64 and 264 in Norfolk, VA. Lane also modified the existing concrete barrier, drainage structures, and guardrail due to the increase in the pavement section.
- ***Relevance to IS-695:*** Mr. Basnight directed project efforts involving innovative geometric analysis to accommodate existing infrastructure, tight lane closure restrictions, pavement markings, safety hardware upgrades, and adjustments to ITS, lighting, and utilities.
- ***Performance:*** Mr. Basnight managed all construction activities to facilitate safe traffic operations in a high-traffic area and to meet contract requirements for quality, safety, and timely delivery.

Scott F. Mednick, PE

Highway Engineer

PROFESSIONAL EXPERIENCE

Mr. Mednick is a Maryland-registered Professional Engineer with 31 years of experience in utilizing good engineering judgment in all phases of roadway design, including H/V alignments, geometrics, interchange design, ROW, MOT, lighting, signing, pavement marking, signals, and utility coordination. He also has worked on several MDOT SHA Highway Noise Analysis and Sound Barrier Design contracts, performing ambient monitoring, feasibility/impact studies, and final noise barrier design and bridge/retaining wall-mounted noise barriers.

Total Years Experience: 31

License/Certification:

- Professional Engineer (MD #21792)

Education:

- Bachelor of Civil Engineering; University of Delaware
- FHWA Traffic Noise Model 1.0
- Traffic Noise Model 2.5 Training
- GEOPAK Road I and II Training

RELEVANT PROJECT EXPERIENCE

MDOT SHA IS-695 Widening & Safety Improvements (MD 41 to MD 147) — Highway Engineer (2014 - 2017)

- ***Project Description:*** The purpose of the project was to improve mobility, safety, and operations due to the volume of traffic merging on and off IS-695 (ADT 200,000). Mr. Mednick utilized good engineering judgment by adding auxiliary lanes along IS-695 and partial deconstruction of the cloverleaf configuration at MD 147 that provided low-cost mobility solutions. He also provided noise analysis associated with a Type I highway widening including noise monitoring, TNM modeling, impact analysis, noise barrier optimization, feasibility and reasonableness determination, and final noise report. Mr. Mednick led the design of 2,000 LF of noise barrier.
- ***Relevance to IS-695:*** This project maximized vehicle throughput, increased motorist safety, and worked within the ROW footprint, while addressing the future transportation network needs of the entire Beltway system.
- ***Performance:*** With an Engineering Award of Excellence from ACEC/MD, the judges' panel stated, *"We're pleased to recognize the IS-695 Project for outstanding achievement, in particular for the application of operational and safety enhancements that made a widespread positive impact to Baltimore-area traffic for a very reasonable cost."*

DDOT 11th Street Corridor Fixed Price/Best Value Design-Build — Highway Engineer (2009 - 2015)

- ***Project Description:*** JMT was the lead designer for this $375 million D-B project that included three new bridges over water and two complex interchanges. Mr. Mednick provided support to refine the planning document alignments, typical sections, and interchange configurations to complete all freeway connections for regional traffic between IS-695 and DC 295/IS-295. The innovative geometric refinements allowed 70% of the roadways to be constructed offline without major interruption to traffic on this heavily traveled network (ADT 106,000).
- ***Relevance to IS-695:*** The new bridges connected freeways, enabled better accessibility, enhanced safety for residents, and improved regional connections. Design reduced major interruption to traffic, while minimizing community/traveling public inconveniences and, at the same time, increasing design/construction efficiency.
- ***Performance:*** JMT's iterative process saved DDOT $85 million from the original engineer's estimate in part by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need while minimizing project impacts, including design modifications.

MDTA IS-95/IS-695 Interchange/IS-95 Corridor Express Toll Lanes — Highway/Noise Engineer (2005 - 2011)

- ***Project Description:*** Mr. Mednick provided highway and noise analysis/design of improvements to of IS-95 and a new IS-95/IS-695 interchange, implementing general purpose and express toll lanes together to improve safety and mobility. He was responsible for multiple line and grade options for the complex interchange and prepared the final design and geometrics. The preliminary design included horizontal and vertical alignment, typical sections, development and review of design standards, and minimization of ROW and utility impacts. Complex MOT plans staged this interchange without disrupting existing traffic (IS-95 ADT 165,000 /IS-695 ADT 135,000).
- ***Relevance to IS-695:*** Innovative design for foundations, MOT, and utilities saved the project several million dollars, reduced the schedule, and increased safety of the traveling public and workers. Section 100 considered safety, context sensitivity, cost control, meeting needs, innovation, and flexibility in design, using sound engineering judgment and fully collaborating with all stakeholders.
- ***Performance:*** Though not a D-B project, this fast-tracked project required design services to be efficiently completed to meet the MDTA 10-month design schedule.

Sarah S. Gary, PE, PTOE

Traffic Engineer

PROFESSIONAL EXPERIENCE

Ms. Gary is a Maryland-registered Professional Engineer/Professional Traffic Operations Engineer (PTOE) with 21 years of experience in utilizing good engineering judgment in traffic design, including analysis for planning/engineering studies, traffic impact studies, development of multimodal analysis using computer traffic simulation and optimization models, and developing signal timing plans/intersection designs.

Total Years Experience: 21

License/Certification:
- Professional Engineer (MD #28357)
- PTOE (#1317)

Education:
- MS and BS, Civil Engineering; University of Kentucky

RELEVANT PROJECT EXPERIENCE

MDOT SHA Traffic Management Strategy Studies (IS-695) — Project Manager/Traffic Engineer (2016 - 2018)
- ***Project Description:*** Ms. Gary conducted studies for various corridors, including IS-695, IS-70, US 301, MD 100, and MD 32, in collaboration with MDOT SHA OPPE's Innovation Planning and Performance Division (IPPD) and CHART. She identified mobility and safety deficiencies, programmed improvement projects, and determined opportunities and benefits for TSMO. A VISSIM model was updated for the study areas and included all signalized intersection ramp junctions and the next signalized intersection in the immediate area of the interchange if it impacted operations along the roadways. Potential TSMO improvements included strategies such as hard shoulder running, ramp metering, incident management, ITS, and connected vehicles operations in VISSIM. The results were summarized in reports and displays.
- ***Relevance to IS-695:*** Ms. Gary conducted analysis of hard shoulder running (TSMO) along the corridor to support reducing recurring/non-recurring congestion and improve travel time reliability and safety along IS-695.
- ***Performance:*** Ms. Gary worked with the TSMO team to develop improvements that considered safety, mobility, reliability, system preservation, and economic development needs in a holistic manner on each corridor.

MDOT SHA IS-695 Widening & Safety Improvements (MD 41 to MD 147) — Traffic Engineer (2014 - 2017)
- ***Project Description:*** To improve mobility, safety, and operations due to the volume of traffic merging on and off IS-695 (ADT 200,000), Ms. Gary utilized good engineering judgment on the traffic design to ensure all requirements were met, working within the existing ROW and accommodating potential future lane options. TSMO solutions included the addition of auxiliary lanes along IS-695 and partial deconstruction of the cloverleaf configuration at MD 147.
- ***Relevance to IS-695:*** Ms. Gary worked closely with MDOT SHA to accomplish not only the initial project goals of mobility and safety, but, with industrious thinking and consideration, addressed the future transportation network needs of the larger Beltway system, while also reducing delays throughout the Beltway itself.
- ***Performance:*** With an Engineering Award of Excellence from ACEC/MD, the judges' panel stated, *"We're pleased to recognize the IS-695 Project for outstanding achievement, in particular for the application of operational and safety enhancements that made a widespread positive impact to Baltimore-area traffic for a very reasonable cost."*

DDOT 11th Street Corridor Fixed Price/Best Value Design-Build — Traffic Engineer (2009 - 2015)
- ***Project Description:*** JMT was the lead designer for this $375 million D-B project in our nation's capital, which included three new bridges over water and two complex interchanges to complete all freeway connections for regional traffic between IS-695 and DC 295/IS-295. Ms. Gary prepared traffic engineering plans and analysis associated with construction of a new interstate-to-interstate connection. Traffic analysis consisted of developing Synchro/CORSIM models for the local street network to determine lane configurations. She developed an IJR and provided traffic design, including ATM, traffic signals, ITS devices, signing, marking, lighting, and MOT. The innovative geometric design refined the project's alignments and allowed for 70% of the roadways to be constructed offline without major interruption to vehicular traffic on this busy network (ADT 106,000).
- ***Relevance to IS-695:*** JMT's design reduced major interruption to traffic, while minimizing community and traveling public inconveniences, and, at the same time, increased design and construction efficiency
- ***Performance:*** JMT's iterative process saved DDOT $85 million from the original engineer's estimate in part by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need while minimizing project impacts, including design modifications.

Tiger Harris, PE, PMP

Intelligent Transportation Systems Specialist

iteris®

PROFESSIONAL EXPERIENCE

Mr. Harris is a registered Professional Engineer and Project Management Professional (PMP) with 26 years of experience utilizing good engineering judgment in ITS design, construction, and implementation. He has managed, coordinated, and delivered several high-profile ITS software design and traffic operations projects across the U.S. involving hard shoulder running, lane control management, and dynamic ramp metering. As an ITS Specialist, he is responsible for the overall design, deployment, and integration of ITS components of the project.

