



**ENGINEERING OPERATIONS COMMITTEE  
MEETING MINUTES  
JUNE 13, 2019, 9:00 A.M. – 11:00 A.M.  
MULTI-MODAL CONFERENCE ROOMS**

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Present:	Carol Aldrich	Jason Gutting	Will Thompson
	Mark Bott	Tony Kratofil	Gorette Yung (phone)
	Gregg Brunner	Ryan Mitchell	Brad Wieferich
	Matt Chynoweth	Kristin Schuster	Hal Zweng
	Mark Geib	Brandy Solak	
Absent:	Ted Burch	Rebecca Curtis	
Guests:	Mike Bellini	Dave Morena	Erik Smalley (phone)
	Elise Feldpausch	Ashok Punjabi	Carlos Torres
	Mark Fisher	Brett Schlager	

OLD BUSINESS

1. Approval of the April 25, 2019, Meeting Minutes – *Approved*
2. Michigan Department of Transportation (MDOT) New Materials and Products – Jason Gutting

NEW BUSINESS

1. Guidance Document – Deployment of Connect Vehicle (CV) Infrastructure at Local Agency Signalized Intersection – Elise Feldpausch

Subject/Issue – Deployment of CV Infrastructure at Local Agency Signalized Intersection  
Guidance Document

Issue Statement – To provide guidance for the deployment and ongoing operation and maintenance of CV infrastructure at signalized intersections and/or communications owned or maintained by a local agency.

Major Issue(s) – CV technologies enable all types of vehicles, roadways, other infrastructure, and mobile devices to all communicate and share vital transportation information. The primary communications technologies used to support CV applications is dedicated short-range communications, which is similar to Wi-Fi and cellular. These roadside units (RSU) are devices that send messages to, and receives messages from, nearby vehicles. The RSU operates from a fixed position or a portable device, and includes a processor, data storage and communications capabilities on a secure channel with other equipped vehicles. As

deployments progress throughout the state, intersections owned by MDOT and maintained/operated by local agencies have become strategic points of interest for corridor deployment and it is anticipated that this number will grow as additional agencies begin to enter the space. Guidance is necessary to establish statewide consistency as a basis for agreements between MDOT and local agencies.

Background/History – As the deployment of these devices has grown in number and type, it was determined that there needs to be a way to standardize how these devices interact with MDOT and local infrastructure and what relationship need to exist for successful installation and operation.

Recommendation(s) – Approve the Guidance Document

*ACTION: Approved*

2. St. Clair County Road Commission Traffic and Safety Roundabout – Brett Schlager

Project Information: St. Clair County Road Commission Traffic & Safety project programmed for intersection improvements (roundabout construction).

Route/Location: Range Road at Dove Road and I-94EB exit ramp

Job Number: 202929

Control Section: 77000

Letting Date: 11/1/2019

Issue(s) – Proposed roundabout construction including removal of existing traffic signal.

Background – St. Clair County Road Commission and MDOT have pooled Congestion Mitigation/Air Quality dollars to fund the programmed above referenced project. MDOT was originally planning to upgrade this signalized intersection including improved detection to optimize operations; however, the St. Clair County Road Commission had proposed additional improvements on the local system that would improve the overall traffic operation. This proposed roundabout has been modeled resulting in a single lane roundabout with no bypass lanes provides a Level-of-Service A. Additional documents including conceptual drawing will be provided for a visual aid only as the survey and design will be commencing in more detail soon. Lansing Geometrics has been involved in the conceptual review and modeling and will continue to be involved through the final design.

Recommendation(s) – This proposed roundabout would be a great opportunity to partner with the locals to improve the operation, safety and reduce maintenance cost.

*ACTION: Approved*

### 3. Job Order Contracting Delivery Method – Ryan Mitchell

Subject/Issue Statement – Request approval for the use of Job Order Contracting (JOC) delivery method for traffic signal modernization and ADA sidewalk upgrades in the Southwest Region, Metro Region/Taylor Transportation Service Center (TSC), and North/Superior Regions.

Major Issue(s) – The use of Job Order Contracting on three projects in the Southwest Region, Metro Region, and North/Superior Regions is being requested to allow for faster installations of new signal approvals and more flexibility when installing Americans with Disabilities Act compliant sidewalk and traffic signal poles.

