



MD 32 – South of  
Linden Church Road  
to I-70

Design-Build  
Statement of Qualifications

Contract No. HO7565370

FAP No. AC-NHPP-G-118-1(69)N

Prepared for  
Maryland Department of Transportation  
State Highway Administration

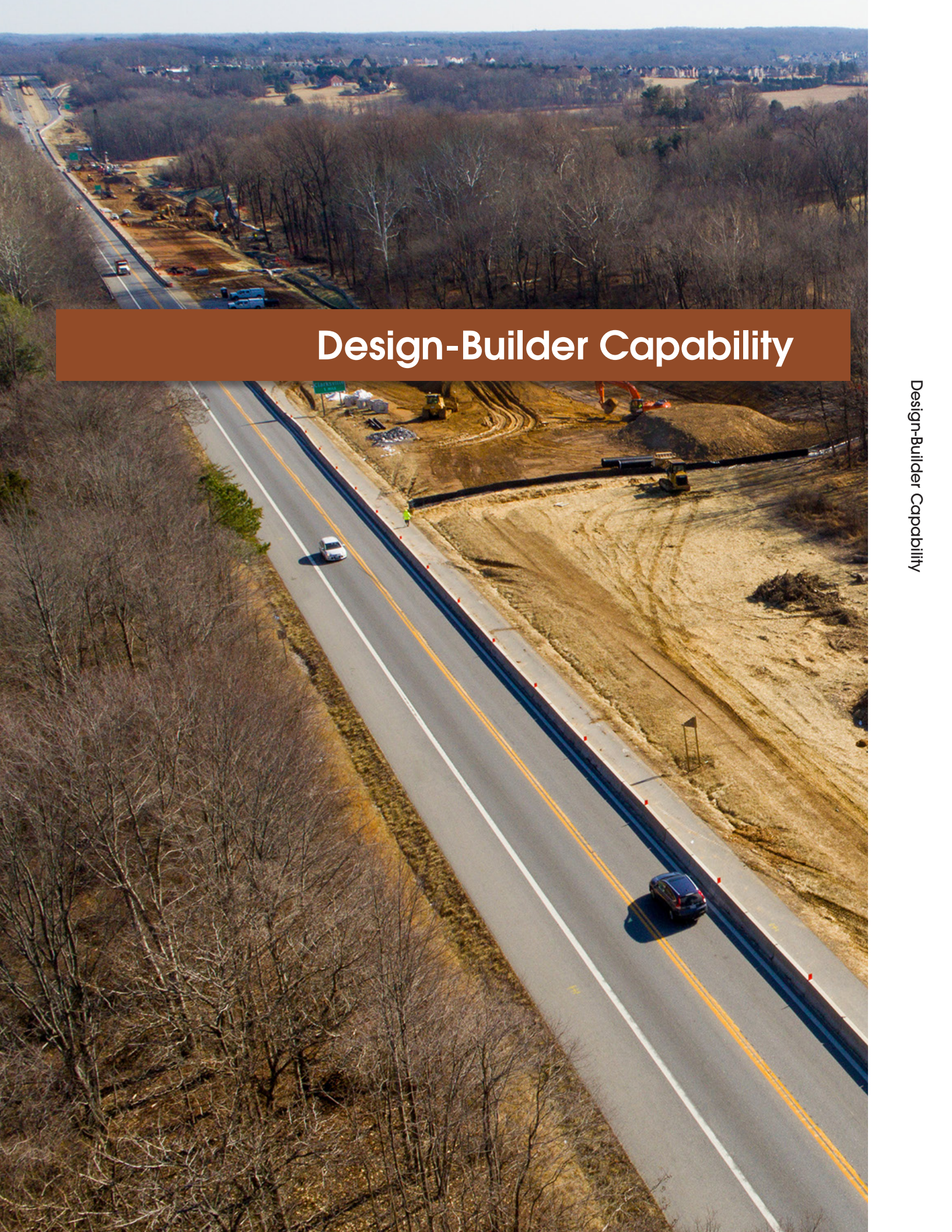
Prepared by  
Concrete General Inc.  
in association with Stantec Consulting Services Inc.

March 2, 2018



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# Design-Builder Capability

## Michael Higgins, PE Project Manager ► Design-Build Project Manager

**Firm:** Concrete General, Inc. **Years of Experience:** 32 w/firm 2 **Education:** BS/1986/Civil/ Engineering

**Registration:** *Pennsylvania Professional Engineer #PE044299E*; Applying for Maryland PE Registration.

**Capabilities:** Mike has more than 30 years of hands-on and management experience in the construction industry. His experience as Project Manager and Design-Build Project Manager spans more than two decades in heavy construction, cost controls, schedule compliance, and procurement for highways, bridges, airports, and utilities in the states of Maryland, Virginia, North Carolina, West Virginia, Pennsylvania, Texas, and Kentucky. Mike has a proven track record delivering complex, traffic-intensive projects to MDOT SHA, VDOT and others, on-time and on-budget. Mike has also been working in conjunction with MDOT SHA leadership in evaluating and reviewing current MDOT SHA policies, procedures and specifications for construction, and helping develop new guidelines to address industry concerns.

### Relevant Experience Includes:

**MD 32 - MD 108 to North of Linden Church Road D/B, Howard Co., MD - MDOT SHA ► Design-Build Project Manager (2017-Present)** This \$33M design-build project provides for the Phase 1 widening of MD 32 from MD 108 to North of Linden Church, for a distance of approximately 2 miles and includes improvements to the intersections for both MD 108 and Linden Church Road. This project is similar in work types as the MD 32 Phase 2 widening project from Linden Church Road to I-70. Mike is serving as the Design Build Project Manager for this project and his responsibilities include ensuring proper allocation of resources for both CGI's labor and equipment along with outside contractor forces, oversight of project management, scheduling, financial and regulatory requirements to meet contractual expectations.

**I-270 Innovative Congestion Management Progressive D/B, Montgomery Co., MD - MDOT SHA ► Design-Build Project Manager (2017- Present)** The purpose of this \$100M progressive design-build project is to reduce congestion and improve travel time along the I-270 corridor. The Design-Builder is providing implementable, practical, bold and innovative solutions to increase vehicle throughput, reduce delay and increase travel time reliability along I-270 with the contract budget. Mike's is serving as the Design Build Project Manager and is responsible for the preconstruction, construction and project management of the overall contract with MDOT SHA.

**MD 210 Livingston Road/Kerby Hill Road Interchange D/B, Howard Co., MD - MDOT SHA ► Design-Build Project Manager (2016-Present)**. This \$83M design-build project consists of a grade-separated interchange at the MD 210 intersection with Livingston Road/Kerby Hill Road to provide safety improvements and congestion relief for this area. The project includes realignment of Livingston and Kerby Hill Road, bridge structures, retaining walls, new pavement and existing pavement rehab, stormwater management quality and quantity facilities, signing, lighting and extensive maintenance of traffic including detours along with major utility relocation and coordination.

**I-95 HOT Lanes, Segment 1, Stafford Co., VA - VDOT ► Design-Build Project Manager (2012-2015)**. Mike represented the contractor responsible for building the 9-mile extension of the existing HOV lanes. This \$85M project was a part of \$925M, 29-mile high occupancy toll lanes project to alleviate the worst traffic bottleneck in the region. Work included installation of all new electronic/dynamic tolling facilities, new sound wall protection and new entry and exit points. Mike worked with the developer, Transurban & Fluor-Lane, to develop construction packages including quantities and cost estimates, submit proposals and reconcile final value for Segment 1. This project included: agency coordination, preconstruction services, design coordination, value engineering, utility coordination, stakeholder coordination, partnering, risk management/mitigation, documenting and implementing DBE/SWAM contract goals/plans.

**Route 58 PPTA-D/B, Hillsville and Stuart, VA - VDOT ► Design-Build Project Manager (2003-2015)**. Mike served as the design-build project manager along with being the authorized representative for the design-builder for this \$223M project. Mike was responsible for all services required, including design, right-of-way acquisition, utility relocation, permitting, construction and QA/QC inspection and testing for both construction and design. The project was for the development, design and construction of 36 miles of Route 58. One of the project benefits was to relieve safety and congestion concerns on both I-64 and I-81 by providing a safe alternate route for all vehicles. To date, three design-build segments have been completed ahead of schedule and on budget. Similar to the proposed MD 32 project, this project included: agency coordination, preconstruction services, reconciliation of cost/price, design coordination, coordination with ROW acquisition, utility coordination and relocation, public outreach, stakeholder coordination, partnering, risk management / mitigation, development of contracting plan including DBE goals, scheduling, permit development and acquisition, permit monitoring, stream/ wetland compensatory mitigation, and bridge/box culvert and roadway construction.

**Route 15 James Madison Highway, Prince William Co., VA – VDOT/PWC ► Design-Build Project Manager (2005-2009)**. Mike led the D/B team for this \$52M, 22-lane-mile project, which included 5 distinct/ separate sections, to improve traffic movement through a highly-congested area. Mike was responsible for managing all work from pre-construction to completion of construction. He oversaw concept designs and development of ATC's; conducted contract negotiations and ROW allowance; supervised all work during final design and construction activities. The project included five bridges, lighting, and signalization for 4 major intersections. Mike coordinated directly with PWC on traffic management systems. The project had geotechnical challenges from the existing soils and rock which required different approaches to mitigate these impacts. Work included agency coordination, design coordination, value engineering, utility coordination/ relocation, stakeholder coordination, roadway widening, permitting/monitoring, geotech, public outreach, and QA/QC coordination.

## Simon Simon, PE Senior Principal ► Design Manager

**Firm:** Stantec **Years of Experience:** 39 w/firm 19 **Education:** MS/1978/Structural Engineering; BS/1977/Civil Eng.

**Registration:** *Maryland Professional Engineer #12953* also in VA, DC, DE, WV, NC, SC, GA, and FL

**Capabilities:** In the past 25 years, Simon has served as design/project manager for design and construction of projects ranging from large, complex highways and bridges to local roads. He has delivered projects involving dualization, widening, reconstruction or new alignments to MDOT SHA, MDTA, MTA; local MD counties; and other State DOTs from concept development through preliminary and final design and construction services. His experience with Design-build (D/B) projects started in 1983 serving as the Design Manager for the \$3M "Modifications to Whitehurst Freeway" in DC, followed by a range of projects from being the Segment Lead for the \$1.4B I-15 Reconstruction D/B (1998) in Utah, to most recently (2016) as the Design QA Manager for the \$92M I-564 Intermodal Connector DB in Norfolk, VA. He has worked on MDOT SHA's D/B projects including the \$3M MD 193 Watkins Dr. Relocation in Prince George's Co.; the \$10M MD 32 Airfield Rd. Interchange in Anne Arundel Co.; and the \$7M I-70 Bridges over Black Rock Rd., in Washington Co.

### Relevant Experience Includes:

**I-564 Intermodal Connector D/B, Norfolk, VA – Perini c/o EFLHD & VDOT ► Design QA Manager (2013-2018).** Simon led the JV Party's design team during the pursuit and was responsible for audits and ensuring implementation of the design QA/QC procedures, review of the deliverables for adherence to contract and design guidelines, value engineering of the flyover structure over I-64, coordination of design QA activities and deliverables with the contractor, attending meeting w/ the contractor at the project site, and allocation of resources to meet the contract design schedules. This \$92M project includes the design and construction of the 2.82-mile of I-564 and safety improvements within the corridor. It includes I-64/I-564 widening; several structures; SWM ponds / BMPs; utility relocation; MOT; and environmental compliance and permitting from VA Marine Resources Commission, VA Department of Environmental Quality, Navy, FHWA (EFLHD), and VDOT.

**US Route 1 Widening D/B, Prince William Co., VA - Lane Constr. c/o PW Co. DOT ► Design Manager (2013-2016).** Simon led the design team during the pursuit and was responsible for final design and preparation of construction plans for this \$47M, 2-mile-long, widening and safety improvement US Route 1 that included the addition of a third lane in both directions and a raised median. Work included design and construction of underground duct banks, utility relocations, culverts, retaining walls, median barrier, SWM facilities, ESC, and MOT. It also included surveys, ROW acquisition, extensive geotechnical investigation and pavement design, and environmental permitting. Simon supervised a design team of 10-15 professionals; coordinated design activities, design subconsultants, and w/the contractor; conducted audits to ensure implementation of the design QA/QC procedures; and provided proper resources to meet the design schedule.

**"Award Winning" I-595 ETL D/B / P3, Broward Co., FL - AECOM c/o ACS/DUSA & FDOT ► Design Manager for Zone 6 (2010-2015).** Simon was responsible for preliminary and final design and plan preparation for Zone 6 (~2.0 miles; \$150M in construction) of this 10-mile, \$1.2B ETL project. Design work under his supervision included surveys (corridor-wide); roadway widening and reconstruction; traffic engineering and complex multiphase MOT; utility coordination; and drainage, SWM, ESC, signal, lighting, signing, and pavement marking designs. Major structures design performed under Simon's direct supervision included 3 steel girder braced ramps, and the University Drive / I-595 Interchange structures. Simon personally performed VE of this Interchange design and developed a practical design, Alternative Technical Concept, saving a flyover bridge and other structures. This ATC was implemented and resulted in more \$50M in construction savings.

**"Award Winning" I-95 Express Toll Lanes (ETL), Section 100, Segment 1, Baltimore City / Co., MD - MDTA ► JV's Project Manager (2005–2013).** Simon oversaw and coordinated work of this \$230M, multi-discipline design effort that utilized more than 30 design and environmental specialists at any given time, including 18 subconsultants. He managed the day-to-day design activities, was the liaison with MDTA, and oversaw the QA/QC program for the JV Team. Simon personally performed value engineering of Chesaco and Hazelwood Ave. Bridges (modification vs. replacement), and the existing noise walls south of Chesaco Ave. (reuse the exiting panels vs. new ones) and implemented cost saving (more than \$10M) solutions. Segment 1 contained three construction packages ranging from \$55M to \$85M. They included I-95 widening, ETLs along I-95 median, and all associated ramps at I-95/I-895 Interchange; seven SWM Ponds (some used as Temp. ESC), stream restoration, environmental investigation and remedial solutions for HAZMAT within the SWM Ponds, and obtaining COE and MDE permits; condition investigation and rehabilitation of pipe culverts under I-95; complex, multiphase MOT (including traffic engineering & TMPs); and several bridges, retaining walls, and noise wall (including noise mitigation analysis) structures. Other services under his supervision included geotechnical investigation, engineering, and pavement design; surveys; utility coordination; and signal, lighting (HML), signing, pavement marking, and landscape designs. Simon led the design Team in the partnering meetings and processes during construction working w/MDTA, Concrete General, and other stakeholders. He also led the JV Team during public workshops. *This project has received four MDQI awards for Design & Construction Partnering (one w/Concrete General).*

**"Award Winning" MD 32-Airfield Rd. Interchange D/B, Ft. Meade, MD – Cherry Hill Constr. c/o MDOT SHA ► D/B Coordinator (2001-2004).** Simon was the design-construction coordinator, and led the design of the structures for the final design and preparation of plans for this \$10M D/B project. Work included widening and dualization of MD 32; two major culverts, retaining walls, two roundabouts; roadway, structures, drainage, SWM, ESC, signal, lighting, signing, and pavement marking designs; traffic engineering and MOT; utility coordination; and obtaining permits from MDE.

## Shannon Brown Construction Manager ► Construction Manager

**Firm:** Concrete General, Inc. **Years of Experience:** 32 w/firm 16 **Education:** High School

**Registrations/Certifications:** 2014/Adult CPR and First Aid Training; 2011 MDOT Traffic Manager Course; 2009/Erosion & Sediment Control Certification; 2006/OSHA 30-Hour Course; and 1999/OSHA 10-hour Course.

**Capabilities:** Shannon has more than over 30 years in the construction industry managing and supervising large and complex highway construction projects. He has served as Construction Manager on the last two segments of MD 32 Dualization D/B projects for MDOT SHA, and has overseen numerous other large highway projects involving bridge, major earthwork and paving construction. He has managed and coordinated all construction activities, developed and implemented schedules, and worked closely with the design team on such projects. His current and past supervisory experience includes projects that are similar in complexity and scope as this project.

### Relevant Experience Includes:

#### MD 32 from MD 108 to north of Linden Church Road D/B, Howard Co., MD - MDOT SHA ► Construction Manager (2017-Present).