Total Years Experience: 26

License/Certification:
- Professional Engineer (VA #0402042930)
- PMP (#1410497)

Education:
BS, Electrical Engineering; Massachusetts Institute of Technology (MIT)

RELEVANT PROJECT EXPERIENCE

VDOT Statewide (including IS-66 PSTOC) Traffic Management Center (TMC) and Operations Program Management — Program Manager (2014 - Present)

- ***Project Description:*** This $45 million upgrade project included the deployment of a Next Generation Statewide Advanced Traffic Management System (ATMS) on behalf of VDOT, which will be utilized by all five Transportation Operations Centers (TOCs) throughout the Commonwealth. Mr. Harris led the design and deployment of Active Traffic Management (ATM) elements/modules within the ATMS. For IS-66 in Northern Virginia, the ATM element encompassed integration of a Lane Control Management (LCM) system, a hard shoulder running system with automated obstacle detection/alerting system, and dynamic ramp metering at selected IS-66 access ramps.
- ***Relevance to IS-695:*** The project incorporates a variety of ITS devices, including those relevant to hard shoulder running. The project site was located within an important, highly congested corridor with ADT exceeding 180,000 in certain segments. No additional ROW was acquired, and all work was completed within the existing corridor.
- ***Performance:*** The deployed ATM project received AASHTO's America's Transportation Award in the Operations Excellence category (medium projects) in 2017.

Ohio Department of Transportation – Statewide ATMS — ATMS Technical Lead and Subject Matter Expert (2018 - 2019)

- ***Project Description:*** This $1 million project involves defining, scoping, and procuring a new statewide ATMS for Ohio. The project includes statewide ITS architecture updates and systems engineering analysis to ensure the Next Generation ATMS platform meets ODOT needs. Mr. Harris is ensuring that the requirements address maintenance of existing functions designated as mandatory by stakeholders, while adding requirements to incorporate enhanced capabilities.
- ***Relevance to IS-695:*** The project involves integration of legacy and new Center-to-Field (C2F) sensor systems to update the existing Concept of Operations for ATMS to interact with external stakeholder centers. Mr. Harris is ensuring continued operation during the system upgrade for this highly visible project within ODOT.
- ***Performance:*** Mr. Harris is responsible for development of ITS architecture and system engineering products and procurement of ATMS.

NCDOT IS-85 Widening Design-Build — Project Manager/Principal Engineer (2003 - 2005)

- ***Project Description:*** This $88 million IS-85 widening project in Charlotte, NC, expanded freeway capacity by adding lanes and improving operations with enhancement of ITS capabilities. Design activities led by Mr. Harris included ITS device layout, fiber communications plant design, buildout, and as-builts, as well as TMC software upgrades.
- ***Relevance to IS-695:*** Performed within a highly congested corridor serving interstate and regional commuter traffic, this project involved deployment of additional ITS devices and integration with an existing ATMS.
- ***Performance:*** Mr. Harris was responsible for ITS design and integration elements. The project was successfully completed while maintaining freeway operations.

Tim Connor, PE, PTOE, ENV SP

Independent Design Quality Management Manager

Gannett Fleming

PROFESSIONAL EXPERIENCE

Mr. Connor brings 29 years of experience providing transportation project management. He has served as the Independent Design Quality Manager (IDQM) on several recent MDOT SHA highway improvement projects. Mr. Connor is experienced in the development and delivery of design-build projects in Maryland, including both ongoing MD 32 projects in Howard County. He manages and oversees transportation design projects with responsibilities ranging from survey, civil, site, highway, geotechnical, structures, traffic, electrical, intelligent transportation systems (ITS), facility engineering, and/or construction coordination.

Total Years Experience: *29*

License/Certification:

- Professional Engineer (MD #33318)
- Associate DBIA Professional
- MDOT TTCMC
- PTOE (#1972)

Education:

BA, Urban Planning and Design; University of Maryland

RELEVANT PROJECT EXPERIENCE

MDOT SHA MD 32 from Linden Church Road to I-70 Design-Build — IDQM (2018 - Present)

- ***Project Description:*** This $85 million project involves design and construction of approximately 6.6 miles of MD 32 in Howard County from a two-lane arterial to a four lane divided highway to provide continuous operational improvements at the I-70 interchange. As IDQM, Mr. Connor is responsible for reviewing all design elements to ensure they are in compliance with the contract requirements.
- ***Relevance to IS-695:*** This heavily utilized roadway must maintain traffic capacity during construction within an existing corridor. Many of the stakeholders, design criteria, and contract requirements will be the same as those proposed for the IS-695 TSMO project.
- ***Performance:*** Mr. Connor is providing quality assurance management, adherence to contract requirements, and effective leadership of the design review team to achieve timely submittal reviews. He is also responsible for the management of project budget and subconsultant oversight and coordination.

MDOT SHA MD 32 from MD 108 to North of Linden Church Road Design-Build — IDQM (2017 - Present)

- ***Project Description:*** This $32.5 million D-B project designs and constructs approximately 2.5 miles of MD 32 to a four-lane divided highway in Howard County. As IDQM Manager, Mr. Connor is responsible for the oversight, scheduling, and tracking of submittal reviews for all design packages to ensure they are in compliance with the contract requirements. Submittal reviews require multi-discipline teams, subconsultant oversight and coordination, which Mr. Connor is responsible for directing.
- ***Relevance to IS-695:*** This heavily utilized roadway must maintain traffic capacity during construction within an existing corridor. Many of the stakeholders, design criteria, and contract requirements will be the same as those proposed for the IS-695 TSMO project.
- ***Performance:*** Mr. Connor is providing quality assurance management services, adherence to contract requirements, and effective leadership of the design review team to achieve timely submittal reviews. He is also responsible for the management of project budget and subconsultant oversight and coordination.

VDOT I-64 Active Traffic and Safety Management System (ATSMS) Design-Build — IDQM (2017 - Present)

- ***Project Description:*** This project involves the design, installation, and integration of an ATSMS system along an 11-mile stretch of I-64 over Afton Mountain in Albemarle and Augusta counties.
- ***Relevance to IS-695:*** Located in a major corridor requiring maintenance of existing traffic capacity during construction, the ITS installation provides positive direction, advance warning, and travel advisories to motorists. Similar to the IS-695 TSMO project, this system requires integration with the statewide operations center.
- ***Performance:*** Mr. Connor is responsible for design oversight of all preliminary and final design plans, including transportation management, MOT phasing, and guardrail design for the ITS devices. He provides design oversight through construction with effective leadership to achieve timely project delivery, while meeting all contract requirements and maintaining the schedule and project budget.

IS-95 Express Lanes Design-Build/ P3

Fairfax and Stafford Counties, VA

Firm(s) Completing the Work: The Lane Construction Corporation
Owner/Client Contact: VDOT, Charlie Warraich, (571) 273-8229
Project Delivery Method: Design-Build/P3
Initial Contract Value: $691 million
Final Contract Value: $726 million (value difference attributable to increases in work scope)
Initial Completion Date: December 2014
Final Completion Date: December 2014 (completed three weeks ahead of schedule)

PROJECT DESCRIPTION

Lane, as part of a construction joint venture, shared responsibility for the design and construction of this $726 million project to create approximately 29 miles of Express Lanes on IS-95 from Alexandria, VA, at the northern terminus to Route 610, Stafford, VA. The scope of work included a 9-mile roadway extension within tight median constraints, beginning at the southern end of the existing HOV lanes, consisting of major clearing and earthwork, an extensive ITS and signing system, stormwater management, noise studies, sound walls, asphalt mill and overlay, shoulder reconstruction, and structural bridge work (29 bridges and rehabilitated flyovers including 9 new structures). Lane provided nearly all of the project supervision and workforce for the self-performed bridge work, 20 miles of existing HOV lane renovation and widening, all asphalt paving, noise wall construction, and some roadway signage. The project recorded over four million safe work hours with no lost-time incidents. This is one of the safest projects (of this size and magnitude) ever constructed in the state.

A dynamic public information program provided advance information notifications to VDOT and the public. This was facilitated through meetings, a website, email blasts, flyers, and door-to-door calls promoting awareness of construction operations and lane closures to provide better travel planning through the corridor.

Because this project involved an expedited schedule, dedicated and significant resources were made available to work both day and night shifts. There was extensive team collaboration amongst all stakeholders to expeditiously produce a quality design within four months of NTP to commence construction.

RELEVANCE TO IS-695 TSMO

Capacity was added to the existing HOV Lanes, providing infrastructure improvements and helping to alleviate the worst traffic bottleneck in the region. Working mainly within the existing ROW, the project area contained site entrance and egress challenges and tight median constraints. Roadway design elements included horizontal and vertical alignment optimization to accommodate reversible lanes within the interstate median, and the shoulder was converted to a travel lane. Intensive MOT plans were required due to heavy interstate traffic with more than 250,000 ADT. Existing capacity was maintained throughout construction.

The project featured an extensive ITS and communication systems that was integrated with an existing megaproject network (IS-495 Express Lanes). More than 700 miles of cable and wire was installed, along with 1,000 tolling and traffic management devices. Lane was responsible for ITS design and construction support of ITS CCTV traffic surveillance cameras, DMS signs, microwave traffic detectors, video-based automatic incident detection cameras, emergency gate telemetry, express lane access gates, EZ-pass toll equipment, fiber optic communications, power distribution, and emergency back-up power system.

Proposed key staff member involved with this project: Brian Basnight (Construction Manager)

MD 237 from MD 235 to Pegg Road Design-Build

St. Mary's County, MD

Firm(s) Completing the Work: The Lane Construction Corporation
Owner/Client Contact: MDOT SHA, Ronald Ergott, (410) 810-1064
Project Delivery Method: Design-Build
Initial Contract Value: $37.6 million
Final Contract Value: $37.7 million (additional scope work requested by owner)
Initial Completion Date: May 2011
Final Completion Date: October 2011 (time extended by owner to accommodate additional scope)

PROJECT DESCRIPTION

Lane was responsible for the design, reconstruction, and dualization of 2.88 miles of MD 237. The purpose of the project was to replace a substandard two-lane roadway with a four-lane divided roadway, featuring controlled access at intersections using signalization and reducing left-turn crossing movements through the introduction of J-turns at uncontrolled median openings and U-turns at signalized intersections. Improved roadway signing, pavement markings, and lighting were incorporated into the project.

