ENGINEERING OPERATIONS COMMITTEE MEETING MINUTES
AUGUST 18, 2022, 9 A.M. TO 11 A.M.
MDOT LOBBY CONFERENCE ROOM WITH TEAMS OPTION

Present:	Carol Aldrich	Jason Gutting	Brad Wieferich
	Mark Bott	Ryan Mitchell	Gorette Yung
	Gregg Brunner	Dee Parker	Kim Zimmer
	Rebecca Curtis	Kristin Schuster	Hal Zweng
	Mark Dionise	Will Thompson	
Absent:	None		
Guests:	Erik Carlson	Mike Phillips	Jeff Triezenberg
	Mike Eacker	Lindsey Renner	Brad Wagner
	Tyler Lemieux	Dina Tarazi	

OLD BUSINESS

1. Approval of the July 21, 2022, meeting minutes – Brad Wieferich

   ACTION: Approved

2. Michigan Department of Transportation (MDOT) new materials and products – Jason Gutting

   A new development sub-committee is being added and setting up guidance.

   ACTION: For information only

NEW BUSINESS

1. Safety Topic: Discussion on the importance of using extra caution with more farming equipment on the roads during fall harvest – Kim Zimmer

   ACTION: For information only

2. Use of experimental Computational Fluid Dynamics modeling and probabilistic scour analysis to determine predicted scour depths – Jeff Triezenberg and Erik Carlson (walk on item)

   Issue Statement – Use of experimental Computational Fluid Dynamics (CFD) modeling and probabilistic scour analysis to determine predicted scour depths at a proposed structure.

Major Issue(s) – Scour depths calculated for the proposed bascule piers at the Lafayette Street Bridge require additional piles to support the large foundation and large lateral loads associated with supporting the movable bridge leaf.

Background/History – This site contains a clay layer approximately at elevation 530 feet. MDOT has partnered with the Federal Highway Administration's (FHWA's) Turner-Fairbank Highway Research Center through a pooled fund study to provide soil and erosion testing required to determine material properties such as critical shear stress needed to calculate scour depths more accurately.

The methodologies in this research are unique in that the hydraulic modeling is done in 3D (computational fluid dynamics or CFD) calibrated with a small physical model assuming a moveable bed (i.e., simulating scour within the hydraulic model, to which we normally model as fixed). This type of modeling can measure the shear stress decay as the scour hole forms. From there, the calculated shear stress (i.e., loading) is compared against the critical shear stress of the soil (i.e., resistance). Because cohesive scour is time dependent, Turner-Fairbanks took the following approaches:

- Measured the resistance of the soil using a hydraulic loading of Q500 +35% for 75 years.
- Ran a Monte Carlo simulation using past gage daily to simulate 75 years of daily hydraulic loading. The Monte Carlo simulation then gave a probability of scour occurring relative to depths.
- Both simulations above showed that the scour has a low probability to proceed more than 5 feet into the clay layer within the design life of the structure.

Researchers from the FHWA have estimated the probability that scour depth will exceed the clay layer at elevation 530ft is 3.3% over the 75-year design life of the structure. For comparison, the probability of exceeding this elevation using HEC-18 is 19.8% and 6.9% for the Q100 and Q500 floods, respectively.

The FHWA report also recommends a scour monitoring system be installed to verify scour predictions after a flood event.

Recommendation(s) – Accept the findings and conclusions in the Report of TPF-5(461) Study for the Lafayette Avenue Bridge over the Saginaw River in Bay City, Michigan. Include a scour monitoring system with construction of the new bridge, per the FHWA recommendations.

ACTION: One time approval. The next one needs to be brought back to the EOC. Final report needs to be brought back to the EOC for information only.

3. Updated Alternate Pavement Bid (APB) process document; refined guidance for project managers during plan development – Dina Tarazi

Major Issue(s) – No process changes, updates include refined guidance for project managers during plan development:

- Clarification when Design-Build is APB
- Design considerations updated after gained experience
- APB JobNet & AAHSTOWare Preconstruction direction

Final document will be updated on the Plan Development website. Revised document along with redline was attached.

Background/History – A guide for APB projects was developed as part of a Technical Agenda and approved by the Engineering Operations Committee (EOC) on 09/1/2011. After suggestions and recommendations from the EOC on 6/10/2014, staff from the Innovative Contracting Unit and Construction Field Services have reviewed the existing guidelines over the years and have updated several areas to reflect previous recommendations and current practice. This document was recently revised and approved by the EOC on 1/21/2020 and is now updated with refined guidance for project managers during plan development.

Recommendation(s) – This report is presented to the EOC for information only. The updated process document is attached and will be available on the Plan Development website.