Shannon is currently overseeing the construction for this \$32.5M dualization project to add capacity and enhance the safety and operations along this section of MD 32. The scope of the project includes the design and construction of approximately 3 miles of MD 32 from a two-lane arterial to a four-lane divided highway from MD 108 to north of the Linden Church Road interchange. The scope of improvements include earthwork, new pavement construction, existing pavement rehabilitation, drainage, stormwater management, erosion & sediment control, reforestation, landscaping, signing and marking, intersection / interchange lighting, construction of small structures such as culverts, utility coordination, and environmental permit acquisition. The MD 32 southbound on-ramp and off-ramp at Linden Church Interchange are being reconstructed with full acceleration and deceleration lanes. The project design accommodates the future widening of MD 32 at the northern limit. Shannon's responsibilities include managing construction activities, constructability reviews, developing and implementing schedules along with the coordination for all phases of construction.

#### Reisterstown Road Streetscape from Northern Parkway to City Line, Baltimore, MD - City of Baltimore DOT

► **Construction Manager (2014-2016).** Shannon oversaw the construction for this \$9M project located in the City of Baltimore. The scope included milling and resurfacing of a portion of Reisterstown Road beginning at Northern Parkway and extending in a northwesterly direction for a distance of 1.49 miles to the Western City Line. The Project included milling, resurfacing, base repair, concrete bus pads, pedestrian ramps, sidewalk, new signalization, conduit and landscaping within the limits of the Project. New signing and pavement markings was also installed under this Project. There were also areas of widening included as part of the Project as well as improvements to Patterson Avenue. This area is subjected to heavy daily volumes of traffic similar to MD 32 so all work on the project was constructed under traffic, primarily utilizing lane closures. Shannon's responsibilities included managing construction activities, developing and implementing schedules along with the coordination for all phases of construction.

#### MD 32 at Linden Church Rd. Interchange D/B, Howard Co., MD - MDOT SHA ► Construction Manager (2011-2013).

Shannon managed the construction for this \$11M project to improve the safety and operations along this section of MD 32 as well as to integrate with the ultimate MD 32 corridor improvements. Work included the design and construction of a full diamond interchange and associated bridges and structures at MD 32 and Linden Road Church Road, construction of a roundabout at the intersection of Linden Church Road and the northbound ramp termini on the east side of the interchange, realignment of Linden Church Road west of MD 32, and improve the sight distance along the existing Ten Oaks Road. The additional improvements included resurfacing of the existing MD 32, realignment of the local road and driveways, installing new closed drainage systems, new stormwater management facilities, erosion and sediment control, landscaping, signing, marking and utility relocation and construction. Shannon's responsibilities included managing construction activities, developing and implementing schedules along with the coordination for all phases of construction.

#### Father Hurley Boulevard Extended, Montgomery Co., MD - MCDOT ► Construction Manager (2009-2010).

Shannon oversaw the construction of this \$10.5M project located in Germantown between Wisteria Drive and MD 118. The project scope included the construction of approximately 6,650 feet of new roadway including a roadway bridge over CSXT railroad along with roadway improvements on both MD 118 and Father Hurley Boulevard. Project improvements included pavement widening, construction of new sidewalk, curb and gutter, traffic barrier W beam, street lighting, signalized intersection, two retaining walls, new storm drainage systems and SWM facilities, ESC measures, landscaping and MOT during construction. This project had significant grading and substantial SWM facilities that were installed alongside existing traffic. Shannon's responsibilities included managing construction activities, developing and implementing schedules along with the coordination for all phases of construction.

#### I-270 SB - Auxiliary Lane Extension (from I-70 to MD 85), Frederick Co., MD ► Construction Manager (2008-2009).

Shannon was responsible for managing all construction activities including scheduling and coordination of work for all CGI and subcontractor resources. This mile-long project included the construction of an auxiliary lane on I-270 to eliminate a mainline merge with I-70 and MD 85. Work included median widening and restriping of SB I-270, SWM, modifying existing signage and lighting relocation. The work was performed under heavy traffic volume and required existing traffic patterns to be maintained during construction. The SWM facility included a substantially large pond and was constructed to offset impacts from impervious area increases.

## **Kathleen Walsh, PE** Senior Associate/Project Manager ► **Highway Engineer**

**Firm:** Stantec **Years of Experience:** 28 w/firm 3 **Education:** BS/1984/Civil Engineering

**Registration:** *Maryland Professional Engineer #17315* also in VA, DC, DE, NC, and TN

**Capabilities:** For the last 20 years, Kathy has served as Project Manager and Lead Highway Engineer on projects from the planning phase through final design and construction using conventional or Design-Build (D/B) delivery methods. Many of the projects she has designed, or led the design, included interchanges, roadway widening, intersection improvements, safety improvements, access management, pedestrian and bike facilities, multi-use trails, roadside safety studies, drainage improvements, and corridor-wide improvements. She understands the principals of Practical Design and she is thoroughly familiar with MDOT SHA, FHWA, and AASHTO design guides, criteria, and specifications.

### **Relevant Experience Includes:**

#### **On-call Survey & Engineering, Montgomery/Prince George's Co., MD – MDOT SHA D3 ► Lead Highway Engineer (2015-Present).**

Kathy is serving as the Lead JV firm's Project Manager and is responsible for all roadway design tasks under this contract. She has supervised and performed hands-on work for assignments that has included traffic studies, intersection improvements; safety analysis; preliminary and final design and preparation of plans and construction documents which has included surveys, drainage design, SWM facilities, ESC, MOT, and obtaining permits for a number of transportation projects. She has personally prepared documents for SWM waiver and PRD reviews. She has supervised preparation milestone deliverables, and Plans, Special Provisions and Estimates for advertisements.

#### **South Capitol St. Bridge & Corridor DB, Washington, DC - Perini c/o DDOT ► Lead Highway Engineer (2015-2016).**

Kathy supervised all approach roadway, MOT, SWM, ESC, structures, and utility design work during the Tender Phase of this \$400M DB project. She developed geometrics for I-295, the interchange ramps and approach ovals; developed innovative concepts / designs for pedestrian access in and around the ovals; supervised development of a complex MOT, including the phasing of several structures – bridges, retaining walls, and pipe supports.

#### **US Route 1 Widening D/B, Prince William Co., VA - Lane Constr. c/o PW Co. DOT ► Highway Engineer (2016).**

Kathy checked final plans for a consolidated review of all roadway, drainage, SWM, ESC and MOT coordinated work for this \$47M, 2-mile-long, widening and safety improvement of US Route 1. The project included the addition of a third lane in both directions and a raised median. Work included design and construction of underground duct banks, utility relocations, culverts, retaining walls, SWM facilities, ESC, and MOT. Kathy led the Value Engineering (VE) of the US Route 1 and Dale Blvd. intersection and the ramps. She suggested an alignment shift (from indicative design by others) that resulted in significant cost savings by using the existing pavement, w/mill and overlay, in lieu of total reconstruction.

#### **MD 4/Suitland Parkway Interchange, Prince George's Co., MD - MDOT SHA ► Lead Highway Engineer (2007-2015).**

Kathy was responsible for day-to-day design activities and performed hand-on geometrics design of a diamond interchange and Directional Flyover Ramp to grade-separate the existing signalized intersection. Work included widening MD 4 from four lanes to eight lanes divided highway, re-alignment of Suitland Parkway to grade separate it at MD 4, and design of all associated interchange and spur ramps, as well as a service road. Kathy led the work from VE of the concept design through the final design and preparation of construction documents. She coordinated work with the utility conflict analysis and relocation design, right-of-way determination and plat preparation; and assisted in the development of the complicated MOT schemes and TMP. She worked on the project through all Milestone submittals and reviews, preparing cost estimates and special provisions. She assisted in the preparation for, stakeholder coordination, and attended at public outreach meetings and presentations. Stakeholders included PEPCO, NPS, Prince George's Co., and Joint Base Andrews.

#### **US Route 29 Widening / Interchange at MD 175, Howard Co., MD - MDOT SHA ► Highway Engineer (2013-2015).**

Kathy was responsible for hands-on design and preparation of final plans and documents for this 3.2- mile widening and interchange modification project. Kathy performed or directly supervised the geometric design, superelevation calculations, grading plans and incorporation of sidewalk and bike access at interchange ramps. She designed the modifications to the existing ramps at MD 175, including a practical design of the superelevation and deceleration lanes to avoid impacts to sensitive historic property. Kathy prepared the special provisions and cost estimates at each Milestone submittal stage, and attended review and comment resolution meetings w/MDOT SHA. Kathy conducted extensive coordination with utility owners, and in-house designers for the utility relocations, sound walls, SWM facilities, and ESC. She also coordinated and assisted in the development of complex, multi- phase MOT schemes and plans for this congested section of US Route 29.

#### **US Route 460 Corridor Improvements P3 / DB, Southeastern, VA - VDOT ► Highway Engineer (2012-2014).**

This 14.6-mile, new 4-lane divided open section arterial project included five diamond interchanges. Kathy performed hands-on preliminary design including the development of horizontal / vertical alignments, superelevation, clear distances, sight distances, interchange spacing, accel/decel lanes, and turning radius, all in accordance with AASHTO standards. She supervised preparation of the preliminary roadway, MOT, SWM, and ESC plans, and coordinated with utility relocation designers for the corridor. She implemented practical designs that included modifying the proposed typical section to reduce side slopes and minimize the use of guardrail; and using retaining walls at interchange ramps to reduce property impacts. She performed an alternative analysis of I-295 Termini interchange spacing, ramp accel/decel requirements, and geometrics to avoid property impacts, provide access to the properties, and avoid railroad at-grade crossings.

## Elizabeth Kanner, PE Senior Water Resources Engineer ► **Water Resources Engineer**

**Firm:** Stantec      **Years of Experience:** 16 w/firm 1      **Education:** BS/2001/Agricultural Engineering  
**Registration/Cert.:** *Maryland Professional Engineer #33330* also PA | MDE Erosion & Sediment Control Responsible  
Personnel Certification #RPC002368 | MD SHA Erosion & Sediment Control Yellow Card Training # 05-033

**Capabilities:** Elizabeth has 17 years of experience in water resources engineering for public infrastructure and transportation projects. She has been serving as an in-house water resources consultant for MDOT SHA for more than ten years. Her experience includes investigation and design of mitigation wetlands; stream restorations; storm drains; culverts; stormwater management (SWM); erosion & sediment control (ESC) and NPDES MS4/TMDL management and compliance. She has performed the hydrologic & hydraulic (H&H) computations necessary for obtaining permits for SWM, ESC and waterway constructions. She has extensive experience in Environmental Site Design (ESD) techniques and the application and interpretation of the Highway Drainage Manual. She has hands-on knowledge and experience of H&H methodologies and software including HDS-2, HDS-4, HDS-5, HEC-14, HEC-15, HEC-22 and HEC-26. She has inspection / compliance experience in the construction of ESC and SWM BMPs. She is trained and experienced in stream assessment and restoration using Rosgen methodologies. She is also an approved expedited reviewer for H&H for MDE's Wetlands & Waterways program.

### **Relevant Experience Includes:**

**Replacement of Median Barrier and Lane Reconfiguration of Bridge on US 50 over the Severn River, Anne Arundel Co., MD - MDOT SHA ► Lead Water Resources Engineer (2015-2016).** Elizabeth was responsible for the SWM and ESC designs, and obtained Concept SWM and ESC approval from MDOT SHA's Plan Review Division (PRD). The ESD practices, micro-bioretenion, bioswales and pavement removal, were designed in accordance with the 2007 Stormwater Act, revised Chapter 5 of the 2000 Maryland Stormwater Design Manual. The entire project is located within the Chesapeake Bay Critical Area. She minimized impacts to environmental features and coordinated work with an adjacent SHA stormwater retrofit project, as well as electric and communication utilities. The project implemented practical design to shift the median towards the westbound lanes to create an additional eastbound lane without widening the bridge. The proposed work also included multi-phase MOT, full-depth reconstruction of the outside shoulders east of the bridge, and full-depth reconstruction where the median was moved toward the westbound lanes.

**I-95 Express Toll Lane (ETL) Program Management, Baltimore, MD - MDOT MDTA ► Independent Design Reviewer (2013).** As part of the I-95 GEC Partners, Elizabeth performed independent design reviews and attended milestone meetings for MDTA for the 65% through 100% submittals for drainage, SWM and ESC for the Segment 2 I-695/I-95 interchange. Reviews included over 9,000 LF of various diameters (15" to 42") storm drain and structures, several SWM facilities, and multi-phase ESC including converting temporary sediment basins to permanent SWM facilities.

**Intercounty Connector (ICC) Contract A D/B, Montgomery Co., MD - MDOT SHA ► Lead H/H-Stream Design Engineer (2007-2009).** Elizabeth led and performed hands-on final design (as subconsultant to Prime) of fish passage and nine (9) stream crossings / relocations for the 7.2-mile, 6-lane MD 200 Toll Road. As the design was performed on a fast-track, rolling basis with the construction (18 months design schedule), Elizabeth worked on-site in a hub office with the MDOT SHA GEC and the contractor. Because of the numerous and unique project commitments to aquatic organism / fish passage, she created H&H models for the low flows (10-year base-flow) that were separate from the models that were being used in the culvert / bridge design. She evaluated four types of crossings using HEC-RAS, HY-8 and FishXing including: natural bottom BEBO arch; RCP/HERCP/CMP; natural bottom CMP with metal baffles; and full span bridges. She analyzed base-flow discharges using USGS Stream Gage Data and statistical methods, including base-flow separation and Log-Pearson III distributions. She also developed protect specific regression equations for hydrology. She coordinated the culvert crossings with the engineers preparing the rough-grade and drain packages as well as the maintenance of streamflow. The relocations were based on natural channel design techniques, Rosgen, and threshold channel designs. Elizabeth developed the criteria for resident fish passage at each crossing. She prepared geomorphic and H&H reports and obtained approval from MDOT SHA GEC, the USACE and MDE and ensured that the design met and complied with all environmental and design requirements. She also performed construction support services by responding to Requests for Information (RFIs) and Field Design Changes (FDCs).

**MD 32 at Burntwoods Road, Howard Co., MD - MDOT SHA ► Lead Designer (2005-2007)** Elizabeth led SWM and ESC design from concept through PS&E for the MD 32 improvements at Burntwoods Road. The project included upgrades to the horizontal and vertical alignments for safety, elimination of direct access points, three roundabouts, and interchange ramp and intersection, five culvert crossings, SWM, stream relocation, landscaping, public involvement, and significant MOT and ESC phasing. Her focus was the design and permitting of quantitative and qualitative SWM (median grass swales and eight shallow wetlands, five with MD Code 378 embankments) and the development of multi-phase ESC in coordination with the MOT schemes / phasing. She attended milestone and public meetings. She conducted H&H analyses (GISHydro2000, WinTR-55/TR-20, SHARISER, HY-8, Hydraulic Toolbox) and was responsible for culvert sizing and outfall protection, open and closed highway drainage system design, and the roundabout design. She assisted with MDE, USACE, and MDOT SHA permitting and coordinated avoidance & minimization documentation for the FEIS and JPA. She also coordinated with SHA-HHD for inclusion of the new BMPs into the NPDES database.



## “Award Winning” I-95 Express Toll Lanes, Section 100, Segment 1

### ► Baltimore City/County, MD

**Firm:** Stantec

**Owner:** Maryland Transportation Authority

**Contact:** Mr. Dan Williams, PE; (410) 537-7824

**Project Delivery Method:** Design-Bid-Build

**Initial Value:** \$237M Construction; \$18M Design

**Final Value:** \$232M Construction; \$18M Design

**Reason for Difference:** Stantec’s Value Engineering for saving and modifying (instead of total replacement) of the Chesaco and Hazelwood Avenue bridges over I-95; reuse of existing sound barrier panels south of Chesaco Avenue.

#### Schedule:

**Commencement Date:** Design: 4/2005; Construction: 10/2006

**Original Completion Date:** Design: 4/2011; Construction: 9/2011

**Final Completion Date:** Contract KH-1501: 2/2008; KH-1503: 7/2011; KH-1502: 11/2011; Design: 4/2011

**Reason for Difference:** N/A

#### Project Description

The Section 100 project begins in Baltimore City south of the I-95/I-895 Interchange and ends 2.7 miles north of the I-95/MD 43 Interchange. The Stantec-led JV Design Team provided comprehensive engineering and design services for the Segment 1 of Section 100 starting south of the I-95/I-895 Interchange and extending 3.6 miles to south of Kenwood Avenue over I-95. The work included, but not limited to:

- Reconstruction and widening of I-895 and I-95, including the I-95/I-895 Interchange; flyover structures; several ramps; retaining walls; sign structures; new culverts; an existing culvert extension; and major drainage structures.
- Six stormwater management ponds (some were temporarily used for erosion & sediment control) and associated landscaping, structures, etc. Stantec coordinated and obtained permits from MDE (for Contract KH-1501 on expedited basis to ground-break 1<sup>st</sup> Section 100 construction on an accelerated basis.)
- Redhouse Creek stream restoration and associated culvert extension under I-95. Performed Video Inspection of this and other culverts to determine structural adequacy of the existing facilities, and provided rehabilitation as needed.
- ITS and toll collection gantries.
- Complex, multiphase MOT and associated construction sequencing.
- Signing, pavement marking, lighting, and all associated roadway features.
- Environmental compliance; wetland delineation, Plate preparation and Permit Modification (obtained permits from US ACOE and MDE for impacts to Waters of US); Hazardous Material testing and remediation for SWM Ponds.
- Utility (Level 3, Gas, Water, Electric, etc.) coordination, conflict identification, analysis and design.
- Value Engineering and implementation of innovative, cost saving alternative designs.
- Partnership w/contractors and services during construction.



