STANDARD OPERATING PROCEDURE

FOR

BRIDGE PRESERVATION PROJECT DELIVERY

Tennessee Department of Transportation

Integrated Program Delivery

Project Management Office

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Introduction and Background

TDOT maintains over 5,700 lane miles of interstate and over 32,000 lane miles of state routes. On this state-owned transportation network, TDOT is also responsible for approximately 19,915 bridges. This document intends to serve as a guideline for TDOT staff and consultants for the bridge preservation project delivery process through a reduced Project Delivery Network (PDN). This document does not supersede other departmental specifications, supplemental specifications, design guidelines, or other departmental guidance and is to be used in conjunction with the respective specifications and guidance. On all preservation projects, it is expected that departmental specifications and proper engineering judgement will supersede this guidance when applicable. These guidelines are intended to drive the bridge preservation process and assist in the delivery of these State-funded projects timely, consistently, and within budget.

Scope

These guidelines help to define the process for project delivery for any given bridge preservation project. The process defined herein should be followed where applicable, and all activities that apply to the project should be observed to successfully deliver bridge preservation projects on schedule and within budget. This process begins once a bridge is selected from the tiered list of bridges to be repaired. Once a bridge is selected, the activities and stages in this document and the appendices should be followed. During the planning stage of the project, the Region Project Manager, Bridge Preservation Technical Lead, and the Consultant are responsible for defining the funding required to repair the bridge (preliminary construction estimate). That information is then passed onto the Bridge Program Manager to verify that all bridge preservation funding is appropriate on the 3-year plan for any given year.

This document is not all inclusive for all possible project activities, rather, this document is to outline the activities that are most typically completed. For any other project delivery guidance, see the overall Project Delivery Network (PDN), and consult as a project team to confirm any activities not defined that must be completed to deliver the bridge preservation project.

Bridge Asset Management

An important aspect of bridge asset management is bridge inspection. Bridges are generally inspected on a 24-month cycle unless the bridge meets certain criteria. Other bridges that have experienced further deterioration are often adjusted to be inspected more frequently. Furthermore, bridges that have been identified to have a lack of redundancy and bridges with special design details must be inspected more frequently. This is all outlined in the BIRM (Bridge Inspectors Reference Manual). All inspectors must have mandated training to be a bridge inspector, and team leaders are to have further training and experience. Due to the large number of bridges to be inspected year-over-year, and the continued adjustments from FHWA (Federal Highway Administration), bridges are inspected by state bridge inspectors and consultants to provide safe travel to the public over state owned bridges.

Another feature of bridge asset management is load rating the structures. Bridges are to be load rated according to FHWA guidance and federally mandated vehicle loading groups. Bridge load rating reports are then developed with the information from the original plans, previous repair plans, and all other pertinent information. These reports are vital to establishing which vehicles can safely pass over the bridge in question, and at times, can lead to repairs to a structure to allow passage of vehicles without posting maximum weight restrictions.

Through the two above processes of inspection and load rating which both factor into bridge asset management, the asset management office then identifies bridges to be repaired.

A certainty also exists in our aging infrastructure that critical bridge repairs are inevitable. These critical repairs are typically identified after a catastrophic event, inspection, or other means and then prioritized accordingly. Additional information regarding time-sensitive, critical repairs are found in the "3-year Plan Adjustments" section below.

Preservation vs. Replacement

When bridges are identified for a repair project, cost, age of the structure, use of the structure, etc. are all discussed. This inevitably leads to an evolving discussion and evaluation by the Asset Management Office on whether a bridge should be preserved or replaced.

In general, bridges last 50-70 years on average. A lot of different factors can affect the expected service life. Repairs can extend the lifespan of a structure if conditions are favorable. However, if a structure is reaching the end of its life span, preservation is too costly, or the use of the bridge has increased significantly, then the bridge would be investigated for a replacement to make the best use of funds and to extend the longevity of the structure in question.

The guidelines herein do not include guidance for bridge replacement as those projects are to go through the entire Project Delivery Network (PDN).

Role Description

Most roles and responsibilities herein are defined in the overall PDN, however, some roles have been elaborated on below to clarify certain team members. Furthermore, the responsibilities listed below are not all-inclusive. The Bridge Program Manager is a dedicated TDOT staff member from the project management office who oversees the budget from each fiscal year, and coordinates project lettings for any given FY. The Bridge Preservation Technical Lead is responsible for assisting with project selection, project scoping, and the technical review of the design and plans for all bridge preservation projects. The Consultant is an outside team member who acts as the Design Lead to deliver bridge preservation plans, estimates, construction documents, etc. throughout the duration of the project.

3-Year Plan Development

3-year Plan Development Process

The 3-year plan is to be developed by the Asset Management Office with the assistance of the Structures Division and the Bridge Program Manager. Each year, a review shall take place starting in March, and the 3-year plan updated and prepared for publishing in April. Once published, the projects shown as “PE” are to begin in July of their respective fiscal years. The 3-year plan that will be published shall include all projects that have been identified for repair/preservation by the Asset Management Office. These projects shall be delivered within 3 years according to the 3-year plan regardless of the critical path activities that may apply. The estimated cost for all projects for each fiscal year (FY) shall align with the funds available for the respective FY. Other expenses (i.e. consultant fees, Construction Engineering Inspection (CEI), etc.) that could draw from the overall available funds are to be incorporated so that no FY budget overages occur. For further guidance on the use of the “Bridge Preservation Schedule Template” (Appendix A), see the section below labeled “Project Delivery and Development”.

Moving forward, the 3-year bridge preservation plan should be analyzed each year and compared to the other programs and the 10-year plan to confirm that projects near the same footprint are not scheduled simultaneously. This is the responsibility of the Bridge Program Manager and Bridge Preservation Technical Lead when projects are first promoted and added to the 3-year plan. When possible, projects in the same geographic area should either be bundled together or schedule(s) adjusted so that the projects are not under construction concurrently. If overlapping projects cannot be adjusted, then the Traffic Operations division shall be contacted to determine the next steps.

3-year Plan Development Roles/ Responsibilities

When reviewing the 3-year plan each March, the Bridge Preservation