ACTION: For information only

4. 2021 Fixed Price Variable Scope Annual (FPVS) Special Experimental Project No. 14 (a.k.a. SEP-14) Annual Report – Dina Tarazi

   Issue Statement – 2021 FPVS Annual Special Experimental Project No. 14 (SEP-14) programmatic report for Type 1, Type 2, and Type 3 FPVS Contracting Approaches on Capital Preventive Maintenance projects.

   Major Issue(s) – Annual report is provided for information only.

   Background/History – Per the FHWA SEP-14 work plan for programmatic use of FPVS contracting, MDOT will prepare and submit an annual report to the FHWA that will include an evaluation of all projects completed within the last calendar year. The report will contain an overall evaluation of the projects along with any suggestions and recommendations for improving the process.

   Recommendation(s) – This report is presented to the EOC for information only. The attached report is approved by FHWA and is posted on the SEP-14 Website:

   MI SEP-14 Programmatic Use of Type 1, 2 & 3 Fixed Price Variable Scope Contracting on Capital Preventative Maintenance Projects 2021 Annual Report (dot.gov)

   ACTION: For information only

5. Exception request for a Life Cycle Cost Analysis on the rehabilitation of M-20 from M-30 to Currie Parkway Drive in Midland County – Tyler Lemieux

   Issue Statement – Exception request for a Life Cycle Cost Analysis (LCCA) on the rehabilitation of M-20 in Midland County

Route/Location: M-20 from M-30 to Currie Parkway Drive
Job Number: 204408 and 208813
Control Section: 56021
Letting Date: August 2023
Total Est. Const. Cost: $23.4M

Major Issue(s) – Impacts to the motoring public by keeping construction with two construction seasons needed instead of one, increased program costs, and further schedule delays of the project.

Background/History – The M-20 rehabilitation project has a new letting date of August 2023 which now passes the threshold for needing a LCCA on the mill and overlay sections. M-20 is a major east-west travel route through central Michigan, with high commuter traffic between Mt. Pleasant and Midland. The work consists of 5.7 miles of rehabilitation of the five-lane roadway including two course mill and resurfacing, shoulder widening, intersection upgrades, guardrail upgrades, drainage improvements, and culvert replacement. The road project (JN 204408) is packaged with the Prairie Creek culvert replacement (JN 208883) and is a combination of road Reconstruction and Rehabilitation (R&R) funds, Bridge Replacement and Preservation funds, and Emergency Relief (ER) funds resulting from the Mid-Michigan flooding event in 2020.

Project Timeline -
Plan Review Date: April 4, 2022
PCD: March 9, 2023
Letting: August 4, 2023

The M-20 project was pushed back from an original November 2022 letting to an August 2023 letting due to an unanticipated delay in environmental classification and increased right of way (ROW) impacts from shoulder widening which requires additional time for real estate needs. Environmental classification was delayed due to a need for historical reviews of adjacent properties and proposal of beginning mile point measures for channel protection due to increased impervious area from shoulder widening. As a result of delayed environmental classification and Statewide Transportation Improvement Program amendments needed, the ROW phase of the project was obligated later than anticipated. With the shoulder widening, the number of consent to grades increased from 15-20 parcels to 60+ parcels with impacts to many residential driveway grades and proposed fill slopes throughout the project.

The LCCA alternative to the mill and two course overlay would be an unbonded concrete overlay and having to pursue a concrete alternative would: 1. impact construction timeline and maintenance of traffic to two seasons from one season, 2. increase costs on an already constrained program, and 3. delay the project further affecting overall program delivery.

<u>Construction Timeline and Maintenance of Traffic (MOT)</u>
With a concrete overlay, the project would move from one construction season to at least one and a half seasons, if not two seasons. With the delay of the Road Project (JN 204408) to August 2023, MDOT committed to maintaining the existing package of the project by also pushing back the letting for JN 208883 (Prairie Creek Culvert Replacement). This was not only to anticipate more competitive bids, but also to keep the projects within one

construction season to minimize impacts to the motoring public. Even though JN 208884 has ER funds, the decision was made without first a response from the Federal Highway Administration to transfer the ER funds from FY22 to FY23; this is an example of the already made commitment made by the Bay Region and the Mt. Pleasant Transportation Service Center (TSC) to keep construction to one year.