#### Stantec’s Role in this Project

Stantec was the lead firm for the JV and provided project administration, project management, scheduling, design and preparation of contract documents. The Stantec JV Team prepared 3 construction contracts packages for Segment 1. The work on initial contract (Contract KH-1501) was performed on an accelerated basis and included the I-895 GP curved steel girder ramp; replacement of Moravia Road and Moravia Park bridges over I-895 with two-span steel girder structures; a sheet-pile-supported retaining wall, and a mile of northbound GP Lanes of I-895/I-95 widening. The design of this contract containing more than 680 drawings was completed for advertisement in seven months. The Engineer’s Estimate for this contract was between the two low bids at \$54.1M (low bid of \$53.7M and the 2<sup>nd</sup> low bid was \$55.6M).

## “Award Winning” I-95 Express Toll Lanes, Section 100, Segment 1 ► CONTINUED

The two other contracts were for reconstruction of I-95 north of the I-895/I-95 split to south of Kenwood Avenue (Contract KH-1503) including modifications to the Chesaco and Hazelwood Avenue bridges, and the I-895/I-95 Interchange and associated roadway work (contract KH 1502). The engineer’s estimates for both contracts were between the two low bids. Stantec managed fourteen (14) subconsultants, was the liaison with the MDTA, conducted studies, and designed and prepared construction plans and documents for the project. Stantec also led the environmental compliance and permitting work. Design services provided by the Stantec forces included:

- **Contract KH-1501:** Developed MOT, signing and marking design and plans; performed an independent QA/QC of the NB GP curved steel girder bridge design; coordinated utility conflicts, environmental compliance and permits, and SWM / ESC design; and performed a peer review of all designs/plans prior to submittals to MDTA/agencies.
- **Contract KH-1503:** Developed Value Engineering and final design of the extension of the Chesaco Avenue Bridge and, modifications to Hazelwood Avenue Bridge (soil nail wall); performed all highway design for reconstruction and widening of I-95 from north of the I-895/I-95 split to south of Kenwood Avenue; design of a turn-around ramp at the Chesaco Ave. / I-95 grade separated structure for MDTA maintenance operation vehicles/trucks; developed MOT, signing and ITS design and plans; coordinated utility conflicts, environmental compliance and permits, and SWM / ESC design; and performed a peer review of all designs and plans prior to submittals to MDTA/permitting agencies.
- **Contract KH-1502:** Developed the bridge and structure design for the ETL Bridges carrying I-895 over I-95 and Moores Run; retaining walls/noise walls south of the ETL bridges; developed MOT, signing and ITS design and plans; coordinated utility conflicts, environmental compliance and permits, and SWM / ESC design; and performed a peer review of all designs and plans prior to submittals to MDTA and permitting agencies.
- **Environmental Compliance:** Stantec was responsible for all environmental services for the project. Work performed included identifying measures to avoid and minimize impacts to existing resources which ultimately resulted in a net decrease in resource impacts on the project. Stantec conducted wetland delineations, forest stand delineations, and developed permit impact plates, tracked total resource impacts, and prepared permit modifications for Segment 1. In addition, Stantec conducted historical research, well monitoring, and responded to issues related to contaminated soils for proper disposal within the project area during construction. This included multiple sampling events, both composite and discrete, while providing the General Engineering Consultant partners with written documentation regarding test results and recommendations.

### Successful Methods, Approaches and Innovations

Stantec’s Value Engineering for saving and modifying (instead of total replacement) of the Chesaco and Hazelwood Avenue bridges over I-95, constructed in 1996, saved MDTA more than \$7M. Work involved construction of soil Nail walls in front of the existing abutments (3 locations), and extending East end of Chesaco Avenue Bridge (instead of total replacement). Also, Stantec’s practical design proposal to re-use the existing sound wall panels along I-95, instead of new panels, resulted in significant cost and construction time savings.

### Award-Winning Project

The Stantec Joint Venture, MDTA and the Contractors have received 4 awards from Maryland Quality Initiative: 2010 “Consultant Structures Design Award”; 2010 “Partnership Award”; 2013 “Maryland Transportation Authority Modal Award”; and 2013 “Partnering Gold Award” *The 2013 Partnering Award was with Concrete General, Inc.*

### Contract Relevance to MD 32 D-B

- Roadway reconstruction, widening and traffic safety improvements
- Bridge, retaining walls, culvert, structures design
- Interchange reconstruction
- Complex MOT and construction staging
- Extensive coordination with utility companies for undergrounding of, and overhead utilities
- Significant number of SWM facilities
- ITS Facilities
- Replacement of existing culvert and bridges, and hydraulic capacity improvements
- Environmental mitigation and permitting
- Innovative, cost-saving design and construction techniques
- Extensive stakeholder coordination, partnering meetings, and issue resolutions



**Key Staff:** Simon Simon, PE – Project Manager

## US Route 1 Widening Design-Build PPTA ► Prince William County, VA

**Firm:** Stantec

**Owner:** Virginia Department of Transportation; Prince William County Department of Transportation (end client); Lane Construction Company (Client / Contractor)

**Contact:** Mr. Mohammad (Mo) Ayyoubi, Chief of Construction, Prince William County DOT (703) 792-7193

**Project Delivery Method:** Design-Build

**Initial Value:** \$44M Construction | \$2.3M Design

**Final Value:** \$47M Construction | \$2.6M Design

**Reason for Difference:** Additional work, geotechnical investigation including soil borings, pavement coring, material testing and slope stability analysis were performed due to unsuitable subsurface soils near southern end of the project. Additionally, driven piles were required to stabilize the roadway side slope on east side of roadway.

### Schedule:

**Commencement Date:** 8/1/2012

**Original Completion Date:** 6/20/2016

**Final Completion Date:** 5/24/2016

**Reason for Difference:** Prime Contractor issued a limited design NTP prior to final contract execution and NTP from Prince William Co. DOT. Early ESC permit for Phase 1 facilitated early mobilization and construction ahead of schedule.

### Project Description

The primary purpose of this design-build project was to rehabilitate and widen US Route 1 from Neabsco Mills Road to Featherstone Road (2.1 miles). The project also included utility relocations and improvements, as well as right-of-way acquisition.

### Stantec's Role in this Project

As the Lead Designer in the Design-Build Partnership, Stantec prepared the design and plans for US Route 1 improvements, which is classified as a principal arterial carrying both intra- and inter-county multi-modal traffic. This project was designed and constructed for the Prince William County Department of Transportation under the Virginia Department of Transportation (VDOT) Locally Administered Program. Three major elements of the project:



- **Element #1 – Roadway Rehabilitation and Widening.** This element consisted of the design and construction of US Route 1 roadway rehabilitation and widening. The widening included the addition of a third thru lane in both the northbound and southbound directions of the highway, as well as the introduction of a raised median and ADA-compliant sidewalks throughout the length of the project.

The project corridor included seven intersections and numerous access driveways. Work also included geometric and safety improvements at the intersection of US Route 1 and Dale Boulevard including four outer connection ramps, signal reconstruction at six intersections, signing and marking, drainage improvements, grass swales and proprietary bioretention structures, erosion & sediment control, replacement of an existing box culvert including hydraulic and hydrologic analysis to determine and improve capacity, retaining walls, earthwork and grading, complex maintenance of traffic for multi-phase construction in an urban area with businesses and residences, modifications to site traffic circulation patterns and parking, environmental compliance, and Virginia Department of Environmental Quality (VA DEQ) permits, and right-of-way acquisition services.

- **Element #2 – Duct bank installation.** This element consisted of the design, construction, easement acquisition, and permitting for the provision of underground utility duct banks along both sides of US Route 1. The duct banks serve Dominion Virginia Power, Verizon, and Comcast.
- **Element #3 – Water main installation.** This element consisted of the design and construction for the provision of Prince William County Service Authority (PWCSA) betterments within the limits of the US Route 1 project. Those improvements include approximately 2,225 linear feet of new 36" ductile iron pipe (DIP) water main, 1,300 linear feet of new 12" DIP water main, 5,875 linear feet of new 16" DIP water main and approximately 945 linear feet of relocated sanitary sewer main.

## US Route 1 Widening Design-Build PPTA ► CONTINUED

### Successful Methods, Approaches and Innovations

**Value Engineering** - Stantec performed a VE analysis of the preliminary design (prepared by others) to optimize the paving component of the project. Although there was an opportunity for refinement, this was not a straightforward task. Geometric criteria, differences between existing and proposed roadway horizontal alignments, existing roadway cross slope variations, constructability issues, and right-of-way constraints all needed to be accounted for.

The preliminary design had been based on a single horizontal and vertical alignment, however, due to constraints, segments of the horizontal alignment varied with respect to the existing roadway alignment. This resulted in mismatches between the existing and proposed cross slopes and presented a challenge when preparing a new design that maximized the reuse of the existing roadway pavement. To further complicate the design approach, the proposed roadway widening dimensions varied along the corridor.

First, Stantec used InRoads to optimize the vertical alignment by bifurcating (or implementing independent profile grade lines) along the northbound and southbound roadways. An iterative analysis was also used to best fit the vertical alignment just above the existing grade. This involved a series of checks alternating between the vertical alignment and cross sections, then making slight adjustments to minimize differences in the existing and proposed grades. Next, Stantec designed the InRoads 3D model to incorporate sophisticated point control and parametric constraint techniques to ensure a smooth, consistent finished grade while minimizing wedge-and-level paving quantities. The InRoads 3D model was prepared to a level of detail that allowed the team to visualize roadway improvements, check drainage patterns, and accurately estimate paving and earthwork quantities. The 3D model included a finished surface with normal, transition, and super-elevated sections, ramp gores, and intersection warping and plateauing as needed to achieve positive drainage. Along with the drawings, the 3D model was provided and utilized by Lane for use in construction.

**Accelerated Permit Process** - Lane/ Stantec efforts in obtaining permits on accelerated basis and innovative construction phasing schemes allowed construction to begin six months ahead of the schedule. The original project schedule reflected a construction start date of October 2013, Stantec accelerated the design and permitting such that the Contractor was able to start construction in June 2013. Working with Prince William County and VDOT, Stantec was able to secure early approvals of erosion & sediment control plans and obtain an advanced road construction permit to allow for the desired early construction start.

### Contract Relevance to MD 32 D-B

- Roadway rehabilitation and widening
- Traffic signal improvements
- Route 1/ Dale Blvd intersection improvement including ramp modifications
- Maintenance of high volume traffic
- Signing and marking
- Extensive coordination with utility companies (DVP, Verizon & Comcast) for undergrounding of overhead utilities
- Highway hydraulics
- Extensive SWM & BMP design
- Replacement of existing culvert and hydraulic capacity improvement
- Environmental mitigation and permitting

### Key Staff

*Simon Simon, PE – Design Manager*  
*Kathy Walsh, PE – Highway Engineer*



## I-564 Intermodal Connector Design-Build ► Norfolk, VA

**Firm:** Stantec

**Owner:** Virginia Department of Transportation; Eastern Federal Lands-Highway Division (Project Administrator)  
Cherry Hill Construction, Inc. (Client / Contractor)

**Contact:** Mr. DeWayne Dietrich, (410) 799-2323

**Project Delivery Method:** Design-Build

**Initial Value:** \$92M **Final Value:** TBD

**Reason for Difference:** N/A

**Schedule:**

**Commencement Date:** 3/17/2014

**Original Completion Date:** 9/9/2016

**Final Completion Date:** Under Construction, July 31, 2018

**Reason for Difference:** After contract award, EFLHD, directed the Design-Build Team to explore additional alternate concepts. The alternate proposal involved switching the project's major interchange to an at grade diverge which would have eliminated a complex structure and significant MSE wall embankments. Ultimately, stakeholders with competing interests and goals, along with additions to the project such as a desire for increased highway capacity, made the alternate proposal no longer cost effective as deemed by EFLHD. Subsequently, and after several iterations of the alternative concepts spanning more than a year, ELHD directed the Design-Build Team to return to the original technical proposal as submitted.

### Project Description

The Federal Highway Administration (FHWA), Eastern Federal Lands Highway Division (EFLHD) was asked by VDOT, to deliver a project to improve access to the Naval Station Norfolk (NSN) and Norfolk International Terminal (NIT). The new highway would help alleviate congestion, improve the level of service on city and naval station streets, and reduce traffic on the adjacent roadways, particularly important given the mission critical nature of the nearby facilities and naval air station. Stantec, in Joint Venture with another firm, is the Lead Designer under a subcontract with Cherry Hill Construction, Inc., the Design-Builder.



The project elements include a new I-564 Intermodal Connector, a reconfigured Commercial Vehicle Inspection Station for NSN access to a relocated NSN Gate 6, widening of I-564, relocation of Patrol Road, and repaving of Ingersol Road. The new Intermodal Connector will extend from the existing I-564 around Terminal Boulevard on the east to the NSN Gate 6 and NIT on the west, representing approximately 2.82 miles of four-lane limited access highway. The proposed improvements include the construction of interchanges, local connectors, bridges, and storm water management facilities. Adjustments and tie-ins will be required at the interface with the Virginia Port Authority (VPA) and Norfolk Southern (NS) Railroad.

### Stantec's Role in this Project

The following are elements of the project were performed and delivered by Stantec forces as part of the Lead Designer:

- As the joint Lead Design firm assisting in project management, oversight and resource allocation.
- Stormwater management master planning and custom erosion and sediment control planning coordinated with various project stakeholders, including EFLHD, U.S. Navy, VDOT, City of Norfolk, and Virginia Department of Environmental Quality (DEQ); compliant with the Virginia Stormwater Management Program (VSMP) and the Energy Independence Security Act (EISA) of 2007.
- Utility relocation design along I-564 including water lines, sewer lines, overhead and underground electrical lines.
- Utility coordination with Cox Cable, Dominion Virginia Power, Virginia Natural Gas, Verizon, and Level 3, as well as the Naval water, sewer and electric utilities.
- Wetland investigation and impact mitigation.
- Extensive traffic modeling for the Navy gate operations to determine queue lengths and the ramp split locations from the mainline.

### I-564 Intermodal Connector Design-Build ► CONTINUED

- Development of detailed MOT schemes and plans for phasing and construction of the I-564 widening.
- Design of three (3) new Bridge Structures:
  - Ramp C Bridge carrying WB Lanes of Intermodal Connector over existing EB & WB I-564. This is a 460-foot-long, three-span, curved steel girder structure supported on two straddle bents and MSE abutments. The straddle bents consist of steel box girders supported on rectangular columns and pile foundation. The bridge is 53'-20" wide measured out-to-out.
  - A dual Bridge carrying EB & WB Intermodal Connector over Bousch Creek consisting of a 60-foot-long, single span, Prestressed Concrete Bulb-T Beam Superstructure supported on integral abutments.
- Right-of-Way acquisition services.
- Pavement rehabilitation and proposed pavement design for flexible and rigid pavement in areas of weak subgrade.
- Extensive ITS design for traffic monitoring.
- Signing design, including overhead sign structures and DMS for multiple destinations.
- Highway lighting through the corridor using the latest VDOT LED standards and requirements.

Stantec performed extensive alternatives analyses and permitting of wetland impacts in this tidally influenced area. Additionally, the stormwater management compliance, given myriad of stakeholders, property owners, and technical criteria, required a multi-faceted demonstration to the DEQ for acceptance and approvals. This was inclusive of a "Maximum Extent Practicable" analysis for use of innovative on-site and off-site treatment options and conformance to state and federal water quality standards.

### Successful Methods, Approaches and Innovations

- Engaging and partnering with stakeholders with competing goals through task force meetings and forum groups early on in the process to inform them of issues, solicit their input, and get their buy-in of solutions.
- Mitigating potential wetland impacts by adjusting mainline alignment.
- Accommodating future projects that extend parallel to the Intermodal Connector.
- Innovative use of MSE walls below existing grade at Bousch Creek Bridges to reduce the span and consequently minimizing the fill impacts to the existing concrete waterway channel.