Lane was responsible for the design, permitting, and construction of the roadway modifications, which included raising the vertical alignment 12 feet in elevation for 2,220 LF to allow for the replacement of undersized pipe culverts with a twin-cell reinforced box culvert (configured so each cell functions as a wildlife crossing). Additional improvements included resurfacing and reconstruction of 16 intersecting side streets, intersection channelization and reconstruction, a box culvert at Jarboesville Run (WUS), new closed drainage system, new noise barrier, and other safety improvements. The project also included 13,500 LF of new pipe for a closed storm water drain system, 8 stormwater management facilities, and extensive phasing of erosion and sediment control. Three noise barriers, totaling 1,700 LF, were installed. Utility work consisted of 10,000 LF of waterline replacement, 6,000 LF of gas line replacement, 350 LF of sanitary sewer replacement, and coordination with utility companies for the relocation of aerial electric, telephone, and CATV. Traffic engineering and construction services included five new traffic signals, signal interconnection, relocation of school flasher, new signing and pavement markings, and intersection street lighting.

RELEVANCE TO IS-695 TSMO

To achieve the project goals of safety and mobility, extensive multi-phase traffic control plans were required to maintain traffic along all roadways. The project was divided into four distinct construction zones to accelerate critical path construction elements, based on maintaining drainage locally. Each construction zone was designed to allow for the complete construction of two of the four lanes while maintaining the existing traffic on the existing roadway. Each phase was staged so as zones were completed, traffic could be switched onto the new pavement and be maintained while constructing the next phase.

Drainage and environmental impacts were minimized through innovative design. A portion of the proposed storm drainage served dual purposes: A 72-inch pipe used for stream diversion during box culvert installation was later converted into a storm drain outfall, eliminating the need for abandonment. The limits of construction were minimized as much as possible to reduce impacts to wetlands and forested buffers. Lane constructed a fish ladder in an environmentally sensitive area on the downstream side of Jarboesville Run that was celebrated by environmentalists all over the region, and will be used as a model for future projects in Maryland.

Route 29 Widening & Improvements Design-Build

Albemarle County, VA

Firm(s) Completing the Work: The Lane Construction Corporation
Owner/Client Contact: VDOT, Dave Covington, (434) 529-6310
Project Delivery Method: Design-Build
Initial Contract Value: $116 million
Final Contract Value: $129 million (includes incentive bonus for early completion)
Initial Completion Date: October 2017
Final Completion Date: July 2017 (completed ahead of schedule and under budget)

PROJECT DESCRIPTION

The Route 29 Solutions program consists of eight highway projects to improve safety and increase mobility along the Route 29 corridor in Albemarle County, VA. Lane was the managing partner of the construction joint venture for three of the eight projects in this program. The project scope involved the total reconstruction of 1.8 miles of Route 29 from a four-lane to a six-lane divided highway between Rio Mills Road to Town Center Drive to improve corridor traffic operations and safety. The scope of work included: design, ROW acquisitions, utility relocations, permitting, stormwater management, open-cut storm drainage, excavation (earth and rock), jack and bore storm pipe systems, new ductile iron water main, retaining structures (permanent and temporary), new stone and asphalt roadbed, demolition of the existing ITS, and new traffic signals with a fiber communication interface. The project also provided multi-use trails along the project corridor, providing citizens safe access. Extensive traffic planning was required to maintain service to four major residential and commercial intersections, plus high volumes of through traffic, with no loss of capacity during construction.

Lane worked alongside VDOT's Public Outreach Manager, supporting the Project Development Advisory Panel and providing updates to VDOT. Activities included communicating with citizens, business owners, homeowners' associations, and others to advise on project developments and upcoming events. Many meetings were performed in advance of impending construction activities to ensure the community was well informed and travel inconveniences were minimized.

RELEVANCE TO IS-695 TSMO

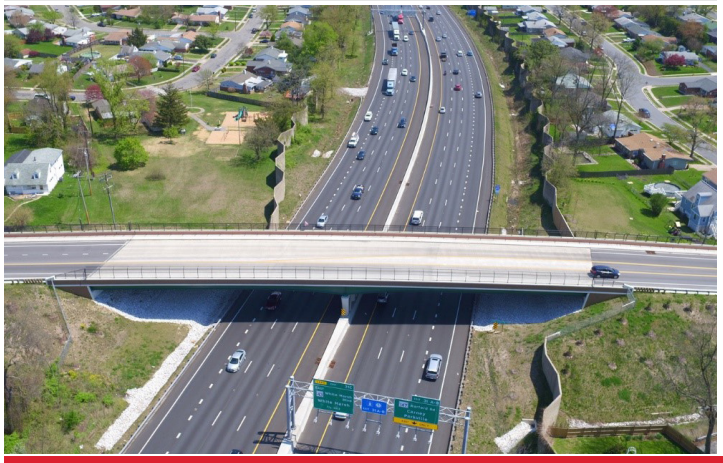
The Route 29 roadway required total reconstruction to improve safety and mobility due to substandard traveling conditions, including: rolling profile, minimal to no shoulders, and poor sight distances. Drainage improvements included both open cut and jack and bore operations. Upgrades to traffic signals and ITS technology were included in the project scope. Self-performing this work allowed the Lane team to control project progress and contributed to early completion.

MOT and traffic phasing was reduced by utilizing more of the existing pavement during construction and building more of the new pavement in each phase than considered in the preliminary engineering concepts. This process minimized disruptions to the community and the traveling public. The level of service for traffic operations was maintained throughout construction.

Through outreach efforts, timely coordination, and direct involvement with the various utilities owners, Lane prevented construction impacts. Several conflicts were resolved by design modifications to accommodate existing facilities and avoid relocation. Early engagement and continuous involvement of the local community and stakeholders allowed all concerns to be fully addressed, resulting in public acceptance of the project.

IS-695 Widening & Safety Improvements

Baltimore County, MD



Firm(s) Completing the Work: Johnson, Mirmiran & Thompson, Inc.
Owner/Client Contact: MDOT SHA, Jason Ridgway, (410) 545-0411
Project Delivery Method: Design-Bid-Build
Initial Contract Value: $22.3 million
Final Contract Value: $23.7 million (owner approved redline revisions and change orders)
Initial Completion Date: August 2017
Final Completion Date: September 2017 (delayed due to relocation of existing utilities, redline revisions, and change orders)

PROJECT DESCRIPTION

Originally a bridge replacement project, JMT was able to add value to MDOT SHA by providing innovative, low-cost mobility improvements to maximize vehicle throughput, minimize vehicle travel times, and create a more reliable commuter trip along IS-695 from Perring Parkway (MD 41) to Harford Road (MD 147). The project involved the widening and reconstruction of nearly one mile of the inner and outer loops of IS-695. The typical section was designed within the existing ROW and noise wall footprint, and accommodated potential future lane options. Construction was completed while maintaining high traffic volumes (ADT 200,000) at freeway speed. The existing cloverleaf configuration at IS-695/MD 147 included short weave sections. The volume of traffic merging on and off IS-695, combined with the short distance of the weave segment along inner loop IS-695, caused congestion upstream on the interstate, especially during the PM peak period. JMT designed the partial deconstruction of the cloverleaf, specifically removing the IS-695 inner loop to MD 147 NB ramp and widening IS-695 inner loop to MD 147 SB ramp. This changed the traffic movement to left turns NB onto MD 147 using a new, fully actuated traffic signal with a pedestrian crossing. These improvements not only benefited motorists along IS-695, they also improved accessibility along MD 147 for both motorists and pedestrians. The new auxiliary lanes increase safety by allowing drivers to merge on and off the highway in designated areas. JMT also provided noise analysis and barrier design associated with a Type I highway widening. Analysis included managing and conducting noise monitoring, Traffic Noise Modeling, impact analysis, noise barrier optimization, feasibility and reasonableness determination, and final noise report. Design included layout of 2,000 LF of noise barrier for plan, profile, and cross sections along with construction plan and estimate preparation. Beyond IS-695 itself, JMT designed roadway improvements for approximately 1,500 feet of MD 147 because of the vertical modifications needed to provide clearance over the future IS-695 typical section.

RELEVANCE TO IS-695 TSMO

During design refinement, the project goals were continuously evaluated concurrently and in coordination with one another to ensure the overall solution provided the maximum benefit and met the project's stated purpose and need. This widening and safety improvements project was truly a microcosm of IS-695 TSMO. Working closely together, MDOT SHA and JMT accomplished not only the initial project goals of improving mobility and safety, but addressed the needs of the larger IS-695 Beltway system through iterative design refinements and TSMO solutions. The project was contained within the existing ROW and required noise analysis, mitigation, and design services. Through the use of practical, low-cost solutions, JMT was able to reduce recurring and non-recurring congestion and improve travel time reliability and safety along IS-695 between MD 41 and MD 147. Construction was completed while maintaining high traffic volumes at freeway speeds.

Proposed key staff members involved with this project: Shawn Reynolds, PE (Project Manager), Sarah Gary, PE, PTOE (Traffic Engineer), Scott Mednick, PE (Highway Engineer)

11th Street Corridor Fixed Price/ Best Value Design-Build

Washington, DC

Firm(s) Completing the Work: Johnson, Mirmiran & Thompson, Inc.

