MARYLAND ACTT WORKSHOP

At-Grade Intersection Improvement

MD Route 97 Georgia Avenue at Randolph Road

U.S. Department of Transportation
Federal Highway Administration

SHA State Highway Administration
Maryland Department of Transportation

ACTT
ACCELERATED CONSTRUCTION TECHNOLOGY TRANSFER
www.fhwa.dot.gov/construction/accellerated

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EXECUTIVE SUMMARY

> **Together, the united forces of our communication and transportation systems are dynamic elements in the very name we bear – United States. Without them, we would be a mere alliance of many separate parts.**
>
> *– President Dwight D. Eisenhower, February 22, 1955*
> Source: "The Quotable Interstate,"
> Federal Highway Administration, U.S. Department of Transportation
> www.fhwa.dot.gov/interstate/quotable.htm
> *Accessed June 6, 2007*

Our Nation's ever-changing technology and increasing mobility make President Eisenhower's remarks as applicable today as they were in 1955.

One of the major challenges many departments of transportation (DOTs) now face is keeping these parts – the States' roadways and communications systems – dynamic in light of aging infrastructure, increased congestion and limited transportation dollars.

These are the very issues that the Maryland State Highway Administration (MDSHA) is dealing with on the MD-97 (Georgia Avenue) at Randolph Road project in Montgomery County.

Together, the FHWA and the MDSHA identified the following skill sets for the MD-97 workshop:

- Construction
- Geotechnical Engineering
- Public Relations/Public Involvement
- Roadway/Geometric Design
- Structures
- Traffic Engineering/ITS/Safety

Each team focused on how the ACTT process applied to its area of expertise. The group as a whole searched for innovative ways to help the MDSHA increase safety and accelerate construction of the MD-97 project.

As the workshop progressed, each team summarized its thoughts and narrowed them down to a list of priority recommendations. On the final day, each skill set presented its suggestions to the conference attendees. Now that the workshop is complete, the MDSHA will evaluate the various recommendations and decide which ideas should be implemented as part of the project.

1. WORKSHOP DETAILS

1.1. Opening Session

MD-97 at Randolph Road is an at-grade four-legged intersection in a heavily urbanized area with heavy traffic flows, particularly during peak hours. The MDSHA ACTT workshop took place September 10-12, 2007, at the Sheraton BWI Airport Hotel in Linthicum, MD.

The FHWA Innovative Contracting Engineer Jerry Blanding, the workshop moderator, welcomed the group and gave a presentation titled *Building on Success*, giving the mostly first-time attendees an overview of the development and implementation of the ACTT process. The Maryland Department of Transportation State Highway Administration Deputy Administrator Douglas Rose and the FHWA Assistant Division Administrator Bill Wade greeted the attendees, and the participants introduced themselves. Ken McDonald. project manager with Johnson, Mirmiran, and Thompson provided an MD-97 project overview, and the group then departed on a tour of the project area.



Photos: Touring MD-97 at Randolph Road. Photo source: FHWA and MDSHA

1.2. Workshop Process

The MDSHA workshop followed the traditional ACTT process. On Tuesday morning, the ACTT management team member and moderator, Jerry Blanding, discussed the brainstorming process with workshop attendees. Each skill-set committee met separately to discuss the project and brainstorm preliminary ideas, reconvening before lunch to share initial thoughts. After lunch, the committees continued their work, intermingling with other teams to ask questions and share ideas. The teams spent the remainder of the afternoon preparing final recommendations for presentation to the full group on Wednesday morning, the final day of the workshop.

A typical breakout session.
Photo source: FHWA and MDSHA

1.3 Skill Sets and Goals

Each skill-set committee had established goals unique to its subject area:

• Skill Set: Construction

Acceleration of the construction process can only happen with the cooperation and participation of the contractors performing the work. While contractors are generally willing participants in a partnering process and are concerned with producing a quality project, it must be recognized that one of their primary goals is to profit financially. Therefore any innovative construction techniques that are suggested must be reasonably constructed and fiscally viable. Moreover, if financial incentives can be associated with envisioned innovative techniques, there is a greater chance that these techniques will result in shortened construction periods without lessening quality. Proactive contract administration, pre-fabricating and pre-ordering materials, state-of-the art field work, such as surveying, data collection and fast-curing concrete,are all ideas that could be explored.

Goals for *Construction* Skill Set:

- This is a highly urbanized area. Possible work areas and staging sites will be difficult to identify and should be explored.
- Work zone safety, pedestrian mobility safety, and motorists safety must be maintained.
- Are there new types of construction materials that could be used on this project that would speed construction, such as quick-setting or pre-cast concrete for drainage structures?
- Construction management by a private firm could improve materials delivery, contract administration and reduce contractor delays. Should this approach be adopted?
- Utility relocation, specifically PEPCO and Verizon, are critical path items for this project. Are there means and methods to improve the efficiency and timeframe for their relocation?
- Maintenance of traffic (MOT) is a critical item in this project and will require a minimum of seven stages. Is there any way to reduce the number of stages of the MOT while maintaining traffic and pedestrian flow and other mobility , and at the same time, preserve work zone safety?
- Much, if not all, of the existing at-grade intersection will be removed. Are there innovative demolition techniques that could be employed to speed this process?
- The newly constructed Randolph Road will be depressed beneath the existing grade approximately 23 feet and will be located approximately 26 feet above Washinton Metropolitcan Area Transit Authority (WMATA) tunnels. A tunnel constructed in multiple states will take Randalph Road beneath the intersection along the same footprint as the existing intersection. Keeping in mind that WMATA has special requirements for working within the “zone of influence,” can this be done more efficiently?

Silas Nichols, FHWA Resource Center, facilitating Geotechnical Engineering skill set discussions

• Skill Set: Geotechnical Engineering

There is a significant amount of excavation that will be performed in connection with this project. Subsurface conditions and innovative techniques, particularly during maintenance of traffic, should be explored to expedite construction.

Goals for *Geotechnical Engineering* Skill Set:

- The finished profile of Randolph Road will be depressed about 23 feet below the existing grade. Attention should be focused on grading requirements within constrained areas and the use of earth retention systems should be used.
- Extensive MOT stages will require temporary detour roads to be constructed at various elevations. Can MOT phases be combined? Will there be adequate materials on site for construction of detour lanes?
- Storm water management is being provided by using bioretention facilities. Are there any opportunities to expedite this construction?
- An existing WMATA rail line exists directly beneath the intersection of MD 97 and Randolph Road, approximately 50 feet below. Considerations for WMATA have included the use of spread footers to eliminate concerns with the vibration of pile driving. Examine any geotechnical reports to explore opportunities during foundation construction.
- Extensive Pepco and Verizon facilities exist directly beneath the intersection and will be relocated into a newly constructed duct bank infrastructure system beneath Judson and Sheraton roads. Will subsurface conditions allow expedited construction of the infrastructure system?
- Groundwater readings were taken at select locations along the depressed roadway. the results indicate groundwater does not appear to be a concern. But should a high groundwater table be encountered, what methods of dewatering can be implemented to expedite construction?

• Skill Set: Public Relations/Public Involvement

In this highly urbanized area impacts during construction to the community, motorists, pedestrians, business owners and emergency service providers cannot be avoided, only minimized. It is critical that effective public outreach and communications are provided to ensure that these citizens are well informed of construction periods and stages and can make intelligent travel decisions. Businesses may elect to alter delivery times to coincide with certain phases of the MOT. Local elected officials will require constant project updates.

Goals for Public Relations/Public Involvement Skill Set:

- Identify all stakeholders in the project.
- Bring stakeholders into the project and the process of regional communications.
- Investigate methods of effective communication to motorists and pedestrians traveling through the area during construction.
- Investigate the need for a public relations manager on site.
- How do we secure the acceptance and participation of all stakeholders?

- How do we collaborate with and manage the information released by the press?
- What is the most effective means of informing the local elected officials and their constituents of construction progress and impacts?
- Develop a plan to engage all stakeholders in the acceleration of construction process and communicate to them the overall benefit. Solicit their assistance.

• Skill Set: Roadway/Geometric Design

Highway design elements such as horizontal and vertical geometrics and roadside grading can impact overall project costs and construction time frames. Adverse impacts associated with roadway geometrics could range from problematic excavation due to rock or unsuitable materials requiring excavation and backfill to impacts to neighboring properties. Vertical and horizontal alignments can often result in utility impacts that should be considered during geometric layout. Design guidelines allow for flexibility during design. The designers challenge is to meet State and national design standards while minimizing adverse impacts overall. If all of these elements can be brought together in an efficient manner, the result should be a construction time frame that is as timely as possible with minimal adverse impacts.