### Contract Relevance to MD 32 D-B

- New roadway, roadway reconstruction, widening and traffic safety improvements
- Complex bridges
- New interchange and intersection reconstruction
- Complex maintenance of traffic and construction staging
- Extensive coordination with utility companies for underground and overhead utilities
- Significant number of SWM & BMP facilities
- ITS Facilities
- Replacement of existing culvert and drainage structures, and hydraulic capacity improvements
- Environmental mitigation and permitting
- Innovative, cost-saving design and construction techniques
- Coordination with railroad company
- Extensive stakeholder coordination and public outreach
- Partnering meetings and issue resolutions

### Key Staff

*Simon Simon, PE – Design QA Manager*



## MD 32 at Linden Church Road Interchange Design-Build ► Howard County, MD

**Firm:** Concrete General, Inc.

**Owner:** Maryland State Highway Administration

**Contact:** Mr. Brian Pickens (301) 674-4531

**Project Delivery Method:** Design-Build

**Initial Value:** \$10.6M

**Reason for Difference:** Owner approved bridge re-design and bridge construction costs associated with re-design.

**Final Value:** \$10.7M

**Schedule:**

**Commencement Date:** 3/2012

**Original Completion Date:** 11/2013

**Final Completion Date:** 11/2013

**Reason for Difference:** N/A

### Project Description

The project consisted of the design and construction of a full diamond interchange at MD 32 and Linden Church Road, which replaced two existing intersections to improve safety and alleviate traffic; construction of a roundabout at the proposed intersection of Linden Church and the northbound ramp termini on the east side of the interchange; a new bridge over MD 32 to provide improved access to the local roadway network; realignment of Linden Church Road west of MD 32 to form a new T-intersection with Ten Oaks Road; and a 700-foot section of Ten Oaks Road. Additional improvements included:

- 0.83 miles of pavement widening and rehabilitation of the existing MD 32.
- Realignment of the local road and driveways.
- Installing new closed drainage systems, new SWM facilities, and ESC.
- Perennial and intermittent stream channel work within the Middle Patuxent watershed.
- Landscaping, signing, pavement marking, and utility relocation.



Major quantities of work for the project include 118,000 CY of excavation / borrow, 14,000 tons of asphalt, 2000 LF of storm drainage pipe and 8,000 LF of underdrain. The purpose of the MD 32 at Linden Church Road project was to enhance the safety and operations along this section of MD 32 and integrate with the ultimate MD 32 corridor improvements. MD 32 Phase 2 (from Linden Church to I-70) project is the subsequent project along the MD 32 corridor and encompasses the improvements that CGI has constructed (MD 32 at Linden Church Road) or is constructing MD 32 Phase 1 (from MD 108 to North of Linden Church Road). CGI's knowledge of local traffic patterns, soil conditions and utilities garnered during the construction of this interchange project and during the on-going MD 32 Phase 1 project will facilitate early identification of potential issues on the MD 32 Phase 2 project. Our knowledge of this corridor will allow for a shorter construction period, as many potential issues / delays will already be addressed during the design process.

### Concrete General's Role in this Project

As the Design-Builder, Concrete General, Inc. was responsible for all design and construction, including roadway, interchanges, bridge, drainage, ESC, SWM, MOT, lighting, signing, pavement markings, signalization, environmental permits / compliance, utility coordination/ relocation, and public outreach. The purpose of this interchange project was to enhance the safety and operations along this section of MD 32 and integrate with the ultimate MD 32 corridor design. Currently, CGI is the design builder for the ongoing MD 32 from MD 108 to North of Linden Church Road project which encompasses the improvements CGI constructed under the MD 32 at Linden Church Road project.

### Successful Methods, Approaches and Innovations

CGI worked successfully with MDOT SHA and MDE in coordinating with environmental agencies, inspecting ESC, SWM, and wetlands, and proactively monitoring the maintenance of these devices during the construction phase.

## MD 32 at Linden Church Road Interchange ► CONTINUED

During design, CGI, implemented several quality control procedures. The first of these was quality control review by senior personnel for each submission. Each discipline of the design was reviewed by experts in their appropriate fields. In-house design procedures and checklists were used to verify that designs met MDOT SHA, MDE, MUTCD and AASHTO standards.

The second quality control procedure were constructability reviews by CGI provided during the design process to minimize potential field problems. The third procedure used was bi-weekly team meetings to keep communication lines open between design and construction personnel. CGI reviewed the project progress in accordance with the CPM schedule, set action items for each team member to accomplish and discussed methods to keep the project on schedule for unforeseen circumstances. Minutes of each meeting were prepared and distributed with the action items of each team member listed. Holding bi-weekly team meetings as well as having monthly partnering/progress meetings helped streamline the design/review process and identified, addressed, and resolved any construction issues that arose.

A major objective of the project was the implementation of an effective ESC plan including the installation of initial and interim ESC measures that were required during the construction phasing. Another major objective was the inspection and maintenance of the ESC that were in place. The ESC measures along with the significant SWM facilities were installed within a limited ROW similar to the current MD 32. CGI met and exceeded the ESC requirements throughout the construction and maintenance period. This experience of design and construction of the SWM facilities within a limited right of way will enable us to work with SHA in minimizing the private property required for environmental resource management.

Partnering meetings were held and were a key element in providing clear communications among all project stakeholders. Every participant benefitted from the Partnering process so that unified relationships with all parties were built, which helped to resolve project issues in a cooperative and expedient manner. One of the keys to this successful project was the integration of contractor and designer during the design process and construction. The team identified challenging issues during design and developed the most efficient approach to mitigate the issues. CGI's continuous involvement in the preparation of contract plans minimized issues that typically arise during construction.

Accommodating traffic without causing delays or compromising the safety of motorists was an important community issue. Through the use of the public outreach program and on-going communication with Howard County public officials, impacts were minimized to the traveling public during construction along with providing greater awareness of the construction schedule. Uninterrupted utility services was another priority for the community, as several neighborhoods were located along the project limits that would have been impacted from service interruptions. Overhead and underground utilities included gas, electric, communications, phone, and cable in addition to a major gas transmission facility that required protection during the construction. Since we are familiar with the local communities, county officials, and utilities along this section of the MD 32 corridor, having already interacted with these same stakeholders, we will be able to more quickly re-establish these lines of communications to help address these stakeholders' concerns. CGI's knowledge of local traffic patterns, soil conditions and utilities garnered during the construction of this interchange project and during the on-going MD 32 Phase 1 project will facilitate early identification of potential issues on the MD 32 Phase 2 project. Our knowledge of this corridor will allow for a shorter construction period, as many potential issues/delays will already be addressed during the design process.

### Contract Relevance to MD 32 D-B

- Location of Project – MD 32 from South of Linden Church Road to I-70 ties into this project.
- Similar geotechnical conditions
- Similar traffic conditions – heavy AM southbound and PM northbound
- Traffic safety improvements
- Complex Structure
- New interchange, intersection reconstruction
- Complex maintenance of traffic and construction staging
- Significant number of SWM & BMP facilities
- Environmental mitigation and permitting
- Extensive stakeholder Coordination

### Key Staff

*Shannon Brown – Construction Manager*





# “Award Winning” MD 355 at Montrose Road / Randolph Road from “Old” Old Georgetown Road to Maple / Chapman Avenue Design-Build

## ► Montgomery County, MD

**Firm:** Concrete General, Inc.

**Owner:** Maryland State Highway Administration

**Contact:** Mr. Mark Dougherty (301) 513-7372

**Project Deliver Method:** Design-Build

**Initial Value:** \$24.8M

**Final Value:** \$25.4M

**Reason for Difference:** Additional work added at the request of MDOT SHA

### Schedule:

**Commencement Date:** 01/2008

**Original Completion Date:** 10/2010

**Final Completion Date:** 10/2010

**Reason for Difference:** N/A

### Project Description

This project consisted of the design and construction of a grade-separated interchange at MD 355 and Montrose Road / Randolph Road. The project included:

- Widening and resurfacing of MD 355 and “Old” Old Georgetown Road.
- Construction of relocated Randolph Road on new alignment.
- A new bridge on MD 355 over Montrose Parkway, approximately 179 LF long.
- Architectural treatment on the bridge.
- A hiker / biker trail and sidewalks throughout the interchange.
- Three interchange ramps on new alignment.
- Full-depth and partial-depth pavement patching; concrete pavement and patching; bridge joints; carbide grinding; spall repairs; and pile driving.
- MOT including a major detour of an 8-lane state highway.
- Temporary drainage; closed/open drainage systems; culvert extensions.
- Structure demolition.
- SWM quality and quantity facilities; maintaining waterways; maintenance of stream flow; and ESC.
- Retaining walls.
- Landscaping and reforestation.
- Signing, pavement markings, signalization, and lighting.
- Utility relocations and coordination.



### Concrete General's Role in this Project

As the Design-Builder, Concrete General, Inc. was responsible for all design and construction, including roadway, interchanges, bridge, drainage, ESC, SWM, MOT, lighting, signing, pavement markings, signalization, environmental permits / compliance, utility coordination/ relocation, and public outreach.

This grade-separated interchange provided capacity and safety improvements and eliminated a major intersection in the MD 355 corridor. The improvements addressed traffic and development growth in the project area and provided pedestrian connectivity to local shopping centers, apartments, schools and service road, and Park & Ride lots, including sidewalks and bike paths.

## “Award Winning” MD 355 at Montrose Road/Randolph Road from “Old” Old Georgetown Road to Maple/Chapman Avenue Design-Build ► CONTINUED

Our objectives were to meet the construction schedule, provide quality construction, and prepare construction phasing and an MOT plan that minimized traffic impacts and provided safety for the construction workers and traveling public; maintain pedestrian traffic during construction; address the project’s stakeholders’ needs; coordinate utilities; and meet the construction expectations of MDOT SHA and Montgomery County for the roadway, bridge, pedestrian and bicycle pathways, pavement, drainage, signals, signing, lighting, and landscaping.

Management of the environmental impacts during construction by keeping the project within the permitted impacts acreage was very important to maintain the design and construction schedule. The pavement design was developed using the performance specifications that describe how the finished product should perform over time. As the storm drain system was constructed, the roadway excavation was phased for positive drainage into the storm drain system. This sequencing of the drainage and roadway excavation ensured that clean stormwater runoff was diverted in the existing system; and sediment contaminated runoff was either filtered with inlet sediment traps or treated through our proposed sediment ponds and traps.

### Successful Methods, Approaches and Innovations

CGI engaged an experienced construction team at the onset of the project to work during the design phase with our design partner to develop a design that was cost-effective and constructible, leveraging the collaboration afforded with the design-build process. We were very successful in coordinating designs and working with other agencies and the public.

The design schedule was developed and achieved to construct the project on time. To avoid a delayed start, the storm drain within the shopping center area was designed to avoid major utility conflicts. Project completion dates and construction costs were met, and the final contract value was increased to include additional work at MDOT SHA’s request.

CGI Design-build Team and MDOT SHA received 2011 MdQI Award of Excellence for Major Roadway over \$10M; as well as the 2011 American Society of Civil Engineers for Outstanding Large Project Award.

### Contract Relevance to MD 32 D-B

- New roadway, roadway reconstruction, widening and traffic safety improvements
- Complex structures
- New interchange, intersection reconstruction
- Complex maintenance of traffic and construction staging
- Extensive coordination with utility companies for undergrounding and overhead utilities
- Significant number of SWM & BMP facilities
- Replacement of existing culverts, and hydraulic capacity improvements
- Environmental mitigation and permitting
- Innovative, cost-saving design and construction techniques
- Extensive stakeholder coordination
- Major detours of existing heavily traveled state highway

### Support Staff

*Steve Beckley – Project Scheduler*

*Larry Smith – Structures Manager*

*Mark Miller – Project Controls*

*Carlos Breckenridge – Surveys*



# MD 124 from South of Airpark Road to Rosewood Manor Lane Design-Build

## ► Montgomery County, MD

**Firm:** Concrete General, Inc.

**Owner:** Maryland State Highway Administration

**Contact:** Mr. Victor Grafton (301) 513-7385

**Project Delivery Method:** Design-Build

**Initial Value:** \$29.5M

**Final Value:** \$30.9M

**Reason for Difference:** Owner added left turn lane, relocated additional sewer, water, gas facilities, and asphalt cement price adjustments.

### **Schedule:**

**Commencement Date:** 10/2007

**Original Completion Date:** 6/2010

**Final Completion Date:** 10/2010

**Reason for Difference:** Owner approved delays from a delayed NTP, extended review and re-submittal time for MDE approvals, additional ROW acquisition, and impacts from record snow fall events.

## **Project Description**

The project consisted of the design and construction for the widening of MD 124 for 1.6 miles from a four-lane to a six-lane highway. MD 124, an arterial highway, is located in Montgomery County with the project beginning south of Airpark Drive and continuing to the Rosewood Manor Lane intersection. In addition to the widening and reconstruction of MD 124, improvements included:

- Resurfacing of side streets and tie-ins.
- A new closed drainage system.
- SWM quality and quantity facilities.
- Landscaping.
- Noise abatement screen walls.
- Retaining walls.
- On-street bicycle facilities and new sidewalks.
- Reconfiguration of existing traffic signals, two new traffic signals including one at the Hadley Farms Drive South / Barcellona Drive intersection, signing, marking, intersection and pedestrian lighting.



Major quantities of work for the project included: 95,000 CY of excavation, 77,000 tons of asphalt, 15,000 LF of storm drainage pipe, 35,000 LF of underdrain pipe, and 33,000 SF of noise wall.

## **Concrete General's Role in this Project**

As the Design-Builder, CGI was responsible for all design and construction, including: roadways; intersections; drainage, SWM, ESC; retaining walls; noise barrier; sidewalks; traffic signalization, lighting, signing, pavement markings; landscaping; environmental permitting and compliance; utility coordination/ relocations; and public outreach.

CGI provided constructability review for all phases and elements of the design. This included meeting with the design team to discuss and recommend construction phasing that will work with the personnel, equipment and subcontractors as well as discussing construction options for material availability, staff resources, subcontractor costs and design schedules. CGI recognized that all of these factors must be incorporated into a successful project. Joint development of the project schedule by the Team was also important to identify all design and construction activities and define how design submissions and construction work was scheduled to avoid delays or conflicts with the weather, maintenance of traffic (MOT), and religious services or school areas. The involvement of our design staff in the procurement and

construction phases related to assisting the construction staff with construction related issues and modifying the design to address site conditions. Typically, detailed discussions took place concerning the utility conflicts, or MOT phases, and changes were made to reduce phases or expensive traffic controls. For example, we used more temporary pavement to

## MD 124 from South of Airpark Road to Rosewood Manor Lane Design-Build ► CONTINUED

save a traffic shift phase and reduce construction time and improve safety. CGI was successful in working with MDOT SHA and MDE in coordinating with environmental agencies, inspecting ESC, SWM, and wetlands and proactively monitoring the maintenance of these devices during the construction phase.

### Successful Methods, Approaches and Innovations

CGI developed a strong Partnering relationship with MDOT SHA and the Design-Build team members that resulted in both constructability and traffic issues being resolved during the design process and minimizing impacts during construction. During the design process, the conceptual roadway profile was studied in detail at the intersections and it was determined that the proposed profile required a complex MOT plan, resulting in major impacts to traffic during construction. The profile was adjusted accordingly, which resulted in a more simplified traffic control plan and thus minimized impacts to the traveling public during construction. This provided SHA with a project reflecting the practice of good judgement and sound decisions.

Along the corridor, there was a variety of businesses with direct access to MD 124 requiring access to be maintained during construction. Instead of maintaining the existing entrance with phased construction, a plan was developed to construct temporary entrances, so the existing entrances could be reconstructed entirely without maintaining traffic. This method resulted in positive feedback from the business community. Soil stabilization of the in-situ material was performed, which eliminated the undercutting of the existing material. This saved both cost and time from not having to perform additional excavation and disposal of the unsuitable material plus the additional backfill. During construction, several unknown utilities were discovered. MDOT SHA and the utility owners were immediately notified to determine an appropriate plan.

Working with the design team, MDOT SHA and the utility owners, made a decision to relocate the utility. A relocation design was prepared, and the utility was relocated in as expedient manner as possible, limiting impacts to the project. The utilities were relocated outside the roadway pavement structure to eliminate future impacts to the roadway during any maintenance of the utility. This project emphasizes our experience in identifying and resolving potential issues and impacts. The revisions to the roadway profile grades, installation of temporary entrances, and use of soil-stabilization all worked to minimize construction time and delays to the public during construction.