Owner/Client Contact: DDOT, Joseph Dorsey, (202) 671-4605

Project Delivery Method: Design-Build

Initial Contract Value: $260 million

Final Contract Value: $375 million (owner issued a change that significantly increased scope)

Initial Completion Date: July 2013

Final Completion Date: November 2015 (owner increased completion time due to scope change)

PROJECT DESCRIPTION

This project completes all freeway connections for regional traffic between IS-695 and DC 295/IS-295 and drastically maximized vehicle throughput, enhanced safety for residents, and created a more reliable commuter trip by separating local from regional traffic. JMT, as the lead designer, completed all design work on schedule for this fixed price/best value D-B project adjacent to the Washington Navy Yard and about 1.5 miles from the US Capitol. JMT refined the planning document alignments and interchanges to reduce environmental and community impacts and to save substantial construction costs by submitting dozens of ATCs. The original construction estimate was $460 million. JMT's design provided three new bridges instead of the planning study concept of one new bridge, and rehabilitation and widening of two existing structures for a fixed price of $260 million. This equated to 70% of the functional elements in the original planning study for 58% of the funding. As a result of the innovative, cost-effective design and construction, the D-B team was awarded $90.7 million in additional scope to complete the final design and construction of the total project, to provide the full functionality considered in the NEPA documentation. The design was driven around the importance of maintaining traffic safety with minimal impact on usage of the road in question. As a major commuter route within the nation's capital, this project not only impacted hundreds of thousands of commuters (ADT 106,000), but was also part of a major emergency access route. Design and construction sequencing plans minimized impacts to existing traffic, allowing for approximately 70% of the project to be constructed with minimal impact to the existing roadway network.

RELEVANCE TO IS-695 TSMO

Project goals were met with innovation and creativity, ultimately saving DDOT $85 million from the original engineer's estimate by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need while minimizing impacts. Innovative design solutions included: 1) Revised alignments – JMT's design minimized environmental and community impacts by reducing the overall interchange height 25 feet. The TMP included MOT phasing, layout of temporary signing, marking, channelization devices, temporary pavement and barrier, and detour plans; 2) Mobility – JMT's innovative design resulted in 70% of the project being constructed without major interruption to vehicular traffic, thereby limiting impacts to the traveling public; 3) Environmental compliance – JMT authored the NEPA Reevaluation of the FEIS and provided all environmental compliance and permitting efforts; 4) Project Schedule – The design was strategically separated into discrete work packages to facilitate construction and ordering of long-lead items to meet the fast-track schedule; and 5) Adaptability – JMT initiated meetings related to future developments and provisions for multi-modal use on local roadways. The planned documents were reviewed, and JMT adjusted the design to minimize impacts within and around the project limits.

Proposed key staff members involved with this project: Shawn Reynolds, PE (Design Manager), Sarah Gary, PE, PTOE (Traffic Engineer), Scott Mednick, PE (Highway Engineer)

IS-95/695 Interchange (Section 100) IS-95 Corridor Express Toll Lanes

Baltimore County, MD

Firm(s) Completing the Work: Johnson, Mirmiran & Thompson, Inc.
Owner/Client Contact: MDTA, William Pines, (410) 537-7873
Project Delivery Method: Design-Bid-Build
Initial Contract Value: $208.4 million
Final Contract Value: $216.8 million (owner issued an extra work order)
Initial Completion Date: June 2010
Final Completion Date: August 2010 (contract extended due to extra work order)

PROJECT DESCRIPTION

During planning, JMT used focus group meetings, collaborating with agencies/communities to establish the project purpose and need. Upon completion of the preliminary engineering phase, JMT provided final design/construction phase services. This project involved 11 lane-miles of IS-95 (ADT 165,000), 12 lane-miles of IS-695 (ADT 135,000 vpd), 16 lane-miles of ramps, 22 bridges, 38 retaining walls, and a full stream relocation. With an accelerated schedule desired by the client, the progress of design plans during planning was essential in fast-tracking the design phase and helping this project move to construction on schedule. The planning team also assisted MDOT SHA in developing a preliminary concept for the future widening of IS-695.

JMT served as lead designer for this complex, multilevel, fast-tracked interchange that involved reconstruction to eliminate braiding and provide upgrades to allow construction of ETLs through the interchange, which implemented general purpose and express toll lanes together to improve safety and mobility. The project included four new mainline bridges on IS-95 and 11 long curved steel fly-over ramp structures to connect IS-95 and IS-695. JMT used INRIX data to create/calibrate a traffic simulation model of IS-695 and evaluated/ranked the effectiveness of 17 projects along the corridor to aid officials with project prioritization. The determination of which projects to build based on their overall benefit was reflected as cost savings to the public and to the environment as a result of applying funds where they yielded the greatest impact. JMT developed a measure for overall user savings, which included delay savings from the simulation model, reliability savings, and safety savings. Though not a D-B project, this fast-tracked project required design services to meet the MDTA's desired 10-month design schedule. More than 1,700 plan sheets were produced for advertisement during design, adding an additional 1,900 plan sheets, for a total of over 3,600 plans sheets for this interchange. JMT collaborated with the Contractor's tri-venture team during the construction, resulting in value engineering proposals involving foundations, MOT, and utilities that saved the project several million dollars, as well as reduced the schedule and increased safety of the traveling public and workers.

RELEVANCE TO IS-695 TSMO

JMT considered safety, mobility, context sensitivity, cost control, meeting needs and without needlessly exceeding them, expected performance, innovation, and flexibility in design, utilizing sound engineering judgment and fully collaborating with all stakeholders during the design. JMT led the design of all ITS/Electronic Toll Collection elements within the project limits, including CCTV surveillance, DMS, RWIS, Highway Advisory Radio, and fiber optic/wireless communication designs and temporary connections. All ITS design elements were compatible and integrated with CHART.

Proposed key staff members involved with this project: Shawn Reynolds, PE (Design Manager), Sarah Gary, PE, PTOE (Traffic Engineer), Scott Mednick, PE (Highway Engineer)

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

LEGEND

★ Key Personnel
⌛ Hours Per Week (Design/Construction)
— Direct Reporting Line
--- Communication Line

(L) Lane Construction
(J) JMT
(I) Iteris
(G) Gannett Fleming

Project Mgmt.
Construction
Design
IDQM

Public and Project Stakeholders

Elected Officials
MDOT Transportation Business Units and Other State Agencies
Federal Highway Administration and Other Federal Agencies
State and Local Police / Fire / EMS
County and Local Governments
Local University and Colleges
Local Pre and K-12 Schools (Public / Private)
CSX Transportation
Residents / Commuters / Businesses
Religious Institutions
Community Associations

Executive Committee
Joe Lark (L)
Bill Schaub, PE (J)

Public Relations
Elisabeth McCollum (J)

Design-Build Project Manager
★ Durant Walters, PE, DBIA (L) ⌛ 24 / 16

Safety Manager
Tim Jones, CHST (L)

Indep. Quality Design Mgr.
★ Tim Connor, PE, PTOE, DBIA, ENV SP (G) ⌛ 40 / 24

Design Manager
★ Shawn Reynolds, PE (J) ⌛ 40 / 24

Design-Build Coordinator
John Campbell, PE (L)

Construction Manager
★ Brian Basnight (L) ⌛ 24 / 40

Design QA/QC
Bill Schaub, PE (J)

Operations/Maint.
Dave Coyne, PE (J)

TSMO Liaison
Candice Ottley-Francois (J)

Assistant Construction Mgr.
Andrew Kitchen (L)

Construction Quality Mgr.
Sean Saksena, EIT (L)

ITS Integration
Dave Register (I)

CQM Inspectors

Highway Engineer
★ Scott Mednick, PE (J) ⌛ 40 / 24

Traffic Engineer
★ Sarah Gary, PE, PTOE (J) ⌛ 40 / 24

Water Resources
Scott Miller, PE (J)

Environ./Permitting
Leyla Lange, QP (J)

ITS Specialist
★ Tiger Harris, PE, PMP (I) ⌛ 40 / 24

Highway Engineer
Patrick Coppage, PE (J)
Allen Jacobs (J)
Structures (Bridges/Walls/Barriers)
Fred Braerman, PE (J)
Desmond Coelho, PE, DBIA (J)
Noise Analysis
Toyin Oluwatoyin, PE (J)
Pavement & Geotechnical
Mike Leffler, PE (J)
Driller/Borings
DBE Support
Landscape Architecture
Jon Conner, PLA, LEED AP (J)
Surveys/SUE
Rusty Smith, PLS (J)
Jon Patterson (J)
Utility Coord./Design
Joe Kittner, PE (J)

Analysis Modeling
Matt Ewell, PE, PTOE (J)
Julie Wright, PE, PTOE (J)
Huchen Courouleau, PE (J)
Traffic Design
Dave Duarte, PE, PTOE (J)
Mitchell Smith, PE (J)
Highway Safety
Matt Wolniak, PE, PTOE (J)
Joanne Arellano PE, PTOE (J)
TMP/MOT
Stevie Eveland, PE, PTOE (J)
Charles Hergesheimer, PE (J)
Lighting Design
Jerry Baxter, PE, PTOE (J)

Drainage
Houng Li, Ph.D., PE (J)
Bryan Maietta, PE (J)
ESC/SWM
Steve Crowe, PE (J)
Andrew Mocca, PE (J)
MDE Reviewer/Expediter
Dave Heckman, PE (J)
Rick Schmuff (J)
PRD Reviewer/ SWM As-Builts
Paul Clement, PE, (J)

NEPA/MEPA
Adriene Metzbower, QP (J)
Jessica Lord (J)
Mitigation
Jim Morris, PE (J)
Frank Bubczyk, QP (J)
Erin Markel, PWS (J)
Permitting
Lindsey Snyder, AICP (J)
Mike Cunningham (J)
Historical/Archeological
Mary Alfson-Tinsman (J)
Abigail Heller, RPA (J)

ITS Engineer
Stuart Hunter (I)
ITS Integration Engineer
Dwight Shank (I)
George Gener (I)
Data Analytics Engineer
Masoud Hamedi (I)