Goals for *Roadway/Geometric Design* Skill Set:

- Evaluate the horizontal and vertical geometrics to assess efficacy of construction both overall and during various phases of MOT.
- Evaluate the horizontal and vertical geometrics with regard to access to the surrounding properties during construction.
- Evaluate the design geometrics with regard to impacts to neighboring properties.
- Review all design elements to ensure that necessary utility relocations have been minimized to the greatest extent possible.
- Review key design elements to assess if there are any means of accelerating construction through innovative design techniques.
- Review design elements with regard to the need for permits and the possibility of minimizing or eliminating permits.

• Skill Set: Structures

The Randolph Road tunnel beneath MD 97, with WMATA rail tunnels located approximately 50 feet below the existing intersection, is the focal point of this project. Any effective means of accelerating the construction of both the tunnel and associated retaining walls could have the resultant effect of accelerating the overall project construction period. Review of standard design and construction practices should be performed. Prefabrication or pre-ordering of materials when applicable to avoid delays should be reviewed. Partnering between the owner and the contractor may aid in communications and expediting construction and should be considered.

Goals for *Structures* Skill Set:

- Design concepts should consider availability of materials. Are there any long-lead items?
- Construction areas will be constrained in this tightly urbanized area. Staging areas and accessibility of those areas should be assessed.
- Design concepts should consider the use of early-strength concrete or pre-cast materials for tunnel and retaining walls.
- Evaluate impacts to utilities associated with structure foundations.

- Assess the stages of construction and evaluate the possibility of reducing stages.
- Should construction management be considered as a means of improving construction efficiency, owner/contractor partnering and reduction of delay?
- Are there other new types of construction materials or techniques that could be used on this project that would speed construction?

• Skill Set: Traffic Engineering/ITS/Safety

Tom Harmon, FHWA Resource Center facilitating Traffic Engineering/ITS/ Safety skill set discussions

Traffic management techniques both during construction and in the completed facility will be critical to the overall success of the project. All innovative techniques that will aide in improving safety, traffic flow, communication and overall speed of construction should be thoroughly reviewed for possibilities. Efficiency in communicating to local elected officials, emergency service providers, motorist, and local businesses regarding traffic shifts, detours, restrictions and MOT phases during construction will help minimize impacts. Information systems to communicate via the Internet and media should be explored. Incident management systems should also be assessed for potential benefit for this project.

<u>Goals for Traffic *Engineering/ITS/Safety* Skill Set:</u>

- Review Maintenance of Traffic Plans for opportunities to improve traffic flow and eliminate phases or shorten durations while maintaining safety practices
- Assess pedestrian and biker safety, mobility and accessibility during construction
- Consider truck detours during heavy construction periods
- Consider working with businesses to coordinate truck business deliveries to non-construction hours
- Assess the benefits of a public involvement liaison and campaign during construction
- Review construction phases for work zone safety
- During construction, consider alternate route detours or elimination of certain movements to maximize work zone areas
- On-hand field resources for incident management; special event planning during construction and post construction
- Utilize ITS into construction phasing
- Assure current technology for traffic control devices (signs, signals, VMS, arrow panels, portable signs)
- Post construction – traffic demand management (HOV, mass transit, car and vanpooling, work with local business to encourage flex time, telecommuting, etc.)

2. PROJECT DETAILS

2.1. Project Overview

The purpose of the proposed project, which is located in Montgomery County, Maryland, is to improve traffic operations for vehicles, bicyclists, and pedestrians using the MD 97/ Randolph Road intersection. The planning study has investigated methods to improve the levels of service (LOS) and reduce congestion at this crucial intersection, which should enhance the performance of the entire network of intersections in the area. The planning study team has concentrated on grade separated intersection improvements that will promote transit use by emphasizing intermodal access to transit services. The improvements should facilitate intermodal access to the Metro Station at Glenmont, particularly for bicycles and pedestrians. The study limits extend for approximately 2,000 feet north and south of the intersection along MD 97 (Georgia Avenue) and approximately 1,500 feet both east and west of the intersection along Randolph Road. The existing intersection is operating at a level of service (LOS) "F" for both a.m. and p.m. peak hours (a.m. v/c=1.21 and p.m. v/c=1.15). Furthermore, traffic forecasts show that these conditions will worsen with a projected traffic and a 53 percent increase in Randolph Road traffic by the year 2020 based on existing and projected average daily traffic or ADTs. The traffic congestion is also compounded when the Kensington Volunteer Fire Company, situated directly on the southeast corner of the intersection, preempts the signal at the intersection in order to enter and exit its facility.

Aerial view of the subject project site. Photo source: MDSHA

2.2. Project History and Development

The MD 97/Randolph Road project has been a focus of the State Highway Administration (SHA) and Montgomery County for many years. Continuing increases in traffic volumes, and a subsequent degradation in levels of service along with increasing accidents, have elevated this project to one of the SHA's top priorities and Montgomery County's top highway transportation project.

Historically, project planning began in the late 1990's, with location and design approval granted in 2002. Once in design, the project was taken to the preliminary review milestone (30%) in January 2004 and semi-final review (65%) occurred in November 2004. Right-of-way plats were issued in January 2007. Due to various issues between the SHA and the county resulting in continuing negotiations, the project has remained in a pre-final review status.

2.3. Project Purpose

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2.4. Project Challenges

Project challenges are significant and include utility relocations. PEPCO is the local electricity provider and has a 69,000-volt line running beneath the existing intersection. Additionally, Verizon has significant communication lines beneath the intersection. Due to the excavation required for the tunnel, both of these utilities must be relocated outside of the footprint of the grade separation. The relocation challenge has been to find a suitable alternate location for the utilities, as well as design and construction timing. It is anticipated that construction of the relocated utilities will require two years to complete prior to advertisement of the roadway project.

Maintenance of Traffic (MOT): MOT during construction is complicated by this is a tightly constrained intersection with business and residential properties close to this intersection. To construct the tunnel in the same footprint as the existing intersection will require seven phases of MOT to allow the structure to be built in phases while maintaining traffic. This will present construction and public relation challenges.

The Kensington Volunteer Fire Department (KVFD). Located in the southwest quadrant of the intersection, the KVFD, serves the community with emergency services. In order to build the project, the property is envisioned as a total take to allow detour roadways to be built, thus providing space to build the tunnel. The KVFD is a privately owned facility. The SHA and Montgomery County have declined to condemn this site until a replacement facility can be provided so that the community has no lapse in

emergency service. The existing site is outdated. The State's appraisal and subsequent purchase offer, as required by law, has been rejected by the Fire Department, and the State and the County have been negotiating the source of funding to provide a replacement facility.

2.5. Project Status

The design of the MD 97/Randolph Road project remains 65 to 70 percent complete. Upon funding approvals this project will proceed to advertisement.

3. SKILL SET RECOMMENDATIONS

3.1. Construction

The construction skill set offered the following recommendations:

Social and Environmental Issues
- Evaluate using 4f properties for temporary construction activities
- Pedestrian mobility

Public Relations
- Community liaison
- Community meetings
- Project Web sites

Phasing
- Think "outside the box" for retaining wall design/bridge design and MOT with the intent for reducing project and phase duration

Advanced Construction Contract
- Utilities
- Storm drain/roadway reconstruction to be completed at Judson and Sheraton Streets
- Advertise utility contract, hold roadway construction contract
- Subsurface utility engineering

Reduce Congestion within Work Zone
- Explore detour options
- Bus route alternatives (Public Transit/School Buses)

Right of Way
- Advanced right-of-way acquisitions
- Monitoring Wells for the purpose of identifying possible contaminated soils

Innovative Contracting
- Incentive/disincentive at critical path milestones
- Design/build
- A+B

Construction Management
- Use of construction management and inspection contracts
- Use of conventional SHA administration and inspection of project

Agency Coordination and Public Involvement
- Start discussions with organizations early
- Restrictions on design and construction must be coordinated into plans

3.2. Geotechnical Engineering Utilities

The geotechnical engineering/accelerated materials testing skill set discussed the strength of the clay and the potential instability of various slopes along MD-97 before offering their recommendations:

3.3. Public Relations/Public Involvement

The public relations/involvement crew centered their recommendations on the ***"Identify, Involve, and Inform"*** model:

- **Key Concepts**
- Budget for public information activities
- Comprehensive community outreach
- Reach a diverse audience
- Informational vs. promotional
- Elected officials support

Public Relations Skill Set Recommendations
- On-site community liaison
- Informational public meetings
- Establish database for outreach
- Project Web site
- Community outreach
- Media outreach
- On-site community liaison
- Hire a public relations consultant at the outset of the project
- Funding must be set aside out of the construction budget
- Located at project field office.
- Informational public meetings
- Pre-meeting with local officials
- Several months prior to construction host one or more open houses.
- Regular update meetings throughout life of the project