CGI was successful in partnering with MDOT SHA and MDE to develop and implement an effective environmental management program for the project. This included the design of ESC measures and permanent SWM facilities. We proactively installed, monitored and maintained all ESC measures and permanent SWM facilities throughout the project. This experience will help in designing an overall environmental resource management program that requires minimal property acquisition.

### Contract Relevance to MD 32 D-B

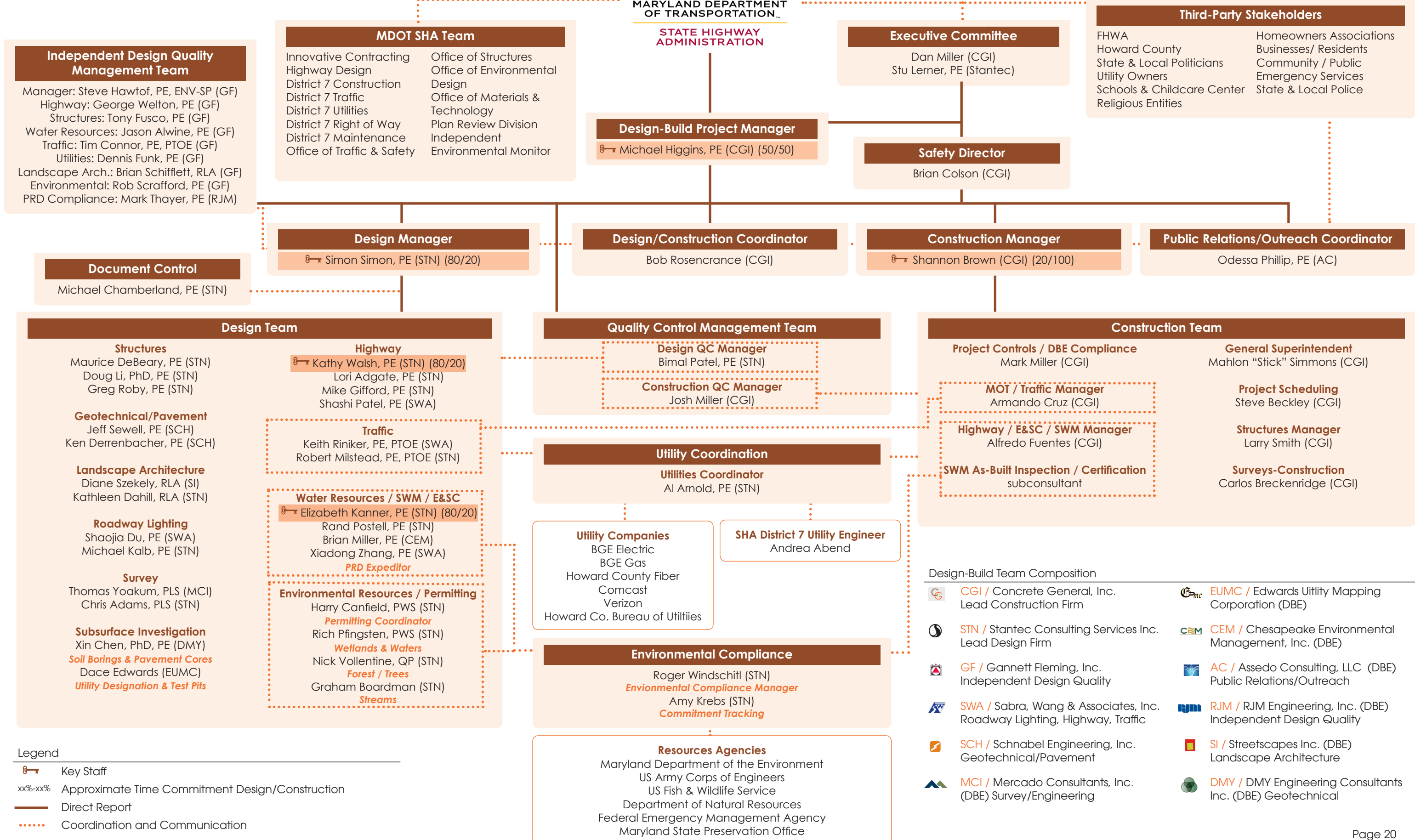
- New roadway, roadway reconstruction, widening and traffic safety improvements
- Interchange/intersection reconstruction
- Complex maintenance of traffic and construction staging
- Extensive coordination with utility companies for undergrounding and overhead utilities
- Significant number of SWM & BMP facilities
- Replacement of existing culverts, and hydraulic capacity improvements
- Environmental mitigation and permitting
- Innovative, cost-saving design and construction techniques
- Extensive stakeholder coordination
- Detours of existing heavily traveled state highway

### Support Staff

*Mahlon "Stick" Simmons – Superintendent*  
*Steve Beckley – Project Scheduler*  
*Mark Miller – Project Controls*  
*Carlos Breckenridge – Surveys*

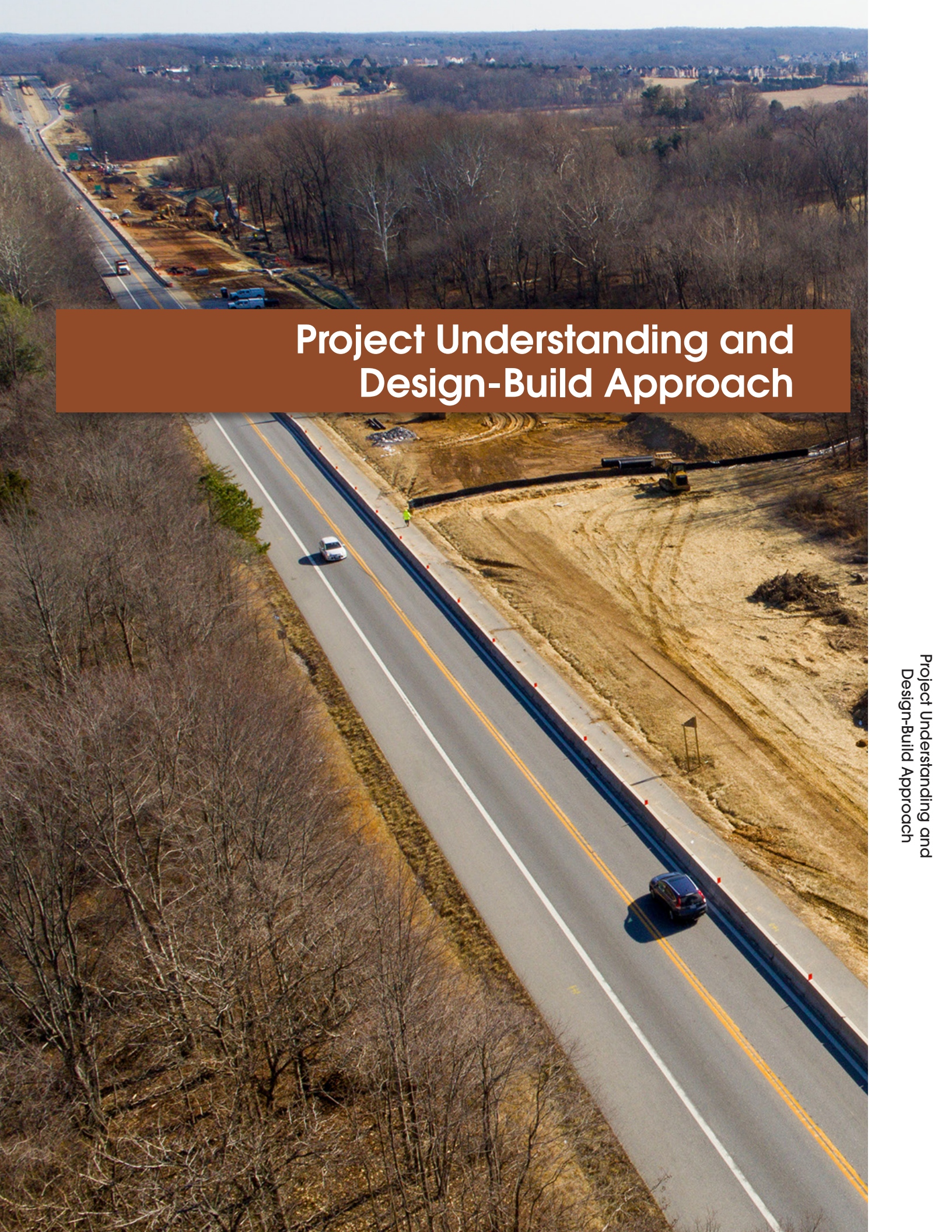


# MD 32 – South of Linden Church Road to I-70 Design-Build



**Legend**

- Key Staff
- Approximate Time Commitment Design/Construction
- Direct Report
- Coordination and Communication



# Project Understanding and Design-Build Approach

## i. Understanding of the Project Goals and Scope

The success of a Design-Build (D-B) project is a combination of effort by MDOT SHA, the Contractor, and their design team to meet the project goals on time and within budget, and it can be accomplished by an experienced team that understands how to plan and execute the work. The goals are often to minimize impacts to the built and natural environments, minimize impacts to the travelers during construction, construct the roadway in a way that is safe for travelers and workers, and provide a final product that is safe, effective and of high quality. This responsibility will ultimately fall on the D-B Contractor and their Design team. The construction professionals, engineers and designers at the Concrete General, Inc. and Stantec Consulting Services Inc. D-B Team (CGI Team) have decades of experience working on D-B contracts, working with MDOT SHA (currently on Phase 1 MD 32 Widening), and obtaining permits and approvals. This experience will be reflected in quality of our work, quick responsiveness, ability to mitigate challenges and risks, and ultimately lead to a successful project.

### Understanding the Scope

The purpose of this project is to improve safety and capacity throughout the MD 32 corridor while attempting to minimize right-of-way (ROW) impacts; residential and business displacements; and environmental impacts. This section of MD 32, described in this proposal, is just one phase of multi-phased corridor improvements, some of which have been completed or under construction, and some of which are planned for the future. This project is a fixed price / best design D-B contract.

This project will create a divided highway for the dualization of MD 32 – South of Linden Church Road to the I-70 interchange, from what is currently a 2-lane road. The corridor is in Howard County and is approximately 6.5 miles long. Improvements to this highway have been occurring in stages and a section of it is currently being widened from MD 108 to just north of Linden Church Road. MDOT SHA has future plans to construct interchanges at locations that are now at-grade intersections, but these interchanges will not be part of this construction project.

The scope of this project includes the design and construction of two lanes for southbound traffic and converting the existing roadway to two lanes for northbound traffic. The roadway will be an open section with a grassed median and median traffic barrier. Acceleration and deceleration lanes will be constructed at all cross-roads; however, reducing the number of access points will be a critical feature of the design. The proposed design for MD 32 will accommodate the design of the future interchanges.

MDOT SHA has received approval of an Environmental Impact Statement through a Record of Decision issued by FHWA, and received approval on a reevaluation of the FEIS based on the current concept design. MDOT SHA will obtain the MDE and WUS permits, as well as the Reforestation permit. The SWM and ESC permits will be obtained by the D-B Contractor. ROW is being acquired by MDOT SHA.

Utility relocation designs are being completed by the utility owners. It will be the D-B Contractor's responsibility to coordinate with the utility owners during the concurrent construction of the relocations and roadway work.

Three bridges will be designed and constructed within the project limits: MD 32 over the Middle Patuxent River, MD 32 over the Terrapin Branch, and the Triadelphia Road Bridge over MD 32. The existing Triadelphia Road Bridge crosses the two existing lanes of MD 32. The new bridge will replace the existing structures and will cross the four lanes of MD 32.

### Understanding the Goals

The CGI Team's main goal is to meet the overall expectations for this project and provide to the State a facility that can be constructed quickly, efficiently and of design excellence. Another critical factor is to deliver this project within the required budget of \$85,250,000. Because of our experience in the State and working on local D-B projects, we understand how to accomplish this by being partners with the State and local review agencies, proactively addressing issues, designing the corridor elements with a thorough knowledge of the State and Federal design criteria, and practical design methodology. Our current invaluable experience providing similar services to the section of MD 32 from MD 108 to Linden Church Road, and the previous Linden Church Road Interchange project, as well as the I-270 ICM cannot be duplicated by any other contractor.

MDOT SHA has defined three goals for this project, listed below, to meet or exceed. The CGI Team is confident that with our commitment to providing the expertise, staff, workforce, and, with our local knowledge of the area and MDOT SHA and State processes and permit requirements, we will design and construct the proposed facility that meets these goals. CGI



has been providing construction and D-B to the State for many years and understands the importance of planning and partnering for a successful result. The three main goals for this project are:

**1. Provide a project that maximizes the project elements to improve corridor traffic operations and safety while being compatible with the future planned corridor improvements**

The CGI Team will develop the design of the project to ensure that the newly constructed roadway will be a safe corridor to travel, align with future interchange construction, and meet the requirements for operations. This will require the team to look at the performance of the MD 32 roadway, as well as each section that connects to the existing road network (and future interchange ramps). A safe facility requires all aspects of the design to meet State and Federal standards for roadway design, while including Practical Design methodology. But beyond following design criteria, access management will be a key feature of the proposed road design to maximize the capacity of MD 32. We understand the importance of reviewing the current access points to ascertain they will provide safe intersections for those traveling along and those entering and exiting MD 32. Reducing the access points by consolidating them through service roads connections will reduce conflict points on MD 32 and create safe locations for turning movements.

**RELEVANT PROJECT EXPERIENCE**  
*D-B I-270 Innovative Congestion Management will improve traffic operations, safety and access. Proposed modifications will integrate with future planned improvements*

Our review and modifications to the Concept Design plans will include a thorough investigation access points including: access spacing, driveway spacing (removal from direct access to MD 32), turning lanes, median treatments, and right of way issues with land locked properties. To provide efficient means of access without disruption to MD 32 traffic flow, we will consider innovative intersection design such as restricted crossing U-turns, median crossing U-turns, and merging left turns. Our Team will include traffic control features to meet industry standards including AASHTO Roadside Design Guide, HSM and MUTCD. Our design of will have provisions for the proposed MD 32 corridor future interchanges at the MDOT SHA Dayton Shop, Rosemary Lane, and MD 32/ I-70 ramps, and will ascertain that both proposed and future elements will work safely and efficiently together. In addition, we will sequence construction work to construct the ramp widening and double left-turn lanes on northbound and southbound MD 32 to westbound and eastbound I-70 as the first order of work, thus increasing capacity and enhancing safety for these movements early on and during the entire construction period. A similar effort will focus on construction and widening of the channelized movements at the intersection of MD 32 and MD 144 to increase capacity and enhance safety during the entire period of construction.

**2. Provide a project that minimizes inconvenience to the community and the traveling public.**

Inconvenience to the community and traveling public during construction cannot be underestimated and will receive significant attention by our CGI Team. The inconvenience during construction is most often related to the safety and efficiency for drivers and problems are often caused by the sequence of construction, interrupted access to and from intersections within the corridor, complicated detours, location of construction entrances and unsafe maneuvers by construction vehicles, lack of proactive communications and outreach with the public and stakeholders, lengthy construction schedule, shifts in peak hour traffic volumes between AM and PM, excessive delays and standing queues, and lack of reasonable access to emergency service providers (Police, Fire, Medical, Snow Plowing, etc.). All of these inconveniences are relevant to this project and should be studied in a proactive manner to avoid issues that cause inconveniences to the public, especially for implementing detours during construction. We have reviewed the project and understand there are a few locations along the corridor that may have additional challenges in regard to the development of the TMP and construction phasing, and they are:

**RELEVANT PROJECT EXPERIENCE**  
*MD 210 Livingston Road/Kerby Road D-B project is currently under construction. This project has similar traffic patterns to MD 32. CGI has implemented traffic control measures to minimize impacts to the traveling public along with providing weekly and monthly newsletters to inform residents of ongoing and upcoming work*

- **Triadelphia Road Bridge:** Facilities / features located in the close vicinity of the bridge and along Triadelphia Road include Folly Quarter Middle School and Triadelphia Ridge Elementary School east of MD 32; a roundabout intersection with Ten Oaks Road to just west of MD 32; and a commercial area along Ten Oaks Road. Construction of the new bridge will require minimizing the impact to the traveling public to and from the schools and commercial area. A project requirement will be to maintain a west bound lane while the east bound traffic will be detoured.



- **Event traffic from the Howard County Fairgrounds:** West Friendship Elementary School is located on MD 144 (Frederick Road) east of MD 32, and Howard County Fairgrounds is along MD 144 west of MD 32. The Howard County Fairgrounds holds events year-round with most events on Saturdays and Sundays. The week-long fair in August will generate the most traffic volume.
- **Existing intersections:** Dayton Maintenance Shop, Parliament Place, Rosemary Lane, Fox Chase Road, Nixon's Farm Lane, Orlando Drive, and Stiles Way are all existing access points on MD 32 that will be re-designed as part of this project.
- **Stream Crossings:** New bridges are required for the new roadway lanes and existing lanes at the Middle Patuxent stream and the Terrapin Branch stream. Two lanes of traffic will need to remain open while a bridge is constructed over the streams and the streams are relocated.