Environmental Stakeholders
USACE, USFWS, EPA, MDE, MD DNR, MHT, MDOT SHA PRD

MDOT SHA
Independent Environmental Monitor

Utility Stakeholders
AT&T, Balt. County DPW, Balt. City DPW, BGE, Century Link/Level 3, Colonial Pipeline, Comcast, Legend, MCI, MDOT SHA, Verizon, Zayo & 24/7 Mid-Atlantic Network

Construction Team

ITS Coordinator
Shane Smith (L)

Project Engineer
Andrea Roccasalvo (L)

Cost Control/ Scheduling Manager
Dan Wungko (L)

Grading Superintendent
Brian Smith (L)

Struct. Superintendent
Armando Castellanous (L)

Document Control
Cheryl Rasnake (L)

Surveying Manager
Craig Cole (L)

Cost Estimator
Jim Huie (L)

DBE/EEO Coordinator
Kevin McGinley (L)

Environmental Manager
Damien Pruitt (L)

Traffic Control Manager
James Schubert (L)

DBE/EEO Subcontractors/ Specialty Firms

Utility Superintendent
Paul Scalph (L)

B. Project Understanding and Design-Build Approach

LANE | JMT
A Design-Build Team

XVII. B. Project Understanding and Design-Build Approach

i. Approach to Meeting Project Goals

The Lane Team will take a strategic, iterative, and coordinated approach to meeting the project goals, individually and together. We will leverage the strengths of our Team members, in partnership with MDOT SHA and project stakeholders, to develop an innovative and budget-optimizing solution that is constructable, and minimizes impacts to the surrounding environment and communities. Our Team's process involves gaining a comprehensive project understanding, thoroughly analyzing opportunities and obstacles within the corridor, applying innovative thinking to mitigate obstacles, and delivering a comprehensive suite of solutions that optimizes the project's goals within the budget while meeting the purpose and need. The following provides the detailed process that our Team will take to evaluate and ensure that each individual project goal is achieved in conjunction with overall goals.

1. ***Existing Data Evaluation and Data Collection*** — Our Team will increase our project knowledge base and understanding by evaluating existing conditions and available information needed to establish our baseline design. We will determine the need for and collect additional information to enhance our understanding of the existing conditions, project context, and help evaluate and minimize project risks. This data will be collected to the extent possible from project stakeholders, field surveys, and assessments of physical attributes including, but not limited to, substandard traffic barrier, traffic, geotechnical, and pavement. We will review existing studies performed in the corridor including noise studies, pavement analysis, hydraulic analysis, and existing intelligent transportation systems (ITS), Coordinated Highways Action Response Team (CHART), and other physical infrastructure inventories.
2. ***Project Constraints*** — Our Team will identify the project constraints by reviewing the information against regulatory, technological, stakeholder, and project-specific requirements. Constraints could include highway geometry, structures, sight distance, pinch points, pavement sections, right-of-way (ROW), stormwater management (SWM) requirements and facilities, natural and cultural resources, noise impacts, traffic barriers with/without conduit, utilities, ITS, and other physical infrastructure. We will create a solution that fulfills the project purpose and need while maximizing the project goals.

Armed with this information and a clear understanding of the project's purpose, need, and constraints, our Team will use our expertise and experience to develop the best solution to meet individual project goals while coordinating across all project goals.

Project Goal: Part-Time Shoulder Use — Our approach to maximize the amount of part-time dynamic median use, increase vehicle throughput, and minimize vehicle travel times and delays throughout the project limits is to: 1) Set the starting point of analysis at the ultimate solution as our baseline model to provide dynamic shoulder running throughout the entire limits of the project; and 2) Use an iterative approach to refine the extent to which we can provide the physical improvements within the budgetary limits. Throughout our iterations, we will dynamically analyze the costs and benefits of each revision using the expertise of each Team member and evaluate the benefits of providing this project goal in coordination with the other project goals. With the data collected and constraints identified, our strategic approach to evaluating and ensuring this goal is met will be as follows:

1. **Baseline Solution** — Our Team will develop an initial baseline design solution by providing full part-time shoulder use along the entire project corridor. This baseline solution will maximize the project requirements and goals and will be evaluated against the identified project constraints.
2. **Baseline Cost and Constructability Analysis** — The initial baseline design will be evaluated by Lane's estimating and construction teams for constructability/conceptual costs. They will work closely with the designers during this analysis to develop a conceptual estimate by project segment/element and identify constructability issues and concerns. The conceptual estimate provides the itemized cost by element of the baseline design, which will be used for identifying high-cost areas that can be targeted for design refinements. Our design team will then review design elements within these targeted locations for refinements.
3. **Design Refinement** — A coordinated, iterative process among the Team will commence to refine the design solution as much as possible and attain budget certainty. Based on the conceptual estimate and constructability information provided by the construction experts, the designers will use previous experience to develop alternative solutions that include redesign within the project requirements, propose alternative means, and develop ATCs, to meet the budget and provide for dynamic part-time shoulder use throughout the corridor.

4. **Project Goal Coordination** — During design refinement for the part-time shoulder use goal, conformity with all project goals will be continuously evaluated concurrently and in coordination with one another to ensure the overall project solution provides the maximum benefit and meets the project's stated purpose and need. Our Team will also perform an evaluation of the Transportation Systems Management and Operations (TSMO) program goals to ensure that our solution is in conformance with not only the goals of this project, but with the program as a whole.
5. **Design Refinement Within Best-Value Constraints** — If it is determined that the proposed solution cannot incorporate part-time shoulder use throughout the entire project limits within the project constraints, the Lane Team will conduct capacity analysis of the system using VISSIM and our accumulated knowledge of the corridor to determine which sections of part-time shoulder use will maximize the increase in vehicle throughput and minimize vehicle travel times and delays. This process is iterative with the known costing of the segments and will be the basis of the final cost benefit analysis to maximize this goal.
6. **Goal-Related Team Experience to Provide Best Value** — The iterative refinement process to optimize part-time shoulder use will be led by key staff members Durant Walters, PE, DBIA (D-B Project Manager), combining his 29 years of knowledge and experience, with Brian Basnight (Construction Manager) and Shawn Reynolds, PE (Design Manager). Mr. Walters has successfully used this technique on past D-B projects, including the 9th Street Bridge Replacement in Washington, D.C. (with JMT as the lead designer), IS-95 Express Lanes, and the current IS-66 Widening, where shoulders are converted for permanent lane usage. Use of this approach on the 9th Street Bridge Replacement project met all of the owner's goals with a budget savings of nearly 8%. This process has also been successfully applied by our Team on IS-26/Port Access Road (Charleston, SC), a collaborative D-B effort with Lane and JMT, which yielded a reduction in structure size and owner lifecycle maintenance costs. Similarly, JMT's iterative process on the 11th Street Corridor D-B saved DDOT $85 million from the original engineer's estimate by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need while minimizing project impacts.

   JMT's Sarah Gary, PE, PTOE, and Matt Ewell, PE, PTOE, supported development of the annual MDOT SHA MD Mobility Report. They analyzed IS-695 in VISSIM through our Traffic Management Strategy studies for MDOT SHA, where we conducted the initial TSMO planning study for the part-time shoulder use. This experience showed the importance of logical termini for the system. It also provided criticality for considering a 'system of systems', in understanding how the dynamic lanes will tie into all interchanges, specifically at IS-70, IS-795, IS-83, MD 43, as well as the future IS-70/IS-695 interchange.

   Tiger Harris, PE, and the Iteris team have experience on the IS-66 Active Traffic Management (ATM) D-B project, and understand that dynamic part-time shoulder use will need to be implemented through ITS components to facilitate the control, monitoring, safe operation, and maintenance of segments equipped with dynamic lane controls. The Lane Team will incorporate the appropriate ITS tools to support implementation of the shoulder use as part of our design solution.

We will ensure that the project goal to maximize the amount of dynamic median part-time use to maximize an increase in vehicle throughput and minimize vehicle travel times and delay throughout the project limits will be met by repeated analysis during our design iterations. Our Team will dynamically analyze the costs and benefits of each revision using the expertise of each team member and evaluate the benefits of providing this project goal in coordination with the other project goals. The results of our iterations and final recommended approach will be transparent and discussed at regular meetings with MDOT team leads from CHART/Offices of Maintenance and Construction to allow for collaborative improvements, guidance, and agreement to the ultimate design solution.

Project Goal: Mobility — With the data collected and constraints identified, our strategic approach to evaluating and ensuring mobility and system reliability to maximize vehicle throughput, minimize vehicle travel times, and create a more reliable commuter trip is as follows:

1. **Baseline Solutions** — We will develop an initial baseline suite of innovative solutions that focuses on a 'system of systems', combining strategies, technologies, roadway improvements, and partnerships that take full advantage of the network, optimize traffic flow, and improve safety. These solutions will meet the mobility goal by evaluating potential treatments, such as ramp metering, interchange improvements, extension of ramp acceleration and deceleration lanes, additional auxiliary lanes, capacity improvements,

better traveler information, TSMO, and ITS solutions. The Lane Team will seek to enhance the existing fixed camera system by augmenting existing pan-tilt-zoom (PTZ) cameras to increase coverage of through lanes to enable enhanced real-time monitoring of traffic conditions to improve alert features.