The additional construction season results primarily on the requirement to have the newly poured concrete cured prior to running traffic on it. The maintenance of traffic would need to be revisited to accommodate the numerous residential drives and road approaches throughout the project. There are 200+ driveways and cross streets within the project limits that would need to be maintained, and many would need to be constructed part-width which would have a greater impact on residents, business owners, and commuters. Additional wedging and maintenance gravel will be needed. Final plan completion (FPC) mainline would also need to be constructed part-width with a stage for one lane of traffic in each direction without a left turn lane which negatively impacts safety. Multiple crossroads with traffic signals would need to be adjusted with the possibility for temporary widening at approaches for crossroads to maintain traffic. Non-signalized crossroad intersections will need to have crossroad traffic detoured or temporary signals installed, increasing costs and time. The reconstructed shoulders would require a separate pavement operation; new Hot Mixed Asphalt (HMA) would need to be placed in the reconstructed section to the height of the existing HMA and then concrete overlay placed. The HMA pavement alternative only requires HMA be used.

Increased Program Costs

Bay Region's FY22 and FY23 R&R templates are currently constrained; FY22 has $63M of unobligated projects with an anticipated $900k remaining, and FY23 has an anticipated $218M of projects with $500k remaining (assuming I-475 Rebuilding Michigan Program project changes occur). Since JN 204408 was pushed back a full year, the project is already pending increased costs due to price inflation on top of a $900k increase from the engineer's estimate at plan review from the current programmed estimate of $18.99M.

JN 204408 has undergone scope creep already including the geometric upgrading of the roadway to current standards to improve safety and mobility; replacing the existing shoulder behind curb and gutter to a proposed flush shoulder with outside curb and gutter which impacted driveways and fill slopes. These extra costs are being minimized by not replacing the existing trunkline storm sewer cross-leads and increasing the shoulder widths to less than the minimum standard.

With a change to a concrete alternative, there would be additional cost increases to both the consultant-designed preliminary engineering phase and the construction-related construction phase including materials, MOT, and Construction Engineering.

Further Schedule Delay

Currently, a FPC submittal is planned for August 2022. The additional nine months of time provided by the delayed letting is to allow adequate time for real estate to make contact and offers with property owners on the 60+ consent to grades and ROW acquisitions that resulted from a late Environmental Classification; the intent was not for additional design work. Only

minor design changes would be needed with other contractual documents that go into effect in January 2023.

A change to a concrete overlay or APB would require at least an additional four months of design work after completion of the LCCA (anticipated three months to complete). This design time is needed for the project process a contract amendment for the scope change, to create new typical sections, update the MOT scheme, update quantities and ROW. After the plan revisions are complete, the project may also require a supplemental review to address the concrete alternative and the impacts associated with a revised maintaining traffic plan (additional two months delay).

The anticipated delay to the plan completion date is thus expected to be three to four months, pushing the letting date further out in the target letting window (TLW) to October or November. It is the desire of Bay Region to let projects earlier in the TLW to anticipate better bids and avoid an overcapacity of workload on statewide planning, contracts services division, region development staff, and TSC project managers (as currently noticed in the current FY22 program).

In summary, JN 204408 is potentially subject to new LCCA requirements with the expansion of the program to include multiple course HMA overlays and thin concrete overlays as a result of the delayed letting to after January 1, 2023. The Bay Region is requesting an LCCA waiver for the mill and two course overlay sections of the M-20 Rehabilitation project to maintain current construction timeline and maintenance of traffic scheme, limit cost increases on an already constrained program, and prevent further project delay.

Recommendation(s) – The Bay Region and the Mt. Pleasant TSC request an exemption to the soon to be implemented LCCA requirements on this M-20 Rehabilitation Design-Bid-Build project.

ACTION: Approved

6. Revisions o the Work Zone Safety and Mobility Manual – Lindsey Renner

Issue Statement - Revisions to the Work Zone Safety and Mobility Manual (WZSMM)

Major Issue(s) – The WZSMM has been revised as follows:

- Removed singular reference to Projects of Division Interest (PoDI) as Federal Highway Administration (FHWA) has changed their language to Risk Based Project Involvement (RBPI).

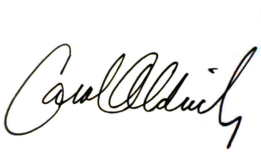
Background/History – The FHWA has ceased use of the term Projects of Division Interest and is instead focusing on Risk Based Project Involvement. In doing so, Form 1365 is no longer used, and the instructions for communication with the FHWA on this item are no longer valid. Because there are no process additions, only deletions, this paragraph is proposed for deletion.

This is the only reference to PODI or Form 1365 in this document and the transition to RBPI will be complete in this move.

Recommendation(s) – Approve this revision to the WZSMM. This will allow us to update the WZSMM in advance of the required FHWA transition date of FY2023.

Status – Document will be revised once permission is granted.

ACTION: Approved



Carol Aldrich. Secretary
Engineering Operations Committee

RA:lrb

cc:
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