Job Number: 203625

Location: Various locations in the North and Superior Regions (administered by the Crystal Falls TSC)

Letting Date: 10/4/2019

Contract Length: 2 years

Construction Cost: \$1,150,000

Job Number: 203627

Location: Various locations within the Metro Region, with one location identified, M-153 at Wyoming Avenue (administered by the Taylor TSC)

Letting Date: 8/9/2019

Contract Length: 2 years

Construction Cost: \$1,150,000

Job Number: 203628

Location: Various locations within the Southwest Region, with one location identified, M-66 (Centerfield) at South Street (TBD which office in the region will administer)

Letting Date: 10/4/2019

Contract Length:

Construction Cost: \$1,150,000

Background/History – The Job Order Contract process has been previously used for traffic signal modernizations in the University Region, and is currently in the Bay, Grand, and Metro (Detroit) Regions.

Recommendation(s) – The Innovative Contracting Committee recommends approval of the use of Job Order Contracting on this project.

*ACTION: Approved*

### 4. Turf Establishment – Kristen Schuster

*ACTION: Tabled for final technical agenda report.*

5. Two-Course Hot Mixed Asphalt (HMA) Mill and Overlay I-275 ATC – Ryan Mitchell

Project Information (if applicable): Two-course HMA Mill and Overlay including full depth concrete and HMA repairs, widening of shoulders, inside/outside ditch work, multiple cross culverts and storm sewer replacements/rehabilitation. The bridge work includes rehabilitation/preventative maintenance work. Located within the Taylor TSC, Metro Region.

Route/Location: I-275 from 5 Mile to M-153  
Job Number: Road: 111073, Bridge: 130003, 200446, 201544  
Control Section: 82293  
Plan Completion: August 2019  
Letting Date: January 2020  
Construction: 2020 (one season)  
Est. Const. Cost: \$44.6M (Road + Bridge)

Issue(s) – Use of Alternative Technical Concepts for Maintaining Traffic and Staging on the I-275 Design-Bid-Build project.

The Taylor TSC and Metro Region are recommending this project move forward with Alternate Technical Concepts (ATCs) for maintenance of traffic (MOT) because I-275 is a major Metro freeway corridor and MOT is going to have major impacts on traffic in the corridor. There are multiple options to maintain traffic and it would be beneficial to allow industry input on the MOT plan and staging.

Background – The project appears to meet the criteria for the use of ATCs.

Recommendation(s) – The Innovative Contracting Committee recommends approval of the use of ATCs for maintaining traffic and staging on this Design-Bid-Build project.

*ACTION: Approved*

6. Proposed Action Plans for Roadside Safety Devices – Carlos Torres

Subject/Issue – Action plans for selection of the following roadside safety devices on projects let after 12/31/19:

- High Tension Cable Barriers (HTCB)
- Concrete Barrier Light Standard Foundations (MDOT Standard Plan R-50-Series)
- Concrete Barrier Sign Support Foundations (MDOT Standard Plan R-51-Series)
- Filler Wall at Bridge Pier Columns (MDOT Standard Plan R-55-Series)
- Short-Radius Guardrail (MDOT Special Detail 21)
- Chain Link Fence with Wire Ropes (MDOT Special Detail 99)
- Luminaire Supports

Major Issue(s)/Potential Complication(s) – Manual for Assessing Hardware (MASH)-compliant versions of the roadside safety devices identified above must be used for new installations on the National Highway System (NHS) on construction projects let after 12/31/19. To date, the Federal Highway Association and American Association of State and Highway and Transportation Officials (AASHTO) have not granted an extension to the 12/31/19 sunset date for any of these devices.

The potential issues with state transportation agencies trying to meet the 12/31/19 sunset date for the following device categories are:

a. HTCB

At the present time, there are no cable barrier systems meeting all the requirements of MASH-16, and for use on 1V:6H or 1V:4H slopes.

b. Concrete Barrier Light Standard and Sign Support Foundations, and Filler Walls at Bridge Pier Columns

MASH design impact loads would be needed to determine, by analysis, if MDOT's current concrete barrier light standard foundation design, concrete barrier sign support foundation designs, and filler wall designs can withstand a MASH impact load. Since MASH design loads for bridge railings have not been formally adopted by AASHTO, MDOT has been unable to perform these types of analyses.

c. Short Radius Guardrail (MDOT Special Detail 21)

The current design depicted in MDOT Special Detail 21 meets National Cooperative Highway Research Program (NCHRP) 230. An NCHRP 350 compliant short-radius guardrail design was never developed, so state Departments of Transportation (DOTs) had to keep using NCHRP 230 designs. The transition to MASH creates two major complications pertaining to the short-radius guardrail design:

- MASH does not contain a specific test matrix for the short-radius guardrail design.
- There is disagreement amongst the major crash testing facilities as to the number and types of tests that should be conducted in order to determine if a short-radius guardrail design is MASH compliant.