Establish Database for Outreach
- Set up a database of all stakeholders, interested parties, and individuals that need to be informed about the project
- Ability to provide updates through e-mails, phone messages, and text messages
- Disseminate timely information to a mass audience
- Project Web site

- Communicate project news and changes on SHA's Traffic Management website (CHART) and Montgomery County's Traffic Management Center
- Purchase domain names
- Web site must be kept current

Community Outreach

- Fliers, door hangers, newsletters (print and electronic), brochures, giveaways
- Speakers bureau (project staff, local officials)
- Information on city and county web pages,
- Drop-in center, kiosks,
- Advertising for display at transit facilities (i.e. METRO, bus) and on grocery bags
- TAR/VMS, static project information signs

Media Outreach

- Limited media attention from DC-area T.V. and radio
- local cable access programs
- Press releases, traffic reports, blogs, radio/TV/print interviews, PSAs, letters to the editor, editorials
- Coordination with traffic reporters
- Outreach to Hispanic organizations, Spanish language radio stations (99.1 El Zol)

3.4. Roadway/Geometric Design

The roadway/geometric design group reviewed the Value Engineering study completed in May 2004 and concluded that the proposals presented are valid design items, noting that they do not appear to accelerate construction or significantly reduce costs. The team then offered the following recommendations:

Roadway/Geometric Design

- Change of utility relocation
- Original plan to relocate along Sheraton and Judson
- Proposed: relocate along MD 97 and Randolph Rd
- *Concerns:*
- Possible 4F issue to be created
- Purchase of residence on northwest corner of the existing intersection. The property is currently for sale.

Other Details

- There are still some utilities to be relocated at Sheraton and Judson
- The house on main intersection could be offered as 4F mitigation

Roadway/Geometric Design

- Hold existing vertical (MD 97)
- Keep MD 97 at the current elevation

Concerns

- While MOT may be simplified, Randolph Rd. may need to be lowered

Coordination

Structures

- Roadway/Geometric Design
- Geometrics
- Eliminate the jug-handle and the tunnel left turn lane.
- Provide the left turn lane from eastbound Ramp B.

Concerns

- Need for advanced signing
- Modification of the vertical curve to shorten the walls on the east end

Other

- Eliminates impact to police lot
- Walls are parallel

Coordination

- Structures, traffic, and construction

3.5. Structures

The structures team offered the following recommendations:

Figure 1: Proposed elevated structure for Randolph Road

Figure 2: Typical retaining walls that may be used in trenching Randolph Road)

Viaduct Bridge for Randolph over MD 97

Advantages

- Minimize utility impacts (no underground relocations)
- Reduce right-of-way impacts (eliminate some total takes)
- Lanes can be tucked under structure
- Carrying heavier traffic movements, improving Level of Service (LOS)
- Less impact on residents

Aesthetics

- Significant time savings for construction
- Reduce construction stages
- Minimize hazardous material impacts
- Minimize impacts to surrounding structures
- Saves money (ROW/Utility impacts)

Disadvantages

- Visual intrusion
- Long-term maintenance costs

- Planning process will require revisiting
- Possible conflicts with WMATA Metro Tunnel (foundations)

Accelerated Construction of Current Designed Bridge

- Weekend Closure to Construct Bridge
- Install foundation elements during short term lane closures. Cover with steel plates.
- Close intersection for weekend.
- Excavate as required depth over the bridge area.
- Install pre-cast abutment caps.
- Place pre-cast superstructure elements.
- Place temporary waterproofing membrane and HMA wearing surface.
- Open to traffic

Accelerated Construction of Current Designed Bridge

Advantages

- Minimize MOT phases
- Shorter construction time frame
- Less temporary pavement
- Potentially less ROW/Easements

Disadvantages

- Closes intersection for a weekend

Issues

- Coordinate foundation with WMATA tunnel
- Superstructure types
- Extensive Public Awareness campaign required
- Dependent on amount of work, could be expanded to two weekends
- Staging area will be needed close by

Secant/Tangent Wall (Top Down)

Advantages

- Can be constructed using lane closures
- May not require tie-backs
- Can be used for a vertical load carrying element at bridge

Disadvantages

- Requires special details at WMATA crossing
- High costs - $110 to $150 per SF
- Potential challenges removing decomposed rock material

Accelerated Construction of Retaining Walls

Soldier Piling/Lagging (Top Down Driven H-Piles)

Advantages

- Lower costs
- Less caisson drilling

Disadvantages

- More extensive MOT
- Requires special details at WMATA crossing (tie-backs)

Soil Nail

Advantages

- Lowest cost

Disadvantages

- Longest construction time
- Possible conflicts with drainage and tie-backs
- Long term durability concerns (soil PH requires investigation)
- Other structure Issues

Shift Bridge/Md 97 Alignment East

Advantages

- Less phases for construction
- Less impact to traffic

Disadvantages

- 4f impacts associated with temporary roadway in Greenway
- Issues with temporary roadway intersecting vertical grade of Randolph Road

Materials

- Self-consolidating concrete (drilled shafts)
- Automated computer control of concrete placement operations
- High-performance overlays
- High-performance rebar
- Utilizing pre-cast elements

3.6 Traffic Engineering/Safety/ITS

The traffic engineering/safety/ITS skill set defined the group's assumptions before offering their recommendations:

Challenges of current design

- Signing
- Shifts congestion to adjacent intersections
- Utility relocations along Judson Road and Sheraton Street
- Length of construction period
- Redirection of local roadway traffic
- Median nose impeding turning movements
- Access management issues
- Growth of shopping center
- Redirect of Inner-County Connector traffic

Skill set goals

- Reduction of construction time and cost
- Minimize impact to traffic during construction
- Provide safe pedestrian access through construction phasing
- Keeping stakeholders (system users, TMC, adjacent residents, businesses, etc.) Informed of traffic and construction conditions
- Real-time monitoring and conveying that information to the public
- Maximize the benefit of the ultimate facility
- Minimize crashes during maintenance of traffic

Reduction of construction time and cost

- Consider two- or three -lane tunnel with reversible lanes for peak direction
- Reconsider alternative grade widening – consider pedestrian bridge/tunnel with elevators
- Consider short term closures for certain activities to reduce construction time and phasing need to perform modeling to determine impact

Minimize impact to traffic during construction

- Signal timing at adjacent intersections within the area network
- Additional traffic monitoring equipment beyond the project limits. Need to determine what Montgomery County currently has in place.
- Reduce or eliminate conflicting turning movements in work zone

Provide safe pedestrian/bicycle access during construction

- Provide positive protection
- Pedestrian/bicycle detours
- Signing
- Local information outreach
- Reduce construction phasing
- Coordination with WMATA and consider moving bus stops
- Provide acceptable riding surface for cyclists
- Maintain adequate lighting

Keeping stakeholders informed of traffic and construction conditions

- Maintain open line of communication with media
- Coordinate closures with property owners and businesses
- Community liaison
- Coordination with ICC construction and other nearby construction projects
- Maintain accurate traffic control devices
- Real-time monitoring and conveying that information to the public
- Provide and maintain monitoring and its devices throughout the area network and include in project cost
- Coordinate construction phasing and signal timing with Montgomery County traffic management center (TMC)
- Coordinate construction activities with WMATA bus operations
- Use existing resources to provide real-time data (WMATA, WTOP, Mont. Co., etc.)
- TAR – travel advisory radio

Maximize the benefit of the ultimate facility

- Simulation modeling of ultimate facility for traffic flow improvements
- Access management to village center
- Remove Randolph Road left turn lanes to Village Center
- Consider second cut and cover at Glenmont Circle and Randolph Rd
- Consider impacts of ICC
- Provide additional left-turn lane out of the shopping center

Minimize crashes during maintenance of traffic

- Clear and accurate use of traffic control
- Routine WZTC inspection
- Reduce or eliminate conflicting turning movements in work zone
- Provide contractor incentives for maintaining safe work zone
- Remove vehicles quickly in the event of a crash or incident – consider performance specifications for contractor

4. CONCLUSIONS

4.1. Next Steps

Now that the workshop is complete, the MDSHA is evaluating the recommendations to determine which items will be implemented as part of the MD-97 Georgia Avenue at Randolph Road project, Montgomery County, MD.

As this report shows, national, State, and local national transportation experts came together to brainstorm innovative techniques for financing and delivering a much-needed project on a major urban corridor. Once again, ACTT has proven to be a valuable tool in project planning and success.