To achieve this goal, the CGI Team will leverage our design and construction expertise to explore innovative solutions and practical design methods that will minimize the design / construction time, while safely providing access and capacity for drivers. We will develop and implement a Transportation Management Plan (TMP) with strategies to help minimize delay to the traveling public and maintain a safe work zone. The TMP will include a temporary traffic control plan, an MOTAA, events work zone analysis, monitoring of conditions, safety and mobility red flag summary, coordination with Motor Carrier Division, incident management plan, coordination with CHART and a public outreach component. A thorough and expansive public outreach plan will employ strategies to keep all stakeholders and drivers informed of scheduled lane closures, delays, and detours. The CGI Team will assign a full-time Traffic Control Manager (TCM) to this project to ensure that all work zones will be safe for all day and night time hours.

Our construction phasing plan will be developed to: separate vehicular conflict points during construction to minimize confusion by motorists and enhance safety to construction workers and the traveling public; and leverage ultimate and temporary roadway improvements at intersections, roadway sections, and ramps early on in the project to maximize capacity of the existing and newly-built facilities. The phasing will provide strategic locations for construction entrances and access by construction vehicles to avoid compromising safety and capacity along MD 32. Horizontal, vertical and intersection sight distances, drive expectancy, and location of construction entrances, in reference to adjacent intersections, will be analyzed for the most effective locations.

Our plan for phasing the construction of the Triadelphia Road Bridge will minimize lane closures and the need for a detour by utilizing innovative bridge construction techniques to reduce the time needed for each phase of construction, and evaluating the use of a temporary structure to remove traffic and allow for fewer construction phases.

3. Provide a project that minimizes overall impacts (utilities, environmental resources, etc.) and provides proactive coordination

**RELEVANT PROJECT EXPERIENCE**  
*MD 32 Phase 1 Widening D-B is being constructed by CGI on the most aggressive schedule to reduce work zone impacts and open the facility to travelers as fast as possible*

Based on CGI Team's decades of experience working in Maryland for MDOT SHA, other MDOT Busines Units, and local jurisdictions, as well as on projects of a similar scope and size, we have thorough understanding of the issues and impacts that may arise on this MD 32 Phase 2 project. Our approach from the beginning will be to plan for potential impacts and proactively confront them to find the right solutions minimizing their affect. Our Team will propose ATC's to improve the proposed design to minimize it's footprint; we will use innovative materials that can be constructed in

less space with less grading required; and we will make certain we understand where the significant features (environmental, utility) are located and understand what is important to the stakeholders. We will be designing and constructing the project to minimize impacts to the environment, the adjacent properties, and utilities.

**Minimize Environmental Impacts:** One of our highest priorities is the minimization of impacts to environmental resources. We understand that the State has made commitments to the Federal and State regulatory agencies; including the Maryland Department of the Environment (MDE), Maryland Department of Natural Resources (DNR), Maryland Historical Trust (MHT), U.S. Army Corps of Engineers (USACOE), and U.S. Fish and Wildlife Service (USFWS) to protect cultural, water, and terrestrial resources. Based on the Record of Decision (ROD) for the project, our team understands that no historic sites will be impacted by the selected alternative, but one archeological site will be impacted and that a Memorandum of Understanding with the Maryland State Historic Preservation Officer has been executed. We also are aware that new bridges will be needed over Terrapin Branch and Middle Patuxent River, and that the Rosemary Lane tributary will be restored to provide compensatory mitigation.



Double Box Culvert Near Rosemary

We will implement numerous measures to identify and minimize project impacts to regulated resources. This process includes developing a commitment tracking database, implementing an extensive environmental coordination plan, meeting with stakeholders, and proactively designing, preparing, and submitting permit modification request and SWM/ ESC plans for review and approval. This includes:

- Performing a comprehensive review of the Project RFP and all related specifications, guidelines, regulations, permits, special conditions, and time of year restrictions to gain a complete understanding of the project requirements and approval process.
- Building and maintaining a collaborative partnership with MDOT SHA, SHA-PRD, regulatory and resource agencies, the project's Independent Environmental Monitor (IEM), and other stakeholders.
- Holding weekly internal design / construction coordination meetings with key staff to review designs, evaluate constructability, and identify innovative ways to avoid and minimize impacts.
- Attending a pre-permitting meeting with MDOT SHA, SHA-PRD, and regulatory / resource agencies to gain a complete understanding of permit conditions and requirements, NEPA commitments, permitting and review timeframes, and submittal requirements to avoid unnecessary revisions and resubmittals.
- Submitting the plans, the Avoidance, Minimization, and Mitigation Report, schedules, and environmental review summaries to MDOT SHA for review and submittal to the regulatory agencies with the permit modification request.
- Utilizing Independent Design Quality reviews to ensure complete and quality submittals to SHA-PRD.

We will develop and implement an Environmental Compliance Plan (ECP) that details how our environmental compliance team will work as part of the design team. We will use our collective experience to identify, develop, and implement Best Management Practices (BMPs) within the project design to reduce environmental impacts and risks. A quarterly environmental compliance report will be produced and submitted to MDOT SHA to track compliance commitments throughout design and construction of the project and impacts to resources including wetlands and other Waters of the US, cultural resources, community, forest land, and trees.

We will create a detailed breakdown of each phase of construction and the associated impacts to land, water, and other resources for direct comparison with the permitted impacts and as documentation of our compliance. We will design construction operations in ways to minimize the areas of disturbance, thereby reducing the need for redundant ESC measures, reducing sediment-laden runoff, and increasing water infiltration. Our stream and wetland mitigation specialists, led by *Rich Pfingsten, PWS* (33 yrs. exp.) and *Graham Boardman* (10 yrs. exp.), will provide the expertise to assess and develop stream restoration and wetland mitigation design and construction oversight that meets all project objectives.

**Minimize Utility Impacts:** Coordinating with utility companies and avoiding conflicts with existing utilities will minimize their impacts to the project cost and schedule. We have designated *Al Arnold, PE* (44 yrs. exp.) as our coordinator to regularly monitor and track utility issues. We understand that design of utility relocations has begun but close coordination with those agencies will be an on-going effort in order to ensure the roadway design features are not in conflict with new utility locations. In addition, our Team will perform a thorough investigation of the corridor to gather as much information as possible on the presence of all utilities within the roadway corridor and LOD. Some of the steps we have implemented on previous D-B projects that have been successful includes:

- Bi-weekly progress meetings during design.
- Making certain that the related key staff attend the coordination meetings at the utility agencies.
- Developing an agreed to time frame for construction / relocations.
- Making certain that construction features (bio-swales, storm drain structures) are not in conflict with existing utilities that are to remain in place.
- Adding special protection details for utilities that have less than ideal vertical and horizontal clearances.

**Minimize Impacts to Adjacent Properties:** Although ROW will be purchased prior to design and construction, our Team is aware of the concerns of adjacent property owners. Sound, view sheds, and historic landmarks are all issues to be addressed and considered. Our design team, including *Odessa Phillip* (18 yrs. exp.) from *Assedo Consulting*, our Public Outreach Coordinator, will listen to and respect public concerns and address issues when possible. For example, on previous projects, the CGI Team understood the issues of the homeowners and was able to add landscaping features and berms to block unwanted views. In other cases, it may be necessary to flatten side slopes instead of providing steep 2:1 grades, or provide barriers / walls to avoid excessive clearing of native shrubs and trees. While meeting required design criteria and commitments, our Team will design the project to fit into the community and provide a Context Sensitive dualized roadway.

## ii. Most Relevant and Critical Risks

This is a significant project for MDOT SHA as well as for our CGI Team. With our Team's experience, we understand the risks inherent in a D-B contract, and specifically with this MD 32 D-B project. We will be proactive in facing these risks to minimize their impact and possible effect to costs and schedules. Our management team will use previously implemented methods of risk management to identify, assess, assign, mitigate and monitor risks. Working together as a team toward a successful project, and with our experience on other D-B contracts in this same corridor, we are confident that risks will be addressed and managed so as not to have an overall impact on the cost or schedule of this project.

At the start of the project, a formal risk analysis will be performed, measuring the likely hood of a risk occurring and the severity of the impact it could have on the project cost, schedule, and goals. With our cursory review of the project, we have developed a preliminary list of risks. Based on our current experience working on the MD 32 widening project, our knowledge of MDOT SHA criteria and permit processes, and a thorough review of the available project data, concept plans, and FEIS document, we have developed a preliminary list of risks discussed below. Although each project is unique, with our depth of experience, we are confident we have successfully handled these risks on past projects, and will be successful in managing them on this project.



### RISK: Maintenance of Traffic

- **Why:** Safety to traveling public and construction workforce, access, traffic congestion and delays, construction schedule delay and inconvenience to the public are all reasons why MOT is a risk to this project. Unless maintenance of traffic control plans and sequence of construction are prepared in a safe, practical, and constructible manner, they could affect safety, mobility, construction schedule and cost, and cause inconvenience to the motoring public. Managing safe and efficient access to all existing traffic movements and modes of transportation within and adjacent to the limits of the project is always a priority for the CGI Team, whether it is for the workers at the site, schools, or emergency medical service providers, and/or for motorists and pedestrians traveling through a construction zone. In addition to safety, access to local driveways and intersections with the least friction from the work zone and construction activities is critical to minimize traffic delays and distractions, as well as providing sufficient work zone clearance for construction of the new roadway.
- **Impact on Goals:** Two of the main goals for this project are to improve corridor traffic operations and safety and minimize inconvenience to the community and the traveling public. These safety concerns and inconveniences include: accidents within and adjacent to the project; lack of mobility and accessibility to reach certain destinations; confusing traffic patterns; road closures; detours that are considered beyond reasonable travel time when compared with existing travel route; distractions caused in work zones such as night glare, unexpected movement of construction vehicles, and improper location of traffic control devices; lack of public outreach and advance information about the construction activities and schedule whether it is a detour, lane shift or an overall change in traffic patterns; excessive travel time delay; slow clearance of traffic incidents; and not clearing debris off the road. These impacts may have implications on credibility of MDOT SHA's mission and the project team, and create a distrust by the local communities and the motoring public.
- **Mitigation Strategies:** Our Team will address the related risks to MOT when we develop the project's comprehensive TMP. Our Team has participated in more than a dozen complex design-build contracts over the past 10 years, which have required the preparation of comprehensive TMPs. Our TMP plan will identify stakeholders, public outreach activities and stakeholder team-building strategies; traffic control management; alternative and preferred MOT plans and sequence of construction; MOT Red Flag summary; detour options and impact assessment; location of construction entrances and access to construction vehicles and equipment; access to emergency service providers; incident management plans; coordination liaisons with various MDOT SHA offices (TEDD, CHART, TDSD, MCD and others), Howard County Police, local Fire Departments, and local schools; and monitoring and evaluation of mobility and safety measures during construction.

Our Public Outreach Coordinator will play a major role in meeting this goal to keep all stakeholders informed, especially when traffic patterns and access control to local intersections will change from full movement access to controlled movement access under the new dualization design. The sequence of construction will play a major role in meeting driver's expectations and maximizing benefits of safety and capacity improvements especially for the early construction activities. The Traffic Control Manager also will play a key role in performing safety audits of the implementation of the MOT plans in work zones, checking all traffic control devices for correct size, proper

placement and proper visibility per the requirements of the MD MUTCD, and ensuring adequate sight distances for all movements at intersections. The TMP plan will be updated to maintain accurate records of all field changes to the traffic control plans, sequence of construction, and assessment of impacts on safety and mobility, stakeholder involvement, and public outreach.

- **Role of MDOT SHA:** Our Team will work closely with MDOT SHA to coordinate approvals of the TMP, MOT plans and sequence of construction, to coordinate with stakeholders and assist in arranging meetings, and also to modify the MOT plans and sequence of construction, if needed. We will require MDOT SHA to perform timely reviews of submitted MOT documents for approval in order to maintain the desired construction schedule. MDOT SHA will have provided restrictions on the MOT with the IFB D-B Contract specifications that our Team will abide by including allowable lane closures, days/times allowed for construction, noise restrictions, and detour restrictions. MDOT SHA and District 7 will be responsible for the review of MOT plans to ensure they meet contract, State and Federal regulations. MDOT SHA will assist with arranging for Public Outreach events to keep the adjacent property owners and travelers aware of the construction phasing and changes to routes. MDOT SHA Project Management inspectors will ensure that MOT features in the field match the approved MOT plans. Partnering by MDOT SHA and our Team on the development of a feasible MOT plan will be a combined effort.

### **RISK: Environmental Permits**

- **Why:** Our ability to obtain timely permits/approvals is crucial to the project schedule and meeting goals. Multiple environmental permits and approvals are required for construction of the project. These include wetlands and waterways permits, SWM and ESC permits, Reforestation Law approvals, and NPDES permits. These necessary permits/approvals are issued by several agencies including MDE, USACE, USFWS, DNR, FEMA, and FHWA. We have no contractual obligations with agencies other than MDOT SHA for timely review and approval of our plans and permit applications.
- **Impact on Goals:** Multiple permits and approvals are needed to construct the project. Delays in acquiring permits could result in a holdup in construction and could prolong the inconvenience to the traveling public.
- **Mitigation Strategies:** Our Team is comprised of highly-qualified and experienced staff in preparing environmental design and permit/approval packages for MDOT SHA roadway projects. We will proactively identify and confirm the environmental resources, identify the temporary and permanent impacts to each individual resource based on the concept plans, identify strategies to minimize the impacts, identify the Time of Year restrictions, and carefully review the permit special conditions. Based on our complete understanding of the environmental resources and restrictions, we will employ the following strategies to mitigate the above outlined permit/approval risk:
  - Utilizing our staff's comprehensive knowledge of MDOT's specifications/guidelines and related regulations, our team will review the Project RFP to create a database of the project requirements and necessary permits/approvals.
  - Limit work to the approved/permitted LOD, and partner with MDOT SHA and the permitting agencies to identify and design cost-effective and practical BMPs to minimize the temporary and permanent impacts to sensitive environmental resources.
  - Achieve complete compliance with the COE Section 404 and MDE wetlands and waterways permits through a proactive, well thought environmental compliance plan that dictates timely and efficient reviews of design plans at each design stage to ensure impacts remain at, or below, the permitted impacts.
  - Our team's commitment to quality and to providing well trained and experienced design and construction staff will ensure high-quality contract documents and permit applications.
  - Ensure ESC and SWM design plans meet all requirements of the 2000 MD SWM Manual, SWM Act of 2007, 2011 MD Standards for and Specifications for Soil Erosion and Sediment Control, and MDOT SHA's specific criteria for submissions at each development stage. Two reviews of each submittal package will be conducted by our team. The first review will be conducted and expedited by our design team's SWM/ESC reviewer and the second review by our IDQM team's expeditor prior to formal submittal to MDOT SHA-PRD to ensure timely and efficient reviews and approvals.
  - Proactive plan development starting at Notice of Award to expedite design package approvals through MDOT SHA-PRD and Office of Structures, as needed, and MDE Waters and Nontidal Wetlands Division
  - Regarding stream crossings, we will expedite PRD/MDE maintenance of stream flow (MOSF), ESC and H&H analysis reviews/approvals utilizing the TS&L design. Each crossing will be developed as a standalone element with independent ESC/MOSF plans, for its construction to allow implementation of MOSF as each design package is approved.

- Build a professional and collaborative partnership with MDOT SHA, MDOT SHA-PRD, resource agencies, and other project stakeholders by providing clear, consistent, and regular communication.
- Divide the project into sub-grading units such that the total area of each sub-grading unit in the segments will not exceed the COMAR 20-acre maximum grading unit requirement. Should larger areas need to be temporarily opened for earthwork storage or construction laydown areas, we will adhere to the standard specification (308.03.14).
- We will divide the project into separate design submittal packages to expedite review and approval of distinct design elements. For example, separate clearing/grubbing/rough grading and initial ESC implementation from final roadway, drainage, SWM, ESC, and MOT.
- To ensure compliance during construction, our environmental compliance team will regularly monitor construction activities to ensure controls are well maintained and functioning properly and ensure that adjacent wetlands and waterways remain unaffected.
- We will monitor/update our permit/approval compliance log and maintain ESC checklists and rating forms to ensure continuous compliance.