This topic has been discussed by AASHTO's Technical Committee on Roadside Safety (TCRS). However, the matter has not been resolved. If this matter is not resolved by AASHTO, and if a MASH, TL-3 compliant short-radius guardrail design is not developed, state DOTs will need to continue using the current NCHRP 230 short-radius guardrail designs.

d. Chain Link Fence with Wire Ropes (MDOT Special Detail 99)

The current version of MDOT Special Detail 99 was never crash tested, and a suitable MASH-compliant alternative for this design does not exist.

e. Frangible Bases for Luminaires

At the present time MDOT uses one supplier that is approved on the Qualified Products List. Currently, no luminaire frangible bases have been tested for MASH requirements and there is no testing currently underway. The frangible bases that MDOT uses meet the testing requirements of NCHRP 350. Items of concern are:

- There has been little communication between manufacturers and FHWA/AASHTO regarding industry testing concerns.
- Some manufacturers are operating under the false pretext that their NCHRP 350 compliant luminaires will be grandfathered into MASH without further testing.
- Some manufacturers have shown a lack of interest in ensuring their luminaires are MASH-compliant.
- Many in the industry feel MASH requirements are confusing and unattainable.
- There have been questions needing clarification regarding how much and what type of testing is needed considering the many different configurations of structures and luminaires that are available.
- Some state DOTs are questioning the need for MASH compliance because the breakaway supports that are currently being used have been performing well.

Background – The MASH was published in 2009 as an updated crash testing standard to supersede National Cooperative Highway Research Program Report 350 (NCHRP 350). In addition, MASH crash testing was required for new or revised roadside safety devices tested after January 1, 2011. In 2016, AASHTO adopted an updated version of MASH, called MASH 2016, and MASH 2016 crash testing will be required for new or revised roadside safety devices tested after December 31, 2016. To avoid any confusion, the original version of MASH, published in 2009, will be known as MASH 2009. The biggest change between MASH 2009 and MASH 2016 involves the addition of several test matrices for cable barrier systems. As a result, most roadside safety devices, with the exception of cable barrier systems, that successfully passed MASH 2009 crash testing will be grandfathered into MASH 2016 without further testing.

The current FHWA-AASHTO joint implementation agreement requires MASH 2016-compliant devices to be used for new installations on contracts involving National Highway System roadways with a letting date after the dates below:

- December 31, 2017: guardrail systems and cast-in-place concrete barriers
- June 30, 2018: tangent, single-sided guardrail terminals
- December 31, 2018: crash cushions (impact attenuators)
- December 31, 2019: cable barriers and cable terminals, double-sided guardrail terminals, flared guardrail terminals, bridge railings, transitions, temporary work zone devices, all

other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports, and all other breakaway hardware

Recommendation(s) – Continue using the currently approved roadside safety devices identified below until the items of concerns for each category are addressed and suitable MASH-compliant alternatives become available.

- HTCB
- Concrete Barrier Light Standard Foundation (MDOT Standard Plan R-50-Series)
- Concrete Barrier Sign Support Foundation (MDOT Standard Plan R-51-Series)
- Filler Wall at Bridge Pier Columns (MDOT Standard Plan R-55-Series)
- Short-Radius Guardrail (MDOT Special Detail 21)
- Chain Link Fence with Wire Ropes (MDOT Special Detail 99)
- Luminaire Supports

*ACTION: Approved*

#### 7. X-Lite Guardrail Terminal Action Plan – Carlos Torres

Subject/Issue – Future of X-Lite Guardrail Approach Terminals on MDOT Roadways.

Major Issue(s)/Potential Complication(s) – MDOT recently received and reviewed information pertaining to the X-Lite family of guardrail terminals manufactured by Lindsay Transportation Solutions, Inc.

It appears the X-Lite-Flared and X-Lite-Tangent terminals being supplied by the manufacturer contain various modifications compared to the units that were successfully crash tested under NCHRP 350 criteria and received Federal Highway Administration (FHWA) eligibility letters CC-120, CC-120A, and CC-120B, respectively.