APPENDIX A: Glossary of Frequently Used Acronyms

ACRONYM	FULL NAME
AASHTO	American Association of State Highway and Transportation Officials
AB	Aggregate Base
ACC	Acid Copper Chromate
ACTT	Accelerated Construction Technology Transfer
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AEP	American Electric Power
AGC	Associated General Contractors of America
ASCE	American Society of Civil Engineers
ASR	Alkali-Silica Reaction
ATB	Asphalt-Treated Base
ATCs	Alternative Technical Concepts
ATMS	Advanced Traffic Management System
BANs	Bond Anticipation Notes
BIMRS	Bridge Incident Management and Response System
BMPs	Best Management Practices
CAD	Computer-Aided Design
CB	Citizen Band
CCTV	Closed Circuit Television
C-D	Collector-Distributor
CDC	Community Development Center
CE	Categorical Exclusion
CIP	Cast-in-Place
CM at Risk	Construction Manager at Risk
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Mitigation Plan
CPI	Consumer Price Index
CPM	Critical Path Method
CRC/CRCP	Continuously Reinforced Concrete Pavement
CSO	Combined Sewer Overflow
CSS	Context Sensitive Solutions
CTB	Cement-Treated Base
D-B	Design-Build
D-B-B	Design-Bid-Build
DBE	Disadvantaged Business Enterprise
DDOT	Detroit Department of Transportation
DEIS	Draft Environmental Impact Statement
DIBC	Detroit International Bridge Company
DIE	Detroit Industrial Expressway
DMS	Dynamic Message Sign
DOT	Department of Transportation
DRB	Dispute Review Board
EA	Environmental Assessment

ACRONYM	FULL NAME
EJ	Environmental Justice
EMS	Emergency Management System
EPS	Expanded Polystyrene
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FMS	Freeway Management System
FONSI	Finding of No Significant Impacts
FRP	Fiber Reinforced Polymer
GARVEE	Grant Anticipation Revenue Vehicle
GIS	Geographic Information System
GISIGOSO	Get In, Stay In, Get Out, Stay Out
GPS	Global Positioning System
GRS	Geosynthetic Reinforced Soil
HAR	Highway Advisory Radio
HfL	Highways for LIFE
HMA	Hot Mix Asphalt
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HPC	High-Performance Concrete
HPS	High-Performance Steel
ICC	Interagency Coordination Committee
IM	Incident Management
IMTF	Incident Management Task Force
IT/ITS	Intelligent Transportation/Intelligent Transportation Systems
JPCP	Jointed Plain Concrete Pavement
LOS	Level of Service
MDOT	Michigan Department of Transportation
MIS	Major Investment Study
MOA	Memorandum of Agreement
MOT	Maintenance of Traffic
MOU	Memorandum of Understanding
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MSE	Mechanically Stabilized Earth
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NHI	National Highway Institute
NPDES	National Pollutant Discharge Elimination System
NS	Norfolk Southern
PAB	Private Activity Bond
PCC	Portland Cement Concrete
PCMS	Portable Changeable Message Signs
PIO	Public Information Officer
PMT	Project Management Team

ACRONYM	FULL NAME
PPP	Public-Private Partnerships
PR	Public Relations
PS&E	Plan Specification & Estimate
PSI	Pounds per Square Inch
QA/QC	Quality Assurance/Quality Control
RAP	Reclaimed Asphalt Pavements
RFP	Request for Proposal
RFQ	Request for Qualifications
RIB	Rail Infrastructure Bank
ROD	Record of Decision
ROW	Right-of-Way
RPMs	Raised Pavement Markers/Markings
RSCH	Repeated Shear at Constant Height
RSS	Reinforced Soil Slopes
RTA	Regional Transit Authority
RWIS	Roadway Weather Information System
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCC	Self-Consolidated Concrete
SEP	Special Experimental Project
SH	State Highway
SIB	State Infrastructure Bank
SIP	State Implementation Plan
SIP Forms	Stay-in-place Forms
SMA	Stone Matrix Asphalt
SMART	Suburban Mobility Authority for Regional Transportation
SPMTs	Self-Propelled Modular Transporters
SUE	Subsurface Utility Engineering
TDM	Traffic Demand Management
TIF	Tax Incremental Financing
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIG	Technology Implementation Group
TMC	Traffic Management Center
TMP	Traffic Management Plan
TRAC	Transportation Review Advisory Committee
TRB	Transportation Research Board
TS&L	Type, Size & Location
TSA	Transportation Security Administration
TSM	Transportation System Management
TSP	Thrift Savings Plan
VE	Value Engineering
VMS	Variable Message Sign
VPD	Vehicles per Day
VPPP	Value Pricing Pilot Program
WiFi	Wireless Fidelity

APPENDIX B: MD ACTT WORKSHOP ATTENDEES (by Team Focus Areas)

Construction Issues Team				
Name	**Title**	**Division/Section/Company**	**E-mail Address**	**Phone**
Maurice Agostino	Assistant Division Chief	SHA, Office of Bridge Development		
William Bradley, III	Regional Construction Engineer	SHA, Office of Construction		
Matt Harrell	Transportation Engineer (Note taker)	SHA, Office of Highway Development		
Joseph Huerta	Pavement Management Engineer, (Facilitator)	FHWA Resource Center	*joe.huerta@dot.gov*	(410) 962-2298
Bernie Kuta	Contract Administration Engineer	FHWA Resource Center	*bernie.kuta@dot.gov*	(404) 562-3204
Chip Lambert		Verizon		
John Mays	Utility Engineer	SHA, District 5		
Kevin Nowak	Area Engineer	SHA, District 3 Construction		
Michael Sprinkel	Associate Director	Virginia Transportation Research Council		
Geotechnical Engineering Issues Team				
Jamie Folden	Assistant District Engineer	SHA, District 5 Construction Office,		
Geoffrey Hall	Division Chief	SHA, Office of Materials and Technology		
Sean Johnson	Transportation Engineer (Note taker)	SHA, Office of Highway Development		
Gus Khankarli	Design Manager	Texas Department of Transportation		
Kelly Nash	Project Manager	SHA, Office of Bridge Development		
Silas Nichols	Geotechnical Engineer (Facilitator)	FHWA, National Resource Center	*silas.nichols@dot.gov*	(404) 562-3930

Public Relations / Involvement Issues Team				
Name	**Title**	**Division/Section/Company**	**E-mail Address**	**Phone**
Mark Ball	Public Information Officer (Facilitator)	Texas Department of Transportation		
Dave Buck	Division Chief	SHA, Office of Communications		(410) 787-5615
Valerie Burnette Edgar	Director	SHA, Office of Communications		(410) 545-0301
Christina Lavoie	Transportation Engineer (note taker)	SHA, Office of Highway Development		
Carin Michel	Marketing & Communications Team Leader	FHWA Resource Center	*carin.michel@dot.gov*	(410) 962-2530
Steve Moler	Public Affairs Specialist	FHWA Resource Center	*steve.moler@dot.gov*	(415) 744-3103
Bob Simpson		Montgomery County Department of Public Works & Transportation		
Kim Tran	Assistant District Engineer	SHA, District 5 Traffic Office		
Fran Ward	Public Relations Officer	SHA, District 4 Office		
Roadway / Geometric Design Issues Team				
Dane Barton	Transportation Engineer (Note taker)	SHA, Office of Highway Development		
Ken McDonald	Project Manager	JMT/SHA, Office of Highway Development		
Girish Pancholi		SHA, District 3 Maintenance		
Jawad Paracha		SHA, Office of Traffic and Safety		
Stephen Park		PEPCO		
Wilton (Bud) Roberts	Facilitator	Parametrix		
Norman Roush		URS Corporation		
Barb Solberg	Assistant Division Chief	SHA, Office of Highway Development		

Structures Issues Team				
Name	**Title**	**Division/Section/Company**	**E-mail Address**	**Phone**
Derek Constable	Senior Bridge Engineer	FHWA, Maryland Division Office	*derek.constable@dot.gov*	(410) 779-7157
Jesse Free	Area Engineer	SHA, Office of Materials Technology		
Keith Gray	Bridge Engineer	FHWA, Delaware Division Office	*keith.gray@dot.gov*	(302) 734-1657
Vasant Mistry	Structural Engineer (Facilitator)	FHWA, Office of Bridge Technology	*vasant.mistry@dot.gov*	(202) 366-4599
Jeff Robert	Team Leader	SHA, Office of Bridge Development		
Dan Sajedi		SHA, Office of Materials Technology		
Jacob Smith	Designer (Note taker)	STV		
Steve Stroh	Deputy of Surface Transportation Bridge Group Manager	URS Corporation		
Traffic Engineering/ITS/Safety Issues Team				
Sae'd Rahwanji		SHA, Office of Traffic and Safety		
Shawn Reynolds	Designer (Note taker)	Johnson, Mirmiran & Thompson		
Jim (J.R.) Robinson				
Mark Robinson	Facilitator	SAIC		
April Stitt	Transportation Engineer	SHA, District 7		
Mark Terry	Traffic Engineer	SHA, District 3		