**Role of MDOT SHA:** MDOT SHA is expected to provide timely oversight and review of our design/ submittal packages as well as issuing the required permits and approvals for construction. We anticipate that any special project/ permit conditions, requirements and commitments, review timelines or any other expectations will be clearly communicated to our team. Through partnering with MDOT SHA and regulatory agencies, we look forward to a collaborative and professional relationship with appropriate decision makers involved and present during the design/ permit approval process.

### **RISK: Geotechnical Conditions**

- **Why:** Unexpected geotechnical conditions such as unsuitable and wet soils, rock excavation, and low strength subgrades soils which are encountered during construction can create schedule delays, increased cost, and design changes. The MD 32 corridor has many of these geotechnical conditions that our Team has encountered on both the MD 32 Phase 1 Widening and MD 32 at Linden Church Road Interchange projects. In addition, our Team may incur additional costs if it is required to dispose of unsuitable soils off-site, bring in borrow material, or perform rock excavation in quantities much greater than expected.
- **Impact on Goals:** Unexpected geotechnical issues may impact the construction schedule and publicized date for opening the facility thereby inconveniencing traveling public. The added quantities will require additional hauling of materials requiring additional trucks to enter/ exit the construction site, increasing safety, traffic and noise levels.
- **Mitigate Strategies:** We will develop our initial project schedule with sufficient contingencies for rock excavation, unsuitable soils, and wet soils or subgrades. Most earthwork will be scheduled during the drier months, where possible, to reduce the time to construct the deep embankment fills. The schedule will be reviewed weekly and revised to account for the impacts of the geotechnical issues. Other mitigation strategies may include:
  - Lime or cement stabilization of the soils if structural fills are required to be placed during the wetter months.
  - Roadway subgrade may be strengthened with lime or cement to achieve stronger pavement subgrades.
  - Pavement designs will account for possible poor subgrade soils.
  - The earthwork balance of the project will be considered during the design to reduce the truck traffic and associated safety concerns.
  - Designing steeper or flatter fill or cut slopes, or building retaining walls to minimize slope limits and environmental impacts.
  - The CGI Team will attempt to find suitable on-site locations to use the excavated rock.
- **Role of MDOT SHA:** MDOT SHA will provide the results of a geotechnical investigation during preliminary design stage and included in the RFP documents. MDOT SHA will provide timely review and oversight of the pavement design. Our CGI Team will meet with MDOT SHA-OMT staff during design to discuss possible measures to reduce earthwork risks. During construction, MDOT SHA will provide review of our team's QA/QC services, including results of borrow soils, testing and inspection reports, and any modifications proposed to mitigate the geotechnical conditions actually encountered.

### **RISK: Utility Relocations**

- **Why:** Utilities are always a known risk to contractor's schedules and costs for several reasons: their locations are often unknown until excavation begins; the owners have priorities unrelated to the contractor; utility construction needs to be coordinated in the MOT plans; and there may be conflicts with relocated utilities and the proposed storm drain, SWM facilities, and other features in the project.

- **Impact on Goals:** The project goals include minimizing inconvenience to travelers and impacts to utilities. Both of these goals are directly related to understanding that the fewer relocations of utilities on the project (known and unknown), the shorter the construction duration, and hence, the fewer impacts to travelers.
- **Mitigation Strategies:** Our experience with local utility companies and our work on MD 32 Phase 1 Widening gives us the understanding to proactively approach these issues. The CGI Team will contract for SUE services to review the Utility Designation files and confirm the locations of existing utilities. We will work closely with the utility companies holding bi-weekly meetings during the design and construction of the relocation of utilities. Our engineers will review proposed utility relocation plans to ascertain there are no conflicts with the proposed storm drain structures, SWM excavation or bridge and culvert design and locations.
- **Role of MDOT SHA:** MDOT SHA will be supplying to the contractor the Utility Designation plan showing the location of all known utilities based on records and Level B SUE. MDOT SHA will coordinate with the Utility companies that have pipes and conduit along the Triadelphia Road bridge in order to have them relocated prior to bridge construction. MDOT SHA will also be part of the Partnering process as we work with the Utility companies to verify the relocation design and schedules.

### **RISK: Maintain Proposed Right-of-Way (ROW)**

- **Why:** The acquired ROW is based on Concept Design plans which may not provide for the land needed for approved/ permitted ESC, SWM and storm drain designs. ROW that is not acquired by NTP may affect the proposed construction schedule because our Team will need to avoid property that is still privately owned.
- **Impact on Goals:** The project goals include minimizing inconvenience to travelers and minimizing impacts to adjacent land owners. Keeping the project schedule as short as possible will require early acquisition of ROW. Maintaining the ROW needs as noted in the Concept design stage and RFP will be critical to the adjacent land owners and to meet public commitments.
- **Mitigation Strategies:** Our CGI Team is ready to implement innovative techniques to minimize slope limits, incorporate SWM features, and provide for drainage structures that stay with the proposed ROW from the Concept Design. Our construction schedule and TMP will allow room for modifications in case the ROW acquisition is not completed on sections of the corridor.
- **Role of MDOT SHA:** Acquisition will be the responsibility of MDOT SHA and is based on the concept design plan limits of work. MDOT SHA will work to have property acquired before NTP. MDOT SHA will need to allow for the flexibility to use innovative design ideas to limit the project limits of disturbance.

### **iii. Approach from Design Through Construction**

*We bring our expertise in design and construction under a unified design-build team to this project minimizing impacts while providing innovative and practical solutions to MDOT SHA and the citizens of Maryland.*

Our CGI Team is not new to the Design-Build process and we understand what it takes to provide to the State a successful roadway and bridge project. From the beginning of the proposal preparation, only the best consultants and staff, that have the experience and skills working with MDOT SHA, are chosen to be part of the CGI Team Phase 2 MD 32 Widening project. Our experience gives us the insight to take a proactive approach to every step of the process, mitigating project issues and risks before they occur, to make sure we meet our commitments to MDOT SHA. Our plans to Partner with MDOT SHA and

Key Stakeholders will result in a project that balances the needs of all users with the environment it is affecting, will keep the project on schedule, and will meet the project priorities and goals.

### **Design and Construction Development**

Neither the Design or the Construction activities can occur independent of each other. There will be continual communication between the D-B Project Manager, Mike Higgins, Design Manager, Simon Simon, and the Construction Manager, Shannon Brown. Together, and with input from discipline leads including Highway Engineer, Kathy Walsh and Water Resources Engineer, Elizabeth Kanner, a well thought out project schedule will be developed that integrates the reasonable time-frame for all activities, by the D-B team and by MDOT SHA and the permit agencies, to complete this project in the most efficient manner possible, while meeting the requirements of the contract.

*We take pride in our partnership we have built with MDOT SHA over the years through the projects we have successfully delivered.*

## Design Development

Simon will work closely with the design team discipline leads and be in communication with the Design/ Construction Coordinator, Bob Rosencrance to coordinate the efforts of the engineers and designers and include the Construction Manager Shannon Brown along with construction discipline leads in decision making, particularly when it relates to construction phasing. Value-added Design/ Construction Coordinator Bob Rosencrance will provide a direct channel of communication between design and construction disciplines for the duration of the project to allow for seamless coordination from start to finish. He will meet with Simon on a weekly basis and review the status of design, provide constructability input, and assist in resolving any outstanding matters. Bob has over 14 years of experience managing and supervising complex construction projects including MD 32 Phase 1 Widening Design-Build for which he is the project manager and will be a valuable asset to our Team.

In addition, the construction team will provide information related to constructability, inclusion of lower cost options (HP Storm pipe, gabion baskets, geosynthetic slope stabilizer), and feedback on work zone requirements. The design engineers will consider Practical Design policies, and will offer ATCs during the proposal phase, to provide to the State corridor improvements that are least impactful to the environment and surrounding community. Modifications to the concept design plans may include modifications to the vertical alignment to balance earthwork and to meet project budget requirements.

This project is a 6.5-mile-long activity which can be efficiently executed only by breaking the project into segments for a phased construction approach. Construction activities will be based on critical factors such as Traffic Operations and Safety, access and convenience, WOUS time of year restrictions, Technical Provision restrictions on lane closures, utility relocation schedule, and right of way acquisition. A strong and effective communication plan will be required to assure that design of one phase to the next is seamless and that discipline leaders share current information and design decisions. Our tentative schedule for design and construction includes the following phases.

DESIGN AND CONSTRUCTION PHASING	
Phase A	Access Road #4, MD 32 from south of MD 144 to I-70 ramps
Phase B	Triadelphia Road Bridge and SB MD 32 from Southern project limit to Ivory Road interchange
Phase C	SB MD 32 from Ivory Road interchange to Fox Chase Road (include both stream relocations)
Phase D	NB MD 32 lanes to be reconstructed
Phase E	Final grading / paving / signing / striping

The design for each phase will be staged such that we have a rolling submission of plans for review, updates, approvals (structures and separate review dates) and permits. Design/Construction Coordinator Bob Rosencrance will coordinate over the shoulder reviews between the design and construction disciplines to evaluate constructability. Our design team will be aggressive and responsive to comments, reviews and resolution of issues to keep the project and each phase of construction on schedule. In order to start construction as soon as possible and maintain an aggressive schedule for completion, we will begin our design submissions for approval starting with MOT, clearing/grubbing, deep drainage and ESC plans, move on to structures design, then final roadway, drainage, and SWM plans.

**Roadway/ Traffic Design:** The project geometric design will reference future MD 32 Corridor phases to ensure this project’s compatibility with the planned future improvements. All design features will be reviewed to make sure they follow MDOT SHA, AASHTO, and Federal design requirements. Lead Highway Engineer Kathy Walsh, PE, Lori Adgate, PE along with other discipline leaders have extensive experience working with MDOT SHA and have a thorough knowledge of their standard details, design manuals, and the latest specifications for construction and materials. The traffic engineering design will be led by Keith Riniker, PE, PTOE (20+ yrs. exp.) and Robert Milstead, PE, PTOE (30 yrs exp.) who have extensive experience in traffic engineering including: TMP development, ITS design, as well as safe and effective MOT phasing.

**Structural Design:** The structures design team will work congruently with the other design disciplines to develop design and plans for the new or replacement structures including any bridge, culvert, retaining wall, and pipe. The structures team will be led by Maurice DeBeary, PE (30+ yrs. exp.) and supported by Greg Roby, PE (30+ yrs. exp.). They will ensure each structure is designed to meet the desired 75-year design life, the requirements of AASHTO LRFD, and MDOT SHA’s Office of Structure’s policies and design standards. This will include designing for service, fatigue, strength, and extreme limit states using the HL-93 live load. After



Triadelphia Road Bridge

the approval of all structural details, a full set of signed and sealed plans and computations will be submitted along with the SI&A & PONTIS data. As-Built plans will be part of the project close-out.

Phasing and MOT staging for construction of the bridges on this project is challenging. However, the CGI Team has significant experience in arriving at innovative, practical solutions for staged bridge design and construction and will implement such techniques on this project to minimize impacts to the traveling public, meet schedules for schools, and provide a safe, and durable end product. For example, Stantec designed and CGI constructed the Replacement of Mouth of Monocacy Road Bridge over CSXT that received the 2009 SHA's MdQI Award of Excellence for Consultant Structure Design for innovative design. To expedite the construction in a cost-effective manner, temporary MSE abutments were constructed adjacent to the existing bridge on an alignment parallel to it; prefabricated new trusses were assembled in a staging area adjacent to the road at the site; and the entire superstructure was lifted into position on a temporary alignment. Traffic was routed onto the temporary bridge while the existing bridge was demolished, and new permanent abutments were constructed in place. Subsequently, the entire superstructure was lifted from its temporary position to its permanent position on the original alignment. The actual road closures for initial and final positioning of the trusses were 2.5 and 4.5 hours, respectfully. The following is additional information related to the structures on this project:

- **Triadelphia Road Bridge:** This bridge will be completely replaced and have a redundant superstructure consisting of haunched, painted, steel girders. The substructure and deck, utilizing the Office of Structure's deck details, will be cast-in-place. To construct this bridge a detour of eastbound Triadelphia Rd. will be permitted from Summer 2019 through Summer 2020, allowing one lane open for westbound traffic. We have considered several options regarding lane shifts and construction methods to allow for phasing of the construction that will minimize the duration of the detour.
- **MD 32 over Terrapin Branch and Middle Patuxent River:** These structures will be replaced with solid prestressed slabs on cast-in-place substructures with a concrete overlay. Once the slabs are placed, a Mix. No. 8 (min 4000psi) normal weight concrete overlay will be placed. These bridges will be constructed in existing lanes and proposed lanes, and include a stream location shift. Phasing this construction may include several lane shifts, a temporary bridge and possible temporary roadway.
- **Retaining Walls:** At least one retaining wall is expected in the project area. Our Team will evaluate various alternatives based on economics, impacts and constructability. Options may include: cast-in-place cantilever, proprietary, and top-down retaining walls.

**SWM/ESC and Drainage Design:** Elizabeth Kanner, PE our Team's Water Resources Engineer will focus on creative design approaches that optimize efficiency, environmental compatibility, and sustainable design while also avoiding conflicts with the future interchanges. Stormwater management systems will be designed using Environmental Site Design (ESD) to the Maximum Extent Practicable (MEP) and in accordance with the project RFP and State and Federal Guidelines.

To minimize the ROW/ LOD our team will utilize the median for linear SWM facilities and investigate retrofitting the shallow wetlands near Burntwoods Road. Stream crossings will be designed and modeled in accordance with COMAR, the RFP and the Maryland Hydrology Panel. Design package submittals will be based on required construction sequencing. ESC approvals will be acquired for rough grading and structures so construction can begin during final road designs. Modifications to the SWM/ ESC concept or rough grade approval will be sought for each construction phase, based on design packages that include complete ESC and SWM for the final proposed roadway areas. Pre-submittal reviews by both our design team reviewer and our IDQM reviewer will ensure that the plans/reports submitted to PRD have been reviewed for compliance and that any comments have been addressed, thus reducing overall PRD efforts. We will meet with PRD reviewers as design efforts commence and continue coordination throughout the approval process.

*As a value added and to assist with PRD's SWM/ ESC review, our team will commit to two pre-submittal reviews by PRD approved expedited reviewers, Xiadong Zhang, PE from the design team and Mark Thayer, PE from the Independent Design Quality Management Team.*

**Environmental Permitting and Compliance:** Our Team will achieve compliance with the project's environmental commitments through a detailed, project-specific Environmental Compliance Plan (ECP). The ECP will detail the Team's processes, structure, organization, chain-of-command, and communication to ensure strict adherence to the COE and MDE permit conditions; and continuous compliance with the FEIS, ROD, and other commitments throughout design, construction, and post construction. We will provide an evaluation of avoidance, minimization, and stewardship efforts throughout design and construction; and complete tracking and documentation of compliance and impacts to ensure that all environmental commitments are clearly addressed.

During the design phase, the Environmental Compliance Team (ECT) will work as part of the design team to identify, develop, and implement Best Management Practices (BMPs) within the project design to reduce environmental impacts and risks. The ECT will be led by Roger Windschitl (20+ yrs. exp.) who served in a compliance oversight role on ICC



Contract B; and will be supported by a team of experienced and dedicated environmental scientists and compliance specialists who will work in concert with the design engineers to ensure that environmental impacts are limited to the LOD presented in the concept plans. Roger's 20+ years of environmental compliance experience includes quality control and oversight for numerous transportation related projects in Maryland. His responsibilities will include, but are not limited to: reviews of design plans for compliance with environmental requirements, tracking overall environmental commitments, coordination with MDOT SHA and agency environmental staff and ensuring that appropriate staff are assigned to the ECT.

Roger will coordinate and communicate with both the Environmental Resources/ Permitting team, led by Harry Canfield (30+ yrs. exp.) as well as the Water Resources/ SWM/ ESC team, led by Elizabeth Kanner. During the design phase, we will perform field inspections to confirm and demarcate the environmental resources and convey the results of those investigations to the design team. We will identify, quantify, and cross check all impacts to environmental resources with the permits and FEIS commitments. Amy Krebs, PWS (18 yrs. exp.), who has previously worked with MDOT SHA OPPE to develop a commitment tracking database, will use her experience to assist in tracking project impacts and mitigation commitments and identifying design measures necessary to maintain permit compliance. Our stream restoration and wetland mitigation specialists, led by Rich Pfungsten, PWS and Graham Boardman, will lead the design for the stream relocations, stream restoration, and wetland mitigation site to ensure they are self-sustaining, stable, and provide ecological uplift.