Furthermore, after reviewing pictures of the X-Lite crash tests performed in 2010, it appears there are some inconsistencies in the hardware used in the crash tests.

So far, MDOT has been unable to find any documentation confirming that FHWA was aware of these modifications and concurring the modified terminals were eligible for federal aid reimbursement. The modifications and inconsistencies in question are detailed in the enclosed file.

Background – The X-Lite guardrail terminals (i.e., X-Lite-Flared and X-Lite-Tangent, respectively) were crash tested under NCHRP 350 criteria in 2010 and received their first FHWA eligibility letter (CC-120) in 2011. At one point in time, the X-Lite terminals were approved for use in 32 states. MDOT approved the X-Lite terminals for statewide use in 2016. Records indicate there are roughly 90 X-lite terminals on MDOT roadways at the present time.

The X-Lite guardrail terminals began to garner national attention in early 2017 as a result of a November 2016 fatal car crash that occurred in Tennessee. The Tennessee DOT (TDOT) published a letter in April 2017 indicating the X-Lite terminals were removed from TDOT's Qualified Product List (QPL) on 10/25/16 due to unclear installation instructions. Furthermore, TDOT stated they would remove all X-Lites installed on TDOT roadways due to their negative experiences with the X-Lite terminals and their belief the X-Lite terminals do not provide an adequate level of protection to the motoring public.

In May 2017, FHWA issued a memorandum concerning guardrail terminals. The memo acknowledges that FHWA received a request to re-examine the FHWA Federal Aid eligibility letter on X-Lite guardrail terminals. An FHWA expert not involved in the initial X-Lite material review confirmed the crash testing was performed in accordance with NCHRP 350 and found no notable concerns with the original crash test report. FHWA also examined in-service performance data and determined the ratio of fatality and serious injury crashes to total crashes does not lead to any conclusions that X-Lite terminals are unsafe. As a result, the X-Lite terminals to this date remain eligible for federal aid reimbursement.

Despite FHWA's position regarding the X-lite terminals, all states have removed the X-Lite terminals from their respective QPL for new installations. MDOT prohibited the use of X-Lites for new installations beginning with the February 2018 letting. Also, in February 2018, MDOT issued a Maintenance Advisory specifying that damaged X-Lite terminals on MDOT roadways shall not be replaced in kind.

Furthermore, numerous states have made commitments to remove existing X-Lite terminals from their respective roadways, with California and Maine being the most recent states to make such commitments. To date, there are only 10 states with existing X-Lite terminals that have not made commitments to remove the terminals; Michigan, Kansas, Louisiana, Florida, Georgia, South Carolina, North Carolina, West Virginia, Massachusetts, and New Hampshire.

Recommendation(s) – Removal of all X-Lite terminals from MDOT roadways.

If the EOC approves the recommended action, it is recommended that work commence on securing funds for removing the X-lite terminals and replacing them with MASH-compliant alternatives. Planning should also commence on developing one or more projects to complete this work.

*ACTION: Approved*

8. Sign Support MASH Action Plan (discussion only) – Mark Bott

Subject/Issue – Discussion on items for consideration for Sign Support MASH Action plan.

Major Issue(s)/Potential Complication(s) – The MASH sunset date for compliant versions of sign supports must be used for new installations on the National Highway System (NHS) on



construction projects let after 12/31/19. To date, FHWA and AASHTO have not granted an extension to the 12/31/19 sunset date for these devices.

Potential issues with state transportation agencies trying to meet the 12/31/19 sunset date are:

- At the present time, there is not a full array of MASH-compliant systems to replace the array of NCHRP 350 systems currently in use. Items of concern:
- To date only one company has a letter of eligibility for MASH. Therefore, at this time MDOT may need to sole source if there is only one product that is MASH-compliant. MDOT may have to consider continuing with NCHRP 350 sign supports until there are two or more devices for a category of signing?
- If a company or other DOT have a compliant device, it most likely was not tested using sign substrate or various sizes of signs available.
- For other sign categories MDOT may need to continue using NCHRP 350 devices to fill the void of support systems.
- For supports behind guardrail is NCHRP 350 compliant devices sufficient?
- With only one company having an approval letter from FHWA to date how are these systems to be certified? One company indicated not submitting any additional products to FHWA. However, they did state they would provide documentation from a testing facility to state their device is compliant. Where does that leave MDOT?