VDOT

APPENDIX C: Skill Sets Recommendations(s) – Team Recording Forms

- **Construction**
- **Geotechnical Engineering Utilities**
- **Public Relations/Public Involvement**
- **Roadway/Geometric Design**
- **Structures**
- **Traffic Engineering//ITS/Safety**

Construction Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1. Social and Environmental Issues	• Using 4f properties for temporary construction activities	• Shopping Center Parking lot, recreation field, Lot north of Kiss and Ride, Glenmont Greenway • Utility Staging Areas, Permanent Easements, and Construction contract. • 4f needs to be revaluated. • Secured prior to advanced Utility Contract.
	• Pedestrian mobility	• Pedestrian MOT per phase • Public relations campaign
2. Public Relations	• Community Liaison, community meetings, project web-sites	• Use of Consultant = more money • Existing contracts • Monthly meetings
3. Phasing	• Think outside-the-box for Retaining Wall Design/Bridge Design and Maintenance of Traffic with the intent for reducing project and phase duration	• Reduction in and lane closures may create a more efficient/productive wall design • Use of innovative wall designs (i.e. top-down walls, secant walls, soil nailing, etc.) • WMATA Concerns • Proposed Phasing- Widen to outside, Build Structure (bridge and walls concurrently), final paving • Eliminate Temporary shift • 3 year construction period for roadway project • Night work/short duration total closures to be investigated • ICC and other project Coordination • Both peds and vehicles • Truss at or slightly above existing Grade, over Randolph Road • Georgia Ave. Truss, workers underneath, safe, one shift in traffic

Construction Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
4. Advanced Construction Contract	• Utilities	• All affected Utilities relocated with one contract (aerial and Underground) • Duct work and Cabling • Specifications included for Pre-qualified Utility contractor for both Pepco/Verizon in advanced contract
	• Storm Drain	• Complete Storm drain with Advanced Utility Construction and reconstruction of Judson and Sheraton Streets • Installation of proposed storm drain allows for Randolph Rd. Excavation
	• Advertise Utility contract, hold Roadway construction contract	• Set NTP for Roadway to coincide with anticipated completion of Advanced contract
	Subsurface Utility Engineering	• Part of Utility design • Identify Utilities, eliminate conflicts Consider Use of SUE as line item in both contracts (advanced utility contract and roadway contract)
5. Reduce Congestion within Workzone	• Explore Detour options	• Identify corridors for east/west and north/south routes during construction • Market to public, community ,local officials, etc.
	• Bus Route (public transit/school bus) alternatives	• Schools use alternative routes • Provide areas for pull-offs • Consider consolidation of bus stops, Mo. Co. and WMATA

Construction Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
6. R/W	• Advanced R/W Acquisitions • Monitoring Wells for the Purpose of Identifying Possible Contaminated Soils	• Demolitions included with Advanced Utility Contract • Monitoring well installation ASAP to determine extent of potential contamination – OMT installs?
7. Innovative Contracting	• Incentive/Disincentive at Critical path Milestones • Design/Build • A+B	• Cap? Is it worthwhile? • Take advantage of contractor's expertise • Risk shifts to contractor • Maximize Flexibility • Specify Constraints – WMATA, Etc. • Advertise all work, D-B team develops concurrent phasing • Performance Specs • Potential for Time reductions

Construction Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
8. Construction Management	• Use of Construction Management and Inspection Contracts	• Specialized expertise • Utility Coordinator • Method of tapping Private Sector • Downfall: Another contract
	• Use of Conventional SHA Admin. and Inspection	• Downfall: SHA may not have manpower
9. Agency Coordination and Public Involvement	• Start Discussions with organizations early	• Washington Metropolitan Area Transit Authority • If required, quick turn around on plan reviews, shop drawings, schedules, change orders • Eliminate surprises from and to
	• Restrictions on Design and Construction must be coordinated into Plans	• Spell out Restrictions in Contract

Geotechnical Engineering Utilities Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1a. Retaining Wall - Top Down Construction Drill Shaft Secant/Tangent Wall	• Construction of top-down wall alternatives can possibly be completed with live traffic on adjacent Randolph Road. This minimizes or eliminates the need for a detour of Randolph Road traffic and combines MOT phases during construction	• Can be installed in advance of construction reducing MOT needs • Shafts constructed below water table will require wet or cased construction techniques • Drilled shaft construction will require staging area • Various wall aesthetic treatments available. Precast facing elements shall be considered for accelerated construction
1b. Retaining Wall – Top Down Construction Soil nail walls	• Construction of top-down wall alternatives can possibly be completed with live traffic on adjacent Randolph Road. This minimizes or eliminates the need for a detour of Randolph Road traffic and combines MOT phases during construction	• Can be constructed in combination with shallow spread footings • Can be constructed as a temporary or permanent solution • Difficult to construct below ground water table • Various wall aesthetic treatments available. Precast facing elements shall be considered for accelerated construction

Geotechnical Engineering Utilities Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

2a. Bridge Foundation Construction Shallow Spread Footings	• Support bridge abutments on shallow spread footings. Earth retention system (ERS) for construction of Randolph Road is a required separate system. (this is not as currently shown in plans as a spread footing for a full height abutment)	• Will require additional earth support system for excavation to Randolph Road • Negligible impact on WMATA tunnels • May require increased span length for bridge due to separate ERS • Construction will require MOT phasing • Easier and more economical to construct than deep foundation alternative
2b. Bridge Foundation Construction Grade Beam on Drilled Shafts (Span WMATA Tunnels)	• Support bridge on drilled shaft foundation with a shallow grade beam spanning the WMATA tunnels	• Least impact of WMATA tunnel zone of influence for deep foundation alternative • Requires large capacity drill shafts • Requires large "cast-in place" grade beam construction • Construction will require MOT phasing
2c. Bridge Foundation Construction Continuous Drilled Shaft Secant/ Tangent Wall (over WMATA Tunnels)	• Continuous wall construction for soil retention at bridge location	• Wall may also act as foundation for bridge • May require sophisticated analysis to determine load transfer over WMATA tunnels • ERS may require additional tiebacks
3. Construction Sequence	• Total and/or sequenced closure(s) of the MD 97/Randolph Rd intersection to construct at-grade bridge. • Advanced construction contracts: - Foundation/substructure - SWM (Bio-retention facility) - Utility relocation	• Reduces MOT phases and possibly eliminates need for full detours • Reduces right of way needs • Requires significant/advanced public notifications • Completing work during advanced construction contracts accelerates project schedule

Geotechnical Engineering Utilities Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

4. Detailed Subsurface Characterization	• Supplemental testing and characterization of sub-surface materials for cost-effective and safe design of geotechnical features	• Enhance/optimize determination of soil and rock strength parameters for bridge foundation and earth retaining structure design alternatives. • Characterization of sub-surface materials for contamination prior to advertisement, if not already done
5. Construction Issues	• Use of high-performance and innovative materials and methods for construction of foundation elements and walls	• Pre-qualify specialty contractors and material suppliers • Consideration of SCC for drilled shaft construction
Example: Mechanically Stabilized Earth (MSE)	• Mitigation to include one or more of the following: deep ground improvement and/or light weight fill (geofoam/light weight slag)	• Advantages: Quick wall construction. Relatively conventional wall. Use of slag as light weight fill should be available. • Disadvantages: Larger excavation and ROW. Disposal of material, potential for contaminated soils. Relocate utilities. May not be feasible in regards to utilities. If deep soil mixing, specialty contractor required.