### Construction Development

The construction team is familiar with this corridor, having worked on the MD 32 Linden Church Road Interchange and the MD 32 Phase 1 Widening D-B projects. Construction Manager Shannon Brown will provide oversight to all construction activities. Steve Beckley (30+ yrs. exp.) will develop a CPM schedule with input from the entire team to include permitting, design, and construction. Construction will follow our rolling design approvals starting with MOT, clearing/grubbing, deep drainage and ESC, move on to structures design, then final roadway, drainage, and SWM. Our Team's Design / Construction Coordinator, Bob Rosencrance, will ensure ongoing coordination between the design and construction teams.

The first step of construction is the implementation of the TMP which will minimize the inconvenience to the traveling public. Traffic engineers Keith Riniker and Robert Milstead, who developed the TMP and MOT plans will work with the Construction Traffic Manager Armando Cruz (20+ yrs. exp.) to make sure MOT is implemented properly and working as expected, with limited traffic delays.

The next step of construction will be implementation of our ESC plan. The MD 32 corridor has environmental challenges. On our current MD 32 Phase 1 Widening project, we are facing similar challenges and have successfully implemented design and construction solutions to minimize impacts to the environment. One approach we have taken is weekly coordination meetings led by our Construction Manager Shannon Brown. This weekly meeting includes our ESC Manager Alfredo Fuentes (10+ yrs. exp.) along with our environmental designer, PRD inspector and the Independent Environmental Monitor to review current work site and future activities, and implement any required design modifications.

The Environmental Compliance Manager Roger Windschitl will work closely with the Construction SWM and ESC Manager Alfredo Fuentes to make sure the features from the permitted design plans are implemented properly. Roger will provide oversight of field activities and environmental monitoring; assure that ECAT training is performed and adhered to in the field; and provide final review and approvals of environmental deliverables and reporting. We will document our compliance by creating a detailed breakdown of each phase of construction and the associated impacts for a direct comparison with the permitted impacts. We will proactively provide MDOT SHA with environmental documentation, including Avoidance Minimization and Mitigation Reports (AMMR), if necessary, to support Joint Permit modifications and MD Reforestation Law approvals and will track all changes to the temporary and permanent permitted impacts

We understand the utility companies are designing and constructing their relocations. Some of these relocations are scheduled to be completed prior to NTP. Our Utility Manager Al Arnold (40+ yrs. exp.) will coordinate with utility companies to review ongoing utility relocations in conjunction with our project construction schedule so that any potential conflicts can be minimized. The design team will quickly respond to design revisions that require review and revised permit approvals. Partnering will continue with MDOT SHA by holding monthly progress meetings to review the level of completion and field meetings will be required to go over unforeseen field conditions or possible design changes. The construction team will keep our Public Outreach Coordinator Odessa Phillip, PE aware of the status of the project including schedule for lane changes or detours, and she will make sure information is available to the public.

#### **CONSTRUCTION STAFF MD 32 PROJECT EXPERIENCE**

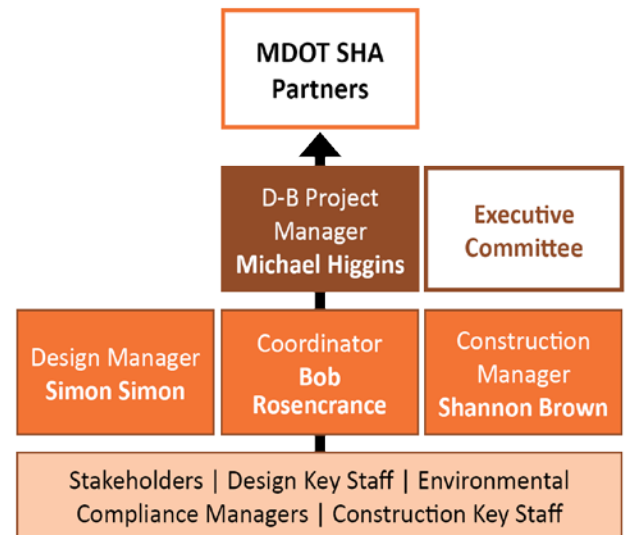
*Mike Higgins, Shannon Brown, Bob Rosencrance, Alfredo Fuentes, Larry Smith, Carlos Breckenridge, Steve Beckley, Mark Miller have all worked on MD 32 at Linden Church Road Interchange and/or MD 32 Phase 1 Widening projects.*

## Design-Build Management

Michael Higgins, PE is our D-B Project Manager for the MD 32 project. He is serving in similar capacity on the MD 32 Phase 1 Widening project. Mike will oversee both the Design Manager, Simon Simon, and the Construction Manager, Shannon Brown. They have previous experience working together and trust the quality and oversight each will bring to the project in design and construction. Each will follow the project specifications and contract agreements made with MDOT SHA, and that includes incorporation of DBE services into design (25%) and construction (16% overall). A thorough, complete and comprehensive Project Management Plan, specific to this MD 32 widening project will be prepared as soon as NTP is received. It will include:

**Coordination and Decision Making Plan:** This plan will outline the flow of information between all parties involved and the hierarchy for decision making. The current Organization Chart indicates the Coordination / Communication responsibilities between design, compliance, and construction and how that relates to the Design Manager, Construction Manager, project Coordinator and overall Design-Build Project Manager.

A comprehensive communication process for the entire team will be established to foster open and continual communication between all parties involved in the project. This will include, but not limited to, CGI Team, MDOT SHA, Stakeholders, local government agencies, permit agencies, utility companies, adjacent property owners and travelers. We believe that having the right people at the right meetings will bring together the decision makers that can make critical decisions to keep the project on track. Weekly internal meetings, including all subconsultants, will be held to assure the progress in design meets the planned schedule, and allows proactive attention to possible issues in design or construction. Bob Rosencrance will facilitate close coordination between Simon and Shannon providing the means for an efficient and effective project delivery. Coordination and communication with MDOT SHA will be our Team's priority and will include monthly Partnering meetings, milestone submittal review meetings, design resolution meetings, and, in addition, an open-line of communication with the MDOT SHA PM and our D-B Project Manager Mike Higgins. The plan will include: File System Management (Project Wise); Comment Tracking; Utility Coordination; Issue Resolution charts; and Permit Tracking.



**DECISION LADDER**

**Change Management Plan:** This plan will document all changes to the Contract in accordance with MDOT SHA policies and standard procedures. This includes change orders either from the design stage or construction stage. During the design stage, there may be scope changes to the preliminary plans due to discovered field conditions, utility relocation plans or stakeholder demands. Changes may be required to the permitted plans due to unforeseen issues in the field. Solutions will be a collaboration of both our CGI Team and the MDOT SHA managers (with possible task force members) to implement the most economic and least impactful solutions. No changes will be implemented until MDOT SHA and Permit agencies have provided their approvals. Changes to permitted and approved construction plans will be saved for incorporation into final As-Built plans.

**Safety Plan:** The safety of our construction crews and the public is a top priority for our Team. We understand that each project is unique and has specific safety concerns; MD 32 has high volumes of traffic during peak hours, high speeds during non-peak hours, one lane in each direction with minimum room for errors, signalized only at MD 144, many access points, truck traffic, and school bus traffic. A project specific Safety Plan will be prepared to outline:

- Safety processes include weekly meetings/ tool box talks, incident reporting, training, emergency protocol
- On-site safety procedures for the design/ construction team members, subconsultants and inspectors
- TMP indicating incident management, MOT plans, and public outreach requirements

All safety regulations will follow OSHA standards and will be led by the Safety Director Brian Colson (10 yrs. exp.) who will ensure that all workers are properly trained in workplace safety, check to make sure they have the proper safety equipment and it is in good working order, and will inspect the worksite and project materials through weekly site walks. Brian Colson will work closely with the Traffic Manager, Armando Cruz, to assure public safety by limiting conflict points with the public, assuring safe truck access to the work site, and providing MOT features that are visible during day and

night, meet sight distance requirements, are well placed and properly signed/ striped. In addition, close coordination with Odessa Phillip on public outreach is a key component to providing a safe corridor for drivers.

**Schedule Management Plan:** Our Team’s extensive experience with D-B in Maryland gives us the experience and understanding of the task items and durations required to develop a comprehensive and inclusive design and construction schedule for this project. The CGI Team will utilize CPM software to develop a schedule during the proposal stage and make sure it is acceptable and reasonable for all design stages, QC reviews, permit stages and construction phasing. The schedule will provide MDOT SHA with a project that can be safely constructed while meeting all project specifications, for the shortest duration possible. The aggressive schedule will be accepted by all those on our CGI Team to work together toward the desired end date. The schedule will be updated on a monthly basis in accordance with contract requirements and to ensure the project is meeting schedule dates. Mike Higgins, the D-B PM, and Bob Rosencrance, the D-B Coordinator, will regularly review the look-ahead schedule and the weekly schedule during construction to make sure progress is on track and or additional staff and resources are available as needed.

**Risk Management Plan:** Our proactive approach to risks on this project will alleviate or eliminate possible issues in design and in construction. We have already begun reviewing and addressing risks as noted in Section ii. Our Risk Management Plan has been established and proven through our work on similar projects with MDOT SHA. Key features include early identification, input by design and construction, communicate with MDOT SHA, thorough development of existing conditions, and a Risk Register to track and resolve issues in a timely manner. Careful consideration and proactive attention to risks will minimize impacts to the schedule, avoid additional work, and meet project goals.

**Partnering Plan:** Our CGI Team is a firm believer in the benefits of Partnering with MDOT SHA and key stakeholders. It provides the basis of our plan for issue resolution and effective input by those invested and involved in the success of the project. Our Partnering Plan will follow the MDOT SHA *Partnering Guidelines for Project Teams* and will be clearly specify a mission statement, a list of stakeholders, an invite list, a meeting schedule and type, a meeting agenda and meeting minute format, method of tracking issues and resolutions. Our Team will have consistent staff attend each meeting to address all issues discussed and we will closely monitor the Issue matrix to assure timely resolution of questions and dissemination of information.

- | <b>Benefits to Partnering</b>             |
|---|
| ➤ <i>Effective Communication</i>          |
| ➤ <i>Reduction of Claims</i>              |
| ➤ <i>Team Cooperation</i>                 |
| ➤ <i>Team Approach to Problem Solving</i> |
| ➤ <i>Timely Project Completion</i>        |
| ➤ <i>Cost Effective Decision Making</i>   |

**Public Outreach Plan:** Our Team has included Odessa Phillip, of Assedo Consulting, to assist with Public Outreach. Odessa served as the Public Outreach Coordinator for the ICC project. She and her staff have been working on Public Outreach in Maryland and for the State for more than five years and are familiar with the people and stakeholders in the region – as well as the issues that are most important to them. Odessa’s team will work closely with the MDOT SHA to prepare for public outreach in all forms: meetings, workshops, flyers, VMS signing and websites. The public outreach plan will begin prior to construction activities and will continue until the final Close- out of the project. The CGI Team will work with MDOT SHA to make sure that the adjacent property owners, local residents, commuters, and other drivers are aware of any activity that may affect their traveling routes or changes to intersections and access to the corridor. In order to facilitate communication, our Team will assist MDOT SHA in maintaining an active website, phone and email for any concerned stakeholder to leave comments and questions for the team.

## Design Quality Management

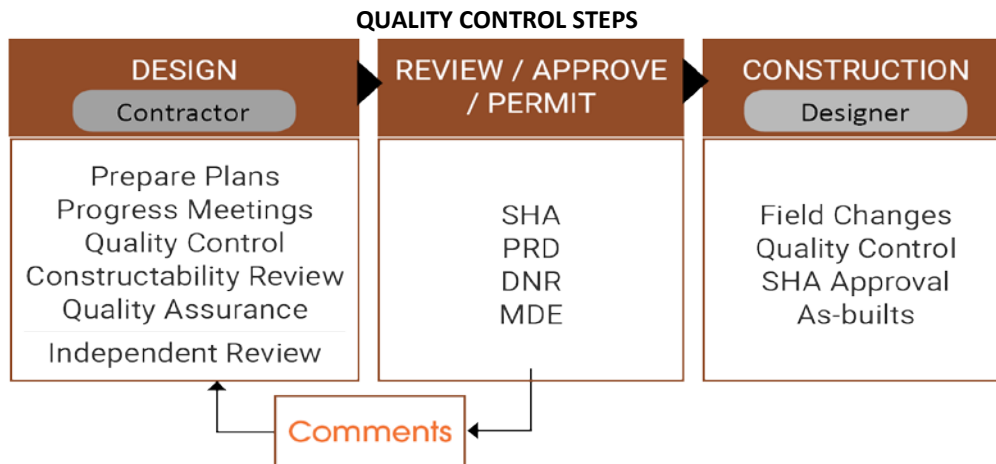
<p><b>IDQM Gannett Fleming</b> Currently supporting Concrete General on <u>Phase 1 MD 32</u> <u>Widening in the same role</u></p>
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Quality Control is built into every stage of the design and construction process. The CGI Team understands the importance of following a standard set of QA/QC processes from the beginning of a project through to the final construction stage. This process includes all members of the design and construction team as well as every aspect of the project; files, calculations, schedules, materials, reports, etc.

The team will follow the ISO9001 standard procedures and, based on those procedures, we will prepare a detailed Design Quality Control Plan (DQCP) that will include review schedules, review staff, responsibilities, forms, team members, and decision matrix. Once the plan is prepared, submitted, and approved by MDOT SHA, it will be rigorously adhered to through all stages of design and construction. Prior to beginning design, a Team meeting will be held to explain to all members of the design team, including all sub-consultants, the exact procedures to be followed and to emphasize to them the importance of following them to provide a fully functional, timely and economical product to Concrete General for construction and to the State to own and maintain. Gannett Fleming will be our IDQM firm and will provide an independent review and certify that the design complies with the contract requirements. The IDQM process will be independent of the design and engineering for this project and will review the plans as if they are MDOT SHA, the project owner, looking to

make sure the final facility meets the MDOT SHA and Federal requirements. Steve Hawtof, PE will be the Independent Design Quality Manager and will be responsible for the team that will provide a full-scale review of all design packages prior to submittal to MDOT SHA or other reviewing and permitting agencies. This Independent review will be MDOT SHA's eyes and fully understand the MDOT SHA policies, procedures, specifications and standards to minimize MDOT SHA review time and ensure them that they are receiving the highest quality designed construction documents.

Our Design QC Manager (DQCM), Bimal Patel, PE will report directly to the D-B Project Manager, Michael Higgins. Bimal is a PE with more than 30 years of experience in design and QC activities in major transportation projects, including his role as the DQCM on several Stantec design-build projects. Bimal will not be involved in the day-to-day design production work but will be responsible for assisting in the development and implementation of the DQCP and ensuring it is followed by the entire design team. He will have the QC responsibility and authority for design of permanent and major temporary components, changes in the design of permanent components, and as-built plans; identify and report non-conformance and non-compliance with the design; track, monitor, and report the status of outstanding design-related non-conformance reports; prepare and furnish monthly reports; submit specified certificates; and reviews of designs.



Our Construction QC Manager, Josh Miller (10+ yrs. exp.) has considerable experience in similar construction work and Quality Control activities, including assignments on CGI's current design-build projects. He will not be involved at all in the design or construction production activities. Josh will be responsible for assisting in the development and implementation of the CQCP. He will have the independent QC responsibility and authority to make any improvements to the quality of Work, as well as stopping Work due to non-conformance to the project requirements or if he deems necessary to improve quality. He will not be influenced directly or indirectly by the Project Management. He will be responsible for timely coordination of the schedules of our assigned QC inspectors, testers, and samplers with construction activities. Josh will establish quality procedures for construction and will train the construction production staff to ensure that QC processes are understood, implemented, and followed on daily basis throughout the life of the project construction.

As a value-added, Executive Management will have the oversight responsibility of the quality control team and all related activities. The Executive Management will guide the overall direction of our QC team and its relationship to the quality efforts. They will ensure that the quality policy is documented and understood by all employees and management as a core value, and implemented by all members of the CGI Team including the design and construction subconsultants and subcontractors, respectively. Our designated Executive Sponsors, Dan Miller (40+ yrs. exp.) and Stu Lerner, PE (30+ yrs. exp.) will have oversight of QC activities and will interface with the Administration on related matters.

## Summary

The CGI Team has established a comprehensive organization and management strategy to address design, quality, safety, environmental compliance, and construction for this project. Successful completion of this project is our primary objective. This objective will be achieved by the hard work of our staff and partnership with MDOT SHA. Our organization and management approach will be to provide a clear definition of authority and responsibility, fostering teamwork and collaboration, and integration of resources for seamless operation. This Team has worked together on similar projects and delivered quality roadway and bridge projects to MDOT SHA, other MDOT Business Units, and local Maryland jurisdiction using Design-build and conventional project delivery methods. We will use this experience and partnership to once again, deliver a project to MDOT SHA and the citizens of Maryland that we all will be proud of!