2. **Baseline Cost and Constructability Analysis** — The initial baseline design will be evaluated by Lane estimators and construction managers for constructability and conceptual solution costs. They will work closely with the design team during analysis and develop a conceptual estimate by each mobility solution and identify constructability issues and concerns. This effort will be led by Lane's Chief Estimator, Jim Huie, who has experience with similarly scoped projects, such as the IS-95 Express Lanes D-B/P3 in Virginia. The conceptual estimate provides the itemized cost element of the baseline solution, which is used for targeting high-cost elements. Our multidisciplinary design team will review mobility design elements within these specific locations for possible refinements.
3. **Design Refinement** — A coordinated, iterative process among the Lane Team will refine the mobility solutions as much as possible and attain budget certainty. Based on the conceptual estimate and constructability information provided by the construction experts, the design team will use previous experience to develop alternative solutions that include redesign within the project requirements, propose alternative means, and develop ATCs, to meet the budget and provide for the corridor's suite of mobility solutions.
4. **Project Goal Coordination** — During design refinement for the mobility goal, conformity with all project goals will be continuously evaluated concurrent and in coordination with one another to ensure the overall project solution provides the maximum benefit and meets the project's stated purpose and need.
5. **Design Refinement Within Best Value Constraints** — Our Team will evaluate mobility solutions that provide the best value for meeting the mobility project goal. Using VISSIM and other methodologies, we will iteratively analyze the suite of geometric, capacity, and TSMO solutions. The resulting solution package will provide the greatest amount of benefit that maximizes vehicle throughput, minimizes vehicle travel times, and creates a more reliable commuter trip throughout the corridor. This will be accomplished holistically to ensure that the mobility goal and associated individual solutions are compatible and coordinated with the overall solution, as well as future projects.
6. **Goal-Related Team Experience to Provide Best Value** — JMT, including Sarah Gary, PE, PTOE, and Matt Ewell, PE, PTOE, conducted a Freeway Congestion Management Study along IS-695 for MDOT SHA. As part of this study, JMT worked extensively with MDOT SHA to analyze IS-695 in VISSIM to determine capacity and safety improvements throughout the corridor. Our Team also features Candice Ottley-Francois as a TSMO liaison to ensure TSMO solutions are evaluated as part of the overall design. JMT team members created value within the IS-695 Widening and Safety Improvement project (originally a bridge replacement project) by providing innovative, low-cost mobility improvements to maximize vehicle throughput, minimize vehicle travel times, and create a more reliable commuter trip.

We will ensure the project goal of mobility is met by applying our Team's accumulated knowledge of the corridor and study area when analyzing the project VISSIM model (including micro/mesoscopic simulations) and the data (traffic volumes, origin-destination patterns). We will use our established relationship with MDOT SHA to collaboratively determine optimal mobility solutions to maximize vehicle throughput, minimize travel times, and improve reliability.

Project Goal: Safety — With the data collected/constraints identified, our strategic approach to evaluating/ensuring a safer corridor and increasing the ability of MDOT SHA to reduce, detect, verify, respond to, and manage non-recurring congestion is as follows:

1. **Baseline Solutions** — Our Team will identify substandard elements, including horizontal and vertical geometry, sight distance, clear zone, pavement conditions, drainage spread, existing signing and reflectivity, pavement markings, lighting, and traffic barrier, to create a substandard features inventory. We will also identify and analyze high crash locations and causes, and determine potential substandard features (both upstream and downstream) that could be contributing to crash patterns. Our existing substandard features inventory, analysis of the existing crash/traffic data, and the *Highway Safety Manual* will be used to develop solutions to improve the safety of the system and correct existing deficiencies to the extent possible. We will assess using enhanced pavement markings/signing, correcting superelevations, providing additional

sight distance, adding shoulders/pull-off areas, using colored pavement, and applying drainage solutions. Also, our Team will evaluate current TSMO practices related to non-recurring congestion to include incident response times, use of existing closed-circuit television (CCTV) cameras, and Road Weather Information System (RWIS) station locations. Potential new technologies and augmented resources to reduce and detect congestion and improve response management efforts will also be considered.

2. **Baseline Cost and Constructability Analysis** — The initial baseline design will be evaluated by Lane estimators and construction managers for constructability and conceptual solution costs. They will work closely with the designers during analysis to develop a conceptual estimate by safety solution element and identify constructability issues and concerns. This estimate provides the itemized cost element of the baseline safety solution, which will be used for identifying high-cost elements that can be economized. Our design team will review the safety design elements within these locations for possible refinements.
3. **Design Refinement** — A coordinated, iterative process among the Lane Team will refine the safety solutions as much as possible and attain budget certainty. Based on the conceptual estimate and constructability information provided by the construction experts, the design team will use previous experience to develop solutions that include redesign within the project requirements, propose alternative means, and develop ATCs, to continue to optimize the safety solutions within the project's budget.
4. **Project Goal Coordination** — During design refinement for each individual goal, the project goals will be continuously evaluated concurrently and in coordination with one another to ensure the overall project solution provides the maximum benefit and meets the project's stated purpose and need.
5. **Design Refinement Within Best Value Constraints** — Our Team will evaluate those safety solutions that provide the best value for meeting the project safety goal. Using VISSIM and other methodologies, we will iteratively analyze the suite of geometric, capacity, and TSMO solutions to deliver a package of solutions that provides the greatest benefit, maximizes safety improvements, and increases the ability of MDOT SHA to reduce, detect, verify, respond to, and manage non-recurring congestion. This will be done in conjunction with other project solutions so that the overall solution meets the project safety goal, and that the individual safety solutions are compatible and coordinated with the overall solution and future projects.
6. **Goal-Related Team Experience to Provide Best Value** — By analyzing the locations and types of crashes along the IS-695 corridor as part of our previous IS-695 TSMO planning study, we understand how the dynamic lanes will mitigate congestion-related crashes. JMT also conducted a Freeway Congestion Management Study along IS-695, identifying safety improvements throughout the corridor that can be implemented as part of the project. Shawn Reynolds, PE, Sarah Gary PE, PTOE, and Matt Ewell, PE, PTOE, also developed similar safety studies for DDOT on IS-295 in Washington, D.C., and for MDTA on IS-95 from Baltimore to the Delaware state line. Tiger Harris, PE, implemented active traffic management (ATM) practices on the I-66 ATM D-B project to improve traffic flow for both capacity and safety, including use of hard shoulder running, static/dynamic message signage, and overhead lane control management signs. For the IS-405 Improvement project in California, Iteris used a precursor to their proprietary ClearGuide software product to provide data analytics support for MOT requirements, which allowed them to monitor real-time traffic conditions and minimize construction impacts.

Our Team will ensure the project's safety goals are met during our iterative design refinements. By applying the experience gained from the IS-695 Widening and Improvements project, as well as the IS-695 TSMO planning study, we will conduct a data-driven predictive safety analysis of the corridor and identify mitigation solutions, especially those that reduce crash severity. As demonstrated on the IS-66 ATM project, Tiger Harris and the Iteris team will help increase the ability of MDOT SHA to reduce, detect, verify, respond to, and manage non-recurring congestion causes by enhancing existing CHART infrastructure to increase coverage and provide automated obstacle detection along the roadway.

Project Goal: Operability/Maintainability/Adaptability — With the base data collected and constraints identified, our strategic approach to evaluating and ensuring that our proposed solution minimizes operations and maintenance activities, while being adaptable to future technology, is as follows:

1. **Additional Information Gathering** — To support the development of our proposed solutions for this goal, additional information will be gathered, including current CHART operations, communication infrastructure

(including resource sharing), devices, and locations. We will gain an understanding of current staff responsibilities and capabilities for CHART, Statewide Operations Center (SOC), regional Traffic Operations Center (TOC), and District 4 staff, as well as current infrastructure and maintenance responsibilities.

2. **Baseline Solutions** — The baseline design will address needed changes to systems, software, devices, and communication infrastructure, including augmentation to roles and responsibilities for MDOT SHA staff. Staff safety will be a major driver for field element design. The baseline will enable operation in a variety of environmental and operational conditions, including design flexibility to accommodate evolving technical capabilities and adapt to future transportation technological advancements, such as connected autonomous vehicles (CAV), other TSMO solutions, and 5G implementation. Consideration will also be made for opportunities for monetization and future sources of revenue generation.
3. **Baseline Cost and Constructability Analysis** — The initial baseline proposed improvements will be evaluated by Lane and Iteris estimators and construction managers for constructability and conceptual cost. We will work closely with the design team during this analysis, while developing a conceptual estimate by ITS and other infrastructure elements and identifying constructability issues and concerns. The conceptual estimate provides the itemized cost elements of the baseline ITS/infrastructure solutions, which will be evaluated to minimize lifecycle costs and targeted for ease of maintenance refinements.
4. **Design Refinement Within Best-Value Constraints** — A coordinated, iterative process among the Lane Team will refine the ITS/infrastructure solutions as much as possible and attain budget certainty. Based on the conceptual estimate and constructability information provided by the construction experts, the design team will use previous experience to develop alternative solutions that include redesign within the project requirements, propose alternative means, and develop ATCs, working towards meeting the budget and providing the corridor's ITS/infrastructure suite of solutions. The iterative design process will analyze and optimize lifecycle costs, as well as minimize worker exposure and risk, with a focus on ease of maintenance.
5. **Project Goal Coordination** — During design refinement for each individual goal, the project goals will be continuously evaluated concurrent and in coordination with one another to ensure the overall project solution provides the maximum benefit and meets the project's stated purpose and need.
6. **Goal-Related Team Experience to Provide Best Value** — Iteris, including key staff Tiger Harris PE, has significant experience from the IS-66 ATM D-B project in reducing operational and/or maintenance activities through the design and implementation of shoulder use control logic tightly integrated with management systems. Drawing on his 30 years of operational experience with MDOT SHA, Dave Coyne, PE, will ensure that our project goal solutions do not preclude MDOT SHA from meeting its operational responsibilities. Our solutions to address the program goals will result in the need for additional education and support as changes in procedures and approaches will be required in the corridor. Some examples would include approach to snow removal operations to eliminate the use of the median shoulder for snow storage, TTC standards for maintenance operations, design of MOT phasing for bridge and roadway construction projects to not affect/eliminate the part-time use of the median shoulder, CHART operations to enhance responses to incidents when the median shoulder is in use, and education of SOC operators on new ITS systems and functions. All operational modifications will be reviewed to ensure the safety of travelers and workers is maintained, without significantly increasing operational difficulty for SOC staff.