Public Affairs/Public Involvement Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1. On-site community liaison	• Hire a PR consultant at the outset of the project. Funding must be set aside out of the construction budget for this. Located at project field office.	• Funding, Qualified Candidate, Locally based
2. Informational Public Meeting	• A week or two before the informational public meeting meet with local officials, county council members, and then open houses to educate public.	• Coordination of date, timing of the year, coordination of all disciplines (i.e. real estate, highway design), consider literacy and LEP, Who is appropriate to deal with these meetings, convincing public officials to support the project publicly
3. Database (blast e-mail) for outreach	• Setup a database of all stakeholders, interested parties, and individuals that need to be informed about the project	• Getting the information, compiling and maintaining the list, trust issues
4. Project website	• Communicate project news and changes on CHART website. Purchase domain names.	• Developing and keeping up to date, IT support, ADA (508) compliant
5. Community Outreach	• Fliers, door hangers, newsletters (print and electronic), brochures, giveaways, speakers bureau, information on city and county webpages, drop-in center, kiosk, develop public service advertising for display in bus shelters (clear channel media) and also on buses, public advertisement on grocery bags, HAR/VMS, static project information signs	• Support of companies, funding, must weigh benefits vs. risk of information overload

Public Affairs/Public Involvement Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
6. Media outreach	Press releases, Traffic Reports, Blogs, Radio/TV/Print Interviews, Public Service Announcements, Letters to the editor, editorials, local cable access programs • Lisa and Bob on WTOP. Hold meeting with traffic reporters to educate them on the project and enable them to air frequent updates. • Outreach to Hispanic organizations, Spanish speaking radio stations (99.1 El Zol)	Buy-in of the media, costs, consistent up to date information, ability to reach non-English speakers, Identifying programs to participate on, availability of staff, identifying talent

Public Affairs/Public Involvement Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

- Identify all stakeholders in the project: Home owner associations, Kensington Volunteer Fire Department (privately owned, volunteers and paid workers), Glenmont Shopping Center (strips of business that extend out to Georgia Ave.), Washington Metro. Area Transportation Authority (WMATA): land, buses, MD National Capital Park and Planning Commission, Former School Site (owned by MO County), DPWT, Apartment Complex (residents as motorists and pedestrians), park users, shoppers, users of the transit system, single family neighborhood, neighborhood activists (Michael McAteer, "don't built and they won't come"), elected officials: State, county (no growth, pro-environment in office), Simultaneously constructing ICC and MD97, Glenmont Citizens Association, Emergency Response (police and Fire), Board of Education, Kennedy High School, School Bus Depot, Business Owners (bank, McDonald's, gas stations, Shoppers grocery store), Business Tenants, County Traffic Management Center, CHART, different ethnic backgrounds (tailoring the message to different ethnic groups), The Gazette, Spanish written newspaper

- Bring stakeholders into the project and the process of regional communications

- Investigate methods of effective communication to motorists and pedestrians traveling through the area during construction: webpage, communicate lane closures on CHART website, e-mail updates/notifications (e-newsletters), geo-serve (key words are spotted and links sent out), public relations or private company to as a communication's manager, office w/ printed information in Wheaton, involvement with the school, bilingual communications, getting the word out when closing down lanes, coordinating construction w/ ICC, PSAs in multiple languages (no budget to do it), bare bones right now – solution: ask for a dollar amount, percentage of project placed aside for PR: on-site liaison, renting space for on-site citizen information center, once a week have an on-site kiosk, portable variable messages signs, purchase of advertising: bus shelters, free public advertisement on grocery bags, door hangers online/webpage, radio/news radio, WTOP traffic reporters (Bob Marbourg& Lisa Baden), & news

- Investigate the need for a Public Relations Manager on site: need a project community liaison for construction paid for by the State out of the project (a State employee on contract acts as a community activist, has knowledge of engineering, construction, and how to work with people), needs to be local, reach out to the community

Public Affairs/Public Involvement Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

- How do we secure the acceptance and participation of all stakeholders? Full time person with dedicated funding, press releases, brochures, fliers and e-newsletters, elected officials support (send letters and meet with them), because of the amount of projects in the district it is imperative to reach out to officials with more personal briefings about the project, informational public meeting (3 to 5 months before the project starts with real estate, design, hydraulics, and environmental representatives), information on city and county web pages, speakers bureau at 'kiwanis' clubs, meet with or develop 15-20 minute video for civic association or college, mindset change that needs to change ($ for PR), look for federal grants through the Maryland Division (Nelson), technology money, PR firms looking for non-profit companies to campaign, deliver what we promise and have a finite end to the construction specifying particular weekends prior, consider the intangible losses that the locals will encounter

- How do we collaborate with and manage the information released by the Press? Cannot manage it or handle it, write a letter to the editor that it is pro-transportation

- What is the most effective means of informing the local elected officials and their constituents of construction progress and impacts? The CTP process, our administrator contacts them, very global and general, a week or two before the informational public meeting meet with local officials, for the meeting consider literacy, look for a non controversial Hispanic organization (99.1 El Zol), population of Salvadorians, Mexico, and Central Americans, county council members, database (blast e-mail) for outreach, clear channel media (bus shelter advertising)

- Develop a plan to engage all stakeholders in the acceleration of construction process and communicate to them the overall benefit. Solicit their assistance. Local cable access program, Consultant community liaison to develop and implement a plan with 1) open house, 2) handouts and public school material, 3) project website, 4) e-mail/e-blast, 5) Spanish language radio, 6) Lisa and Bob on WTOP*, 7) face to face meetings, 8) direct mail, 9) field office, 10) bus shelter advertising, 11) press releases, 12) ask the project manager

Roadway/Geometric Design Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1. Relocate Utilities along Georgia and Randolph instead of Sheraton and Judson	Bring the relocated utilities along the west side of MD 97, north side of Randolph, across Randolph west of Judson, and the southern edge of Randolph to tie back to the original scheme. Avoid reconstruction of Sheraton and Judson Roads except as needed for storm and sanitary construction.	Possible 4F issue to be considered. Buy the house currently for sale on the northwest corner of the intersection for several uses during project construction. This property could be converted to green space after construction is completed, if needed o mitigate the 4F impacts. Coordinated with Traffic and Construction Skill Sets.
2. Build the retaining walls from the top down to avoid the detours and relocation of the Fire Station.	Keep the current horizontal alignment along both roadways, even during construction. Build the retaining walls built top down. Build the bridge first, then excavate under. If this alternative proves unfeasible, construct a new intersection south of the current intersection. Shift Randolph Rd farther south. Build a temporary bridge, then excavate under. Cuts down on lane shifts but may need to relocate Police Station, on or off site (the building could be moved).	Coordinated with the Construction and Geotechnical Skill Set.
3. Consider keeping the existing vertical alignment of MD 97.	Hold the existing grade will potentially simplify M.O.T. but may require Randolph Road to be lowered.	Coordinated with the Structures Skill Set.
4. Eliminate the jug handle. Eliminate the left turn from the express lanes. Provide left turn from eastbound Ramp B.	Eliminate the left turn lane from the tunnel and shift the left turn lane onto the local lanes. Sign the tunnel traffic as through only and local traffic to keep right. The two retaining walls will be positioned parallel to each other. To accomplish the shift, the vertical curve will need to be modified from slightly to shorten the walls on the east end. The need to buy the police station's parking lot and its replacement is also eliminated.	Coordinated with Structures, Traffic and Construction Skill Sets. Traffic is considering the elimination of the signal at this intersection altogether. If this requires a U-turn to gain access eastbound to the shopping center, we do not support it.

Structures Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1. Bridge Randolph Road over MD 97	Build bridge/MSE wall approximately 1900' long starting just west of Judson Road to just east of Glenmont Circle carrying the through movements of Randolph Road over existing MD 97. Segmental concrete box girder super structure with large cantilivers, approximately 70' wide, probably constructed span by span with underslung truss or overhead gantry. (other super structure options possible). Approximate cost of $20M. Approximate span length 130'. Foundations constructed using monoshaft with single column piers. ALTERNATE OPTION: Extend MSE Wall to minimize the bridge structure length.	*Advantages* • Minimize utility impacts (no underground relocations) • Reduce ROW impacts (eliminate some total takes) • Lanes can be tucked under structure • Aesthetics • Significant time savings for construction • Reduce construction stages • Minimize hazardous material impacts • Minimize impacts to surrounding structures • Saves money (ROW/Utility impacts) *Disadvantages* • Visual intrusion • Long term maintenance costs • Planning process will require revisiting

Structures Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
2. Bridge MD 97 over Randolph Road	Build bridge/MSE wall approximately 1900' long carrying the through movements of MD 97 over existing Randolph Road. Segmental concrete box girder super structure with large cantilevers, approximately 70' wide, probably constructed span by span with underslung truss or overhead gantry. (other super structure options possible). Approximate cost of $20M. Approximate span length 130'. Foundations constructed using monoshaft with single column piers. ALTERNATE OPTION: Extend MSE Wall to minimize the bridge structure length.	*Advantages* • Carrying heavier traffic movements, improving LOS • Less impacts on residents • Minimize utility impacts (no underground relocations) • Reduce ROW impacts (eliminate some total takes) • Lanes can be tucked under structure • Aesthetics • Significant time savings for construction • Reduce construction stages • Minimize hazardous material impacts • Minimize impacts to surrounding structures • Saves money (ROW/Utility impacts) *Disadvantages* • Possible conflicts with WMATA Metro Tunnel (foundations) • Visual intrusion • Long term maintenance costs • Planning process will require revisiting