The status of the pooled fund efforts currently underway does not seem to be providing anything, and if they do, it does not seem they will be done before the sunset date.

MASH tests required for each different sign configuration is prohibitive. A Michigan R1-1 sign configuration contains the potential for hundreds of tests per MASH.

- R1-1 sizes (3) 30", 36" and 48"
- Substrates (2) .125 & plywood
- Roadside configurations (36 slopes & curb heights and types) 1:1 – 1:8 and 1:1 – 8:1 and the 21 curb designs and heights
- General Soil Types (3) set in concrete, dense and loose soil
- Number of Posts (2) 1 and 2 post
- Testing
  - o High speed (2)
    - Angle of impact (2) signs could be impacted from the side when installed at intersections
    - 0 degrees
    - 90 degrees
  - o Low speed (1)

- Angle of impact (2) signs could be impacted from the side when installed at intersections
  - 0 degrees
  - 90 degrees
- Therefore, does a test cover several variables that exist out in the field?
- If a manufacturer certifies their system, where does that leave the liability?

The cost increase estimate would require our goal of a 15-year sign replacement cycle to be moved to a 20-25-year cycle further degrading the quality of our system potentially impacting safety.

For the one compliant system additional staff and equipment are required for installation that we don't have resources for. Additional staff presence at installation increases the chance of personnel and vehicular crash potential.

Background – The Manual for Assessing Safety Hardware (MASH) was published in 2009 as an updated crash testing standard to supersede National Cooperative Highway Research Program Report 350 (NCHRP 350). In addition, MASH crash testing was required for new or revised roadside safety devices tested after January 1, 2011. In 2016, AASHTO adopted an updated version of MASH, called MASH 2016, and MASH 2016 crash testing will be required for new or revised roadside safety devices tested after December 31, 2016. To avoid any confusion, the original version of MASH, published in 2009, will be known as MASH 2009. The biggest change between MASH 2009 and MASH 2016 involves the addition of several test matrices for cable barrier systems. As a result, most roadside safety devices, with the exception of cable barrier systems, that successfully passed MASH 2009 crash testing will be grandfathered into MASH 2016 without further testing.

The current FHWA-AASHTO joint implementation agreement requires MASH 2016-compliant devices to be used for new installations on contracts involving NHS roadways with a letting date after the dates below:

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Recommendation(s) – Discussion only. Will submit a plan at the July EOC meeting.

*ACTION: For Information Only*

## 9. Memorial Highway Signs – Mark Bott

### Project Information - Memorial Highway Signing

Issue(s) – The size of requested memorial signing has been increasing due to the increase of legend be required per legislation. The larger the sign, the larger the cost to fabricate and install. The amount of legend being requested does impact the type of materials being used for both the sign and the supports. On freeways the design is required to be installed with extruded aluminum plank and steel columns. Every sign requested must go through a separate cost estimate to determine not only fabrication but installation costs. The cost of installation is influenced by the location of the sign and who is doing the work. In addition, the law requires the requestor to pay for maintaining the sign.

What is proposed is a cost table based on roadway type and region that sets an average cost including 10 percent for all future maintenance for a maximum sized sign. The sizes proposed in the attached guidance are the largest for those materials for that roadway type which reduces both the cost to the requestor and the size of an object that could be struck by an errant motorist. To compensate for the reduced sign size the size of the legend has been reduced to accommodate longer messages. In addition, the signing unit can provide a preliminary sign design to ensure the requested message will fit appropriately on the maximum size sign permitted.

Background – State statute (MVC 250.1002) requires “The state transportation department shall only provide for the erection and maintenance of suitable markers at the approach of any of the highways described in this act when sufficient private contributions are received to pay the cost of erecting and maintaining those markers.”

Recommendation(s) – Approve the maximum size permitted along state trunk line along with a set price by region which includes maintenance.

*ACTION: Approved pending consolidation of price to a statewide level.*

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Carol Aldrich, Secretary  
Engineering Operations Committee

RA:lrb

cc: EOC Members	M. DeLong	J. Becsey (APAM)
Meeting Guests	D. Jones	D. Needham (MAA)
P. Ajegba	C. Libiran	M. Ackerson-Ware (MRPA)
L. Mester	R. Jorgenson (FHWA)	
Region Engineers	R. Brenke (ACEC Michigan)	
Assoc. Region Engineers	G. Bukoski (MITA)	
TSC Managers	D. DeGraaf (MCA)	