To ensure the project goal of operability/maintainability/adaptability is met, Shawn Reynolds, PE, and Tiger Harris, PE, will oversee evaluation of the lifecycle cost benefits of ITS and other infrastructure improvements during the iterative design process and estimate development. To minimize SOC operational complexity and maintenance difficulty, routine operations will be performed without operator action, using a combination of scheduled usage and traffic conditions to initiate and terminate shoulder usage. SOC/TOC operators will have the ability to manually initiate shoulder usage through CHART workstations in response to emergency/special events. The shoulder use module controls all relevant ITS components, including lane control signs, upstream DMS, and processors executing obstacle detection logic. The shoulder control logic will be able to access traffic sensors and have an operator interface display to show current shoulder use status, allow for configuring shoulder use parameters, and provide for manual override of shoulder use operations. This ultimate package of solutions will ensure the minimization of MDOT SHA operations and/or maintenance activities, while being adaptable to future transportation technological advances.

ii. Project Risks

A preliminary risk matrix was developed so that our Team could evaluate the probability, impact, and overall rating for each risk. This matrix will be updated and used throughout the duration of the project to ensure that our Team understands the major potential risks, including those most relevant and critical to achieving the project goals. We have developed a process that uses the experience and expertise of our Team members to balance and manage potential risks and mitigate any anticipated impacts. Based on our Team's initial evaluation, we have identified the most relevant and critical risks associated with each project goal.

PART-TIME SHOULDER USE — Critical Risk: Pinch Points

Our process for balancing this risk and utilizing Team expertise:

Identify — Our Team has identified pinch points associated with part-time shoulder use as a critical risk. Pinch points are geometric constraints within the corridor that do not meet all MDOT SHA, AASHTO, and other roadway design and safety guidelines, and require significant design and construction for the project. We will use the information obtained from the data evaluation and collection process to perform an AASHTO compliance review to evaluate pinch point locations and their effect on roadway geometry, site distance, lane widths, clear zones, and superelevations.

Analyze Impact — We will analyze potential solutions to resolve pinch point conflicts. Each solution will implement practical design and utilize an avoid/minimize/mitigate strategy, with avoidance always being the preferred solution. When avoidance cannot be achieved, minimizing and mitigating impacts will be analyzed using a practical design approach. In particular, the minimization of environmental resource impacts, while still remaining within the confines of the existing ROW, is critical to this project. Solutions include: horizontal geometric revisions, lane width reduction, dynamic speed advisories, and relocation or modification of geometric elements. Our Team will analyze the effect of geometric modifications on the mobility and safety of the roadway, including the reduction of free-flow speeds. When geometric modifications cannot adequately avoid pinch point conflicts, we will evaluate the practicality of structural solutions. Each potential solution will use practical design to minimize and mitigate impacts. A trade-off analysis will be conducted to explore viable options to mitigate any pinch points, while maximizing the use of part-time shoulders.

Team Expertise to Manage Risk — The Lane Team has experience in managing the risks associated with these challenges. Many Team members, including proposed key staff, performed similar roles for the successful 11th Street Corridor D-B project, developing a design solution for DDOT that saved $85 million from the original engineer's estimate in part by truly understanding the project constraints and revising the design and construction to meet the project's purpose and need, while minimizing project impacts.

PART-TIME SHOULDER USE — Critical Risk: Noise Impacts Requiring Additional Abatement

Our process for balancing this risk and utilizing Team expertise:

Identify — We will conduct additional noise analysis for improvements not included as part of the original model being prepared for the NEPA document. Based on this analysis, we will identify noise abatement mitigation measures generated by our geometric changes to the provided model.

Analyze Impact — Noise abatement can result in adding considerable costs and impacts and can severely compromise the ability to maximize part-time shoulder use throughout the corridor. We will identify potential cost, ROW, and SWM impacts to mitigate additional noise impacts. Our iterative design process will include trade-off analysis for geometric improvements versus noise abatement structures.

Team Expertise to Manage Risk — Our Team, featuring Highway Engineer Scott Mednick, PE, has extensive experience with noise analysis, including modeling, analysis, design experience, mitigation strategies, and abatement for MDOT SHA, within the project corridor (IS-695 from MD 41 to MD 147 and IS-695 at Milford Mill Road) as well as the IS-495 Noise Study and IS-95 Lawyer's Hill. This provides us an advantage for managing noise analysis and mitigation for specific areas within this project corridor.

Potential management strategies for this critical risk include the following:

- We will optimize roadway geometric modifications to minimize outside travel lanes shifts, which will help

avoid triggering additional noise abatement requirements.

- Noise mitigation applies to peak noise conditions, which may not always occur during peak-hour congested conditions. Dynamic lane use could be restricted during peak noise conditions to eliminate or minimize additional noise abatement requirements. Dynamic speed reductions during the peak hours when the shoulder is being used for additional capacity could minimize any additional noise abatement requirements.
- We will evaluate alternative noise abatement measures in lieu of traditional concrete/steel post and concrete panel noise walls, such as earthen berms and other types of materials used for construction.
- A trade-off analysis would be conducted to explore viable options to mitigate any noise abatement requirements, while maximizing the use of part-time shoulders.

MOBILITY — Critical Risk: SWM Requirements Due to Replacement and Additional Pavement

Our process for balancing this risk and utilizing Team expertise:

Identify — The potential for pavement rehabilitation or reconstruction of existing shoulder pavements to meet the project goals will require significantly more construction/MOT and SWM requirements for the project. We will perform a review of existing as-built information and pavement cores conducted on the existing pavement, as well as additional field investigations of the existing pavement and subgrades. We will also inventory existing SWM facilities within the corridor, locations for potential new facilities, watershed boundaries, and existing ROW limits.

Analyze Impact — The potential need to rehabilitate or reconstruct existing pavement, and the associated SWM requirements of doing so, are a risk to maximizing all four of the project goals. The Lane Team will analyze the potential impact of this specific risk to meeting the project goals, including:

- ✓ Determine locations of inadequate pavement structure and weak subgrade soils
  - Perform FWD testing and GPR surveying on the existing shoulders to identify inadequate pavements
  - Perform pavement core borings to identify existing pavement structure and conduct subgrade material characterization to identify weak subgrade soil areas
  - Insert cameras into the existing longitudinal drains and outlet pipes to evaluate conditions
- ✓ Determine the resultant rehabilitation/reconstruction section required and develop a plan for where pavement rehabilitation/reconstruction would be required to meet the project goals
- ✓ Determine the costs, schedule impacts, and MOT and SWM requirements
- ✓ Determine locations within the corridor where SWM facilities could be placed, such as interchange areas
- ✓ Determine existing SWM facilities that will be impacted by proposed improvements

Team Expertise to Manage Risk — We are experienced in avoiding/minimizing risks associated with these challenges. We will perform detailed investigation during the pre-bid and design phases to minimize risks to manageable levels. Our Team has addressed similar risks for other urban projects, such as US 40/MD 715, IS-695 Widening and Safety Improvements, IS-495 at Suitland Parkway Bridge Replacement, IS-95 ETL NB to MD 24, and the 11th Street Corridor.

MDOT SHA Plan Review Division (PRD) will require SWM quantity control at any POI where there is an increase in runoff leaving the ROW. This is even more of a risk for POI discharges within the Jones Falls watershed where management of the 100-year storm event is required. Our design goal is to keep the proposed drainage and impervious area the same as existing for each POI. We will evaluate existing SWM facilities for retrofit to provide additional quantity control. Quality control will be required where there is an increase in new impervious area or where redevelopment criteria are applicable. Milling and resurfacing of existing roadway surfaces is considered maintenance (not new pavement requiring SWM quality treatment) and should be used to eliminate/minimize new impervious areas. Increasing the pavement profile without performing full-depth pavement reconstruction would also be considered maintenance. If there is an increase in impervious area, SWM for quality control is not POI-specific and can be provided anywhere within the watershed. Therefore, our Team will identify potential existing impervious areas not currently being treated for SWM water quality where existing ROW exists to allow for treatment with ESD SWM devices (including underground facilities) or even retrofitting of existing SWM facilities to provide additional water quality treatment.

Our SWM team, led by Scott Miller, PE, with recent success on the MD 404 D-B project, will partner with MDOT SHA and MDOT SHA-PRD and manage the risks associated with providing SWM in urban/suburban areas.

SAFETY — Critical Risk: Shoulder Use for Mobility/Traffic

Our process for balancing this risk and utilizing Team expertise:

Identify — When the dynamic lanes are in operation, there are several potential risks. First, if there is an incident and a motorist suddenly stops in the dynamic lane, the lane will no longer be used as a travel lane and capacity will be lost. Also, the shoulder will no longer be available for motorists to use if they try to swerve to avoid stopped motorists. If lanes are narrowed to avoid geometric constraints, crashes could increase, especially sideswipe crashes. Sight distance may also be limited in the dynamic lane and require all lanes to be shifted right to maintain adequate sight distance, reducing the outside shoulder in these areas. The inside shoulder use should have a logical terminus, and we should avoid left lane drops wherever possible and provide optimal merge operations. Safety will be impacted if interchanges are reconfigured for dynamic lane use, merge and diverge, and weave operations.

Analyze Impacts — To determine the primary crash patterns, crashes by time of day and the types of incidents on IS-695 should be analyzed. We will identify locations with the highest number of incidents. The crash data will be analyzed to determine the types of crashes and congestion-related crashes. The optimal time for dynamic shoulder use, which balances both safety and mobility, will be determined through comprehensive analysis of the crash patterns along the corridor. Studies have shown the trade-off for hard shoulder running is more beneficial compared to maintaining shoulder use. When dynamic lanes are used to alleviate congestion, headways increase and the occurrence of stopping and starting significantly decreases.