Structures Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
3. Weekend Closure (as design scheme)	Use drill shafts/steel piles to build bridge over the course of one weekend. Close intersection for a weekend, reopen traffic, then excavate from underneath. Construction sequence: 1. Install foundation elements during short term lane closures. Cover with steel plates. 2. Close intersection for weekend. 3. Excavate as required depth over the bridge area. 4. Install precast abutment caps. 5. Place precast superstructure elements. 6. Place temporary waterproofing membrane and HMA wearing surface. 7. Open to traffic.	*Advantages* • Minimize MOT phases • Shorter construction time frame • Less temporary pavement • Potentially less ROW/Easements *Disadvantages* • Closes intersection for a weekend o Detours/Traffic Plan Issues • Coordinate foundation with WMATA tunnel o Span length a function of foundation type, spread footing or deep foundation spanning WMATA with a transfer beam • Superstructure types o Adjacent box beam o Solid precast slabs • Extensive Public Awareness campaign required Dependent on amount of work, could be expanded to two weekends • Staging area will be needed close by

Structures Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
4. Wall Alternatives	Investigate use of secant wall, soldier piling/lagging (top down), soil nail	**SECANT/TANGENT WALL (TOP DOWN)** *Advantages* • Can be constructed using lane closures • May not require tie-backs Can be used for a vertical load carrying element at bridge *Disadvantages* • Requires special details at WMATA crossing • High costs - $110 to $150 per SF Potential challenges removing decomposed rock material **SOLDIER PILING/LAGGING (TOP DOWN DRIVEN H-PILES)** *Advantages* • Lower costs • Less caisson drilling *Disadvantages* • More extensive MOT • Requires special details at WMATA crossing (tie-backs) **SOIL NAIL** *Advantages* ▪ Lowest cost *Disadvantages* • Longest construction time • Possible conflicts with drainage and tie-backs • Long term durability concerns (soil PH requires investigation)

Structures Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
5. 69KV Utility Line on Bridge	Place 69KV utility line on bridge rather than relocating it around intersection	*Advantages* ▪ Reduce utility relocation costs *Disadvantages* ▪ May need to be underground for gas cooling purposes ▪ Other utilities may need relocated ▪ May not be permitted by Utility Co.
6. Alternate Contracting Options	Consider alternative contracting options such as A+B, Design Build, Detail Build, or Design Build Finance.	*Advantages* ▪ Spur innovation for reducing construction time and possible costs ▪ Introduces opportunity for financing and other options *Disadvantages* ▪ Less control by Agencies ▪ More QA/QC required
7. Tunnel under MD 97 (jack and bore)	Consider keeping MD 97 exactly where it is and tunnel Randolph Road under MD 97.	This option considered and discarded due to high costs and specialized equipment which is not warranted by the size of the project.
8. Box Culvert Sections rather than bridge	Close intersection for week (detour traffic) and insert box culvert section to construct bridge	This option considered and discarded due to high costs and issues with transportation of large segments.
9. Shift bridge east	Construct bridge further east, construct temporary roads through greenway on the west side	*Advantages* • Less phases for construction • Less impact to traffic *Disadvantages* • 4f impacts associated with temporary roadway in Greenway

Structures Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
10. Staging Areas	Potential staging area locations: ▪ Shopping Center Parking Lot in NE quadrant of intersection ▪ Glenmont Greenway ▪ Victory Youth Center Recreation Field	Issues • Close proximity particularly important for weekend closure options
11. Materials	Potential use of high performance materials.	• Self Consolidating Concrete (drilled shafts) • Automated Computer Control of Concrete Placement Operations • High Performance Overlays • High Performance Rebar • Utilizing Precast Elements

Traffic Engineering/ITS/Safety Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
1. Challenges of the Current Design	▪ **Signing.** ▪ **Shifts Congestion to adjacent intersections.** ▪ **Utility relocations along Judson Road and Sheraton Street** ▪ **Length of Construction period** ▪ **Redirection of local roadway traffic** ▪ **Median nose impeding turning movements** ▪ **Access Management Issues** ▪ **Growth of shopping center** ▪ **Redirect of ICC traffic**	▪ Concern with decision point where drivers have to get into Express or Local lanes. Signing should be adequately provided to clearly mark the lanes. ▪ Concern for the actual benefit of the current design with proposed signal at the shopping center, are we just shifting the problem? ▪ There is existing on-street parking along Judson Road and Sheraton Street. Has this been considered in determining construction impacts and providing parking during construction along these roads? ▪ The length of construction seems to be very long. Should consider other methods and/or phasing to reduce construction time required. ▪ Certain existing turning movements from the local roadways have been removed. Has this been presented to the local communities? ▪ Review the median noses and curb radii to verify all turning movements for the design vehicle can be made within the project limits. ▪ Concern with the intersection at the shopping center and it's affect on the flow of traffic. Consider eliminating and/or reconfiguring turning movements at this intersection. ▪ Has the growth of the shopping center been considered in the modeling of the traffic? This needs to be considered. ▪ Has the redirection of ICC traffic been considered in the traffic modeling? Both during construction, after

Traffic Engineering/ITS/Safety Recommendations(s) – Team Recording Forms
Accelerated Construction Technology Transfer Workshop

		ICC Contract A is completed and ICC traffic is dumped onto MD97, and ultimate build out. These scenarios should be analyzed.
2. Reduction of Construction Time and Cost	• Consider two/three lane tunnel with reversible lanes for peak direction. • Reconsider alternative E – at grade widening – Consider pedestrian bridge/tunnel with elevators. • Consider short term closures for certain activities to reduce construction time and phasing – need to perform modeling to determine impact	• By constructing a smaller roadway section under the existing intersection, the footprint could be made smaller and the construction time and cost could potentially be reduced. This could also potentially allow for construction of the utilities along the mainline roadways instead of along the local roadways. • Reconsider other options, including at-grade widening. The concern with this option was pedestrian safety; consider using pedestrian bridge/tunnel. • Consider closing the intersection for short term closures to complete certain construction tasks, such as over a weekend, to expedite construction. Should perform traffic modeling to determine the impacts and adjust traffic control throughout the area accordingly.
3. Minimize impact to traffic during construction	• Signal timing at adjacent intersections within the area network • Additional traffic monitoring equipment beyond the project limits (need to determine what Mont. Co. currently has in place) • Reduce or eliminate conflicting turning movements in the work zone.	• SHA should coordinate with Montgomery County regarding signal timing and monitoring equipment within the area network to minimize the impact to traffic during construction. Any additional equipment required should be included as part of this contract. • Consider eliminating or reducing conflicting turning movements in the work zone. This could improve operation within the intersection during construction. This would need to be modeled to determine the impacts. Also, if requiring those turning movements to make u-turns at adjacent intersections verify that it can done (consider turning requirements of truck traffic).

Traffic Engineering/ITS/Safety Recommendations(s) – Team Recording Forms

Accelerated Construction Technology Transfer Workshop

4. Provide safe pedestrian / bicycle access during construction	• Provide positive protection • Pedestrian / Bicycle detours • Signing • Local Information outreach • Reduce construction phasing • Coordination with WMATA and consider moving bus stops • Provide acceptable riding surface for cyclists • Maintain adequate lighting	• It was noted that there is significant pedestrian traffic through this intersection and within the area. This should be considered in the development of MOT plans and the phasing of construction. Need to look at various options to keep the pedestrian / bicycle traffic informed and safe during all phases of construction. • Detailed pedestrian / bicycle maintenance of traffic plans should be included in the bid documents
5. Keeping stakeholders informed of traffic and construction conditions	• Maintain open line of communication with media • Coordinate closures with property owners and businesses • Community liaison • Coordination with ICC construction and other nearby construction projects • Maintain accurate traffic control devices	• SHA must maintain an open line of communication throughout the construction of the project with all stakeholders. • A Community Liaison dedicated to this project only is strongly recommended. • Coordination with other area projects (including the ICC) is a must as they will also have an affect on the area traffic network. These should be considered when reviewing construction phasing, signal timing adjustments, and additional traffic monitoring equipment required.

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IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
6. Real time monitoring and conveying that information to the public	• Provide and maintain monitoring and ITS devices throughout the area network and include in the project costs • Coordinate construction phasing and signal timing with Montgomery County Traffic Management Center (TMC) • Coordinate construction activities with WMATA bus operations • Use existing resources to provide real time data (WMATA, WTOP, Mont Co., etc.) • TAR – Travel Advisory Radio	• • It is important that real time monitoring of traffic be maintained throughout the construction phasing of this project. This information also needs to be conveyed to the public, real time. Use of existing resources is required including radio, Montgomery County, and WMATA.