Team Expertise to Manage Risk — The Team will use our experience within the corridor, including the IS-695 TSMO planning study, to conduct a crash analysis using *Highway Safety Manual* methodologies, such as crash modification factors. We will use data analysis to determine the optimal traffic conditions for dynamic lane use, which balances both operations and safety. If interchanges are reconfigured for dynamic lane use, or if there is a major lane drop, we will determine the optimal solution for improved operations and safety and reduce conflict points where possible. Also, by implementing dynamic lane use, the number of lane changes on the freeway will increase. Proper signage is crucial for providing guidance to roadway users. When dynamic lanes are active, speeds may need to be reduced to minimize crash severity and the potential for crashes using speed advisories. Speeds may also need to be reduced if sections of the dynamic lane do not meet the minimum AASHTO standards for the posted speed limit.

It is critical to minimize the impacts of disabled vehicles in the dynamic lanes. Our Team has implemented traffic management in an urban freeway setting on the IS-66 ATM project. Prior to the ATM project, the roadway had been expanded to use all available median, leaving limited pavement expansion options. The traffic management tools included ITS elements and shoulder-running techniques similar to those expected to be used for IS-695 TSMO. The ATM elements communicate with an existing traffic management system using existing and enhanced infrastructure. The overhead dynamic signs immediately deactivate the affected lane and inform motorists of an incident downstream. Emergency response technicians should be stationed along the Beltway to remove vehicles in the dynamic lanes. We will provide enhanced monitoring equipment, such as detectors and cameras, for improved incident management.

OPERABILITY/MAINTAINABILITY/ADAPTABILITY — Critical Risk: Technology Implementation

Our process for balancing this risk and utilizing Team expertise:

Identify — Depending on the pace of new technological innovation during the design life of the project, some or all of the project may require significant or total reconstruction if the use of hard shoulder running becomes obsolete. While the likelihood of this level of obsolescence is considered low, the potential impact is very high.

Analyze Impacts — Technological innovation could have a wide range of outcomes and related project impacts. Ongoing research related to roadway transport is currently focused on connected and autonomous vehicles. These technologies are expected to enhance the safety and convenience of vehicles using existing infrastructure, with modest impact to the demands placed on the roadway infrastructure. Traffic patterns may be affected, leading to

changes in the scheduled operation of TSMO solutions. Demands placed on related communication infrastructure are expected, although the extent of security and bandwidth demands is still being researched. Operational regimes for increased penetration of automated vehicles may lead to dedicated lanes for automated operation of light or freight vehicles, including separation barriers, narrow lane widths, and repetitive pavement wear. Some of these impacts could be accommodated with prudent design for enhancement, while others could lead to significant reconstruction of the roadway. Other innovations affecting travel demand and the need for TSMO along the IS-695 corridor are more speculative and difficult to account for in risk management.

Team Expertise to Manage Risk — The Lane Team will use our extensive experience, including our work on the IS-66 ATM D-B project, to coordinate with MDOT SHA staff working on future transportation technologies to consider preparation for innovations. Featuring experts from Iteris, our Team members are highly experienced in technologies related to connected and automated vehicles. Jointly, our Team and MDOT SHA specialists will consider technology innovations that could impact roadway transport. Potential investments to lessen impacts from demand of future services will be considered for incorporation into infrastructure deployed as part of the TSMO project. For example, collocating communication access points with TSMO devices provides the ability to accommodate functions benefiting automated vehicles.

iii. Design-Build Process

We will provide MDOT SHA with a seamless, transparent progression of activities through communication and engagement. Some specific practices/activities/approaches that we will use on the IS-695 project to ensure conformance with the contract documents and to provide a high-quality product include:

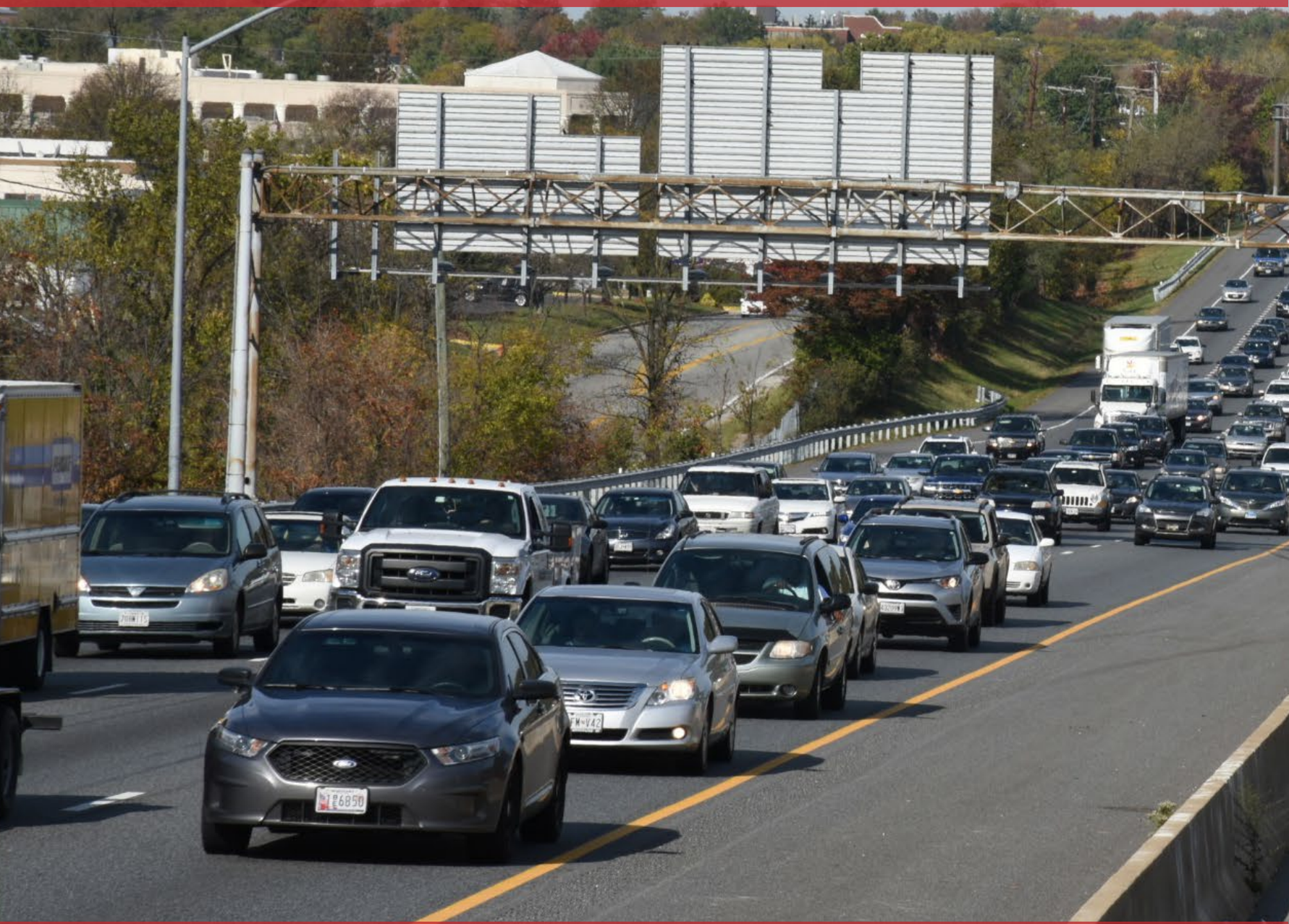
- Professional personnel with previous collaborative experience provide developed relationships to smooth start-of-project activities and encourage and support innovative practices.
- Designers will be active during construction in monitoring the project's progress, responding to RFIs, reviewing submittals, and compiling as-builts.
- Regular partnering meetings will ensure the project is following the envisioned design tract and to provide a thorough understanding of any issues that may arise.
- Cost and schedule benefits generated by innovative design and construction practices will be captured.
- In-place tools to monitor, track, analyze, and report schedule, budget, and quality will be used.
- Experienced support personnel will be available for ROW, railroad coordination, utilities, and permitting.
- Corporate resources include a proven Project Controls group to provide budget, schedule, quality, and operational support, which allows project personnel to devote more time to project management.
- Value-added positions feature John Campbell, PE, as the Design-Build Coordinator to ensure targets are met and communication maintained; Candice Ottley-Francois as TSMO Liaison to confirm TSMO solutions are evaluated as part of the overall design; and Dave Coyne, PE, to oversee design improvements that minimize operations and maintenance activities and are adaptable to future technological advancements.
- Quality and safety are core functions for which the entire Team is responsible.

Our proposed IDQM is Tim Connor, PE, PTOE, DBIA, ENV SP, from Gannett Fleming, Inc., who brings 29 years of experience providing transportation project and quality management. He has served as the IDQM Manager on several recent MDOT SHA highway improvement projects. He will be responsible for leading a team of discipline reviewers who will study design packages throughout all phases of the project (including design changes during construction) for conformance with contract requirements, as well as attend design coordination over-the-shoulder review meetings and owner coordination/partnering meetings.

Mr. Connor's IDQM Team will develop a formal response tool to document review comments for all submissions. JMT will be responsible for responding to, addressing, and resolving all IDQM comments. Mr. Connor will share these reviews with MDOT SHA to ensure the design review process and submissions are in compliance with the DQCP and the performance requirements listed in the RFP. It is understood that Mr. Conner can only certify compliance of the design packages and cannot make interpretations or decisions for MDOT SHA. Additionally, JMT will conduct regular biweekly meetings with Mr. Connor to keep the IDQM team updated of the design changes and address potential issues related to design comments. Mr. Connor will establish an issue resolution process at the partnering kick-off meeting.

LANE | JMT

A Design-Build Team



510 McCormick Drive, Suite B
Glen Burnie, MD 21061
443-577-5546
laneconstruct.com