Traffic Engineering/ITS/Safety Recommendations(s) – Team Recording Forms

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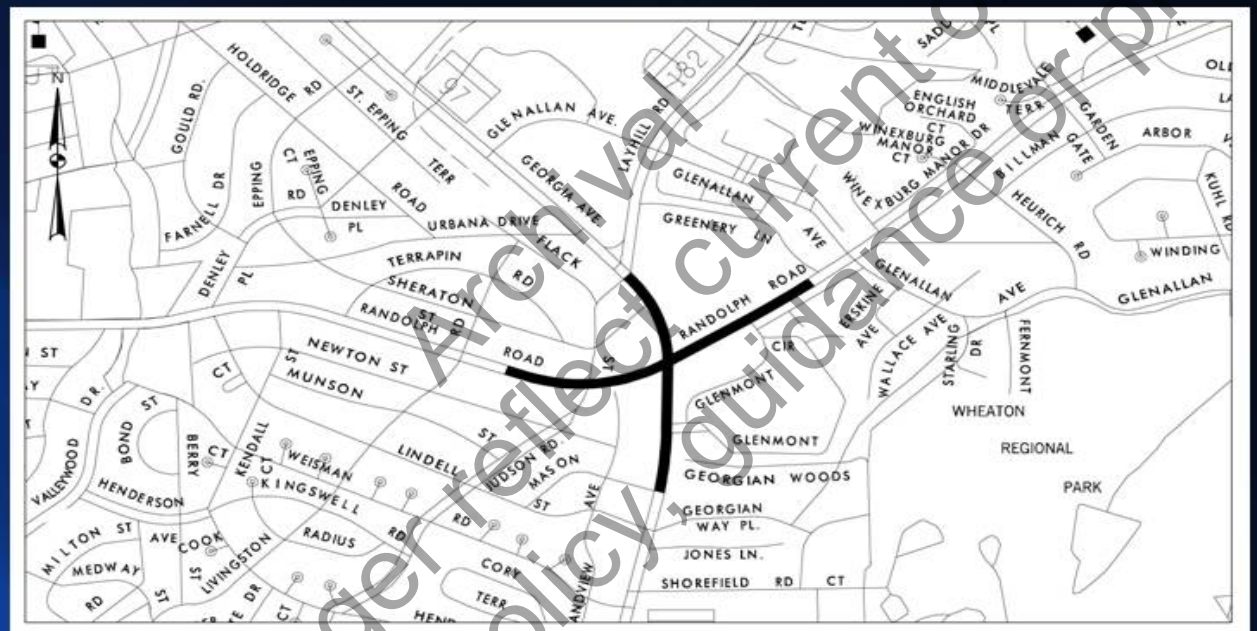
IDEA (Short Name)	IDEA (Detailed Description)	Implementation Details (Barriers, Skill Set Coordination, etc.)
7. Maximize the benefit of the ultimate facility	• Simulation modeling of ultimate facility for traffic flow improvements • Access management to shopping center • Remove EB Randolph Road left turn lanes to shopping center • Consider second cut and cover at Glenmont Circle and Randolph Road • Consider impacts of ICC • Provide Additional left turn lane out of the shopping center	• Detailed Simulation modeling should be performed within the area network to maximize the benefit of the ultimate facility including a detailed analysis at all intersections. This should include the potential impacts of the ICC traffic (Ultimate and ICC Contract A), and growth of the shopping center. • Concern with intersection of Randolph Road and Shopping Center entrance. This intersection reduces the benefits of the project and alternatives should be looked at and considered including, a second cut and cover to take the express lanes under this intersection, eliminate or reconfigure turning movements (Remove left turn lane movement from express lanes), and provide an additional left turn lane out of the shopping center to reduce the green time required for this movement.
8. Minimize crashes during maintenance of traffic	• Clear and accurate use of traffic control • Routine WZTC inspection • Reduce or eliminate conflicting turning movements in work zone • Provide contractor incentives for maintaining safe work zone • Remove vehicles quickly in the event of a crash or incident – consider performance spec for contractor	• SHA and Contractor must make sure that the proper traffic control is in place at all times and that it is always clear and accurate. Routine inspections should be performed to ensure this. • Again, consider reducing or eliminating conflicting turning movements in the work zone. • Consider including contractor incentives in a performance spec for maintaining a safe work zone and for developing a system to quickly remove vehicles from the travel lanes in the event of a crash or incident.

Appendix D: Project Limits

Overview



MD 97 (GEORGIA AVENUE) AT RANDOLPH ROAD

Photo 1: ACTT Workshop Team meets at Intersection of MD-97 and Randolph Rd

APPENDIX E: Workshop Photos

Photo 2: Workshop attendees tour the project.

APPENDIX E: Workshop Photos

Photo 3: Workshop attendees walk the project site.

APPENDIX E: Workshop Photos

Photo 4: The Traffic Engineering/ITS/Safety skill set members develop their recommendations in a breakout session

APPENDIX E: Workshop Photos

Photo 5: ACTT facilitator (standing) leads the discussion during the Construction skill set team breakout session

APPENDIX E: Workshop Photos

Photo 6: Team member presents the Structures skill set recommendations to other skill sets at the ACTT Workshop.

APPENDIX E: Workshop Photos

Photo 7: ACTT Workshop participants listen to skill set reports

APPENDIX E: Workshop Photos

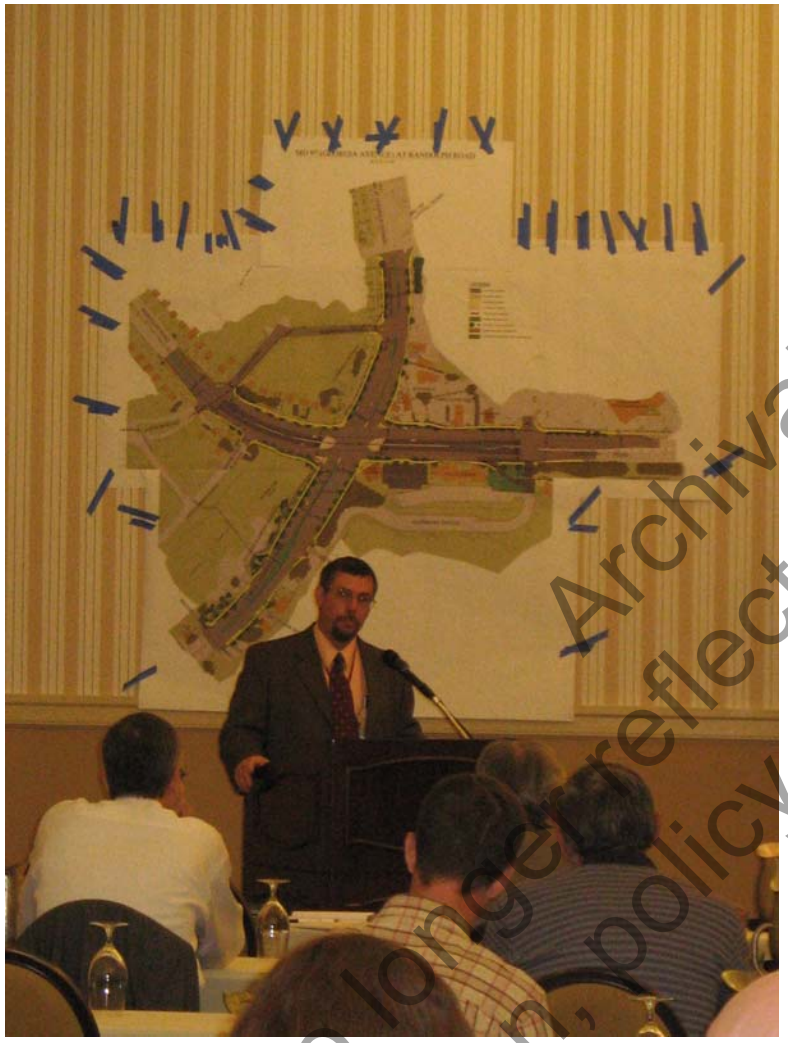


Photo 8: Director, Office of Highway Development, Maryland State Highway Administration, delivers feedback to workshop participants following skill set presentations.

APPENDIX E: Workshop Photos

Photo 9: MD SHA workshop coordinators at registration table

APPENDIX E: Workshop Photos

Photo 10: Participants network and discuss project

Background of ACTT

ACTT is a process that brings together public- and private-sector experts from across the country in a setting that encourages flexibility and innovation. The goal is to recommend technologies that will accelerate construction time while reducing user delay and community disruption. This necessitates a thorough examination of all facets of a highway corridor with the objective of improving safety and cost effectiveness while minimizing adverse impacts to the traveling public.

The ACTT concept was originated by the Transportation Research Board (TRB) in conjunction with FHWA and the Technology Implementation Group (TIG) of the American Association of State Highway and Transportation Officials (AASHTO). Following the completion of two pilot workshops, one in Indiana and one in Pennsylvania, the originating task force, A5T60, passed the concept off to the FHWA and TIG to continue the effort. They have done so by coordinating a series of ACTT workshops around the country, with several more pending in 2007.

More information on the ACTT program is available online at ***www.fhwa.dot.gov/construction/accelerated/index.htm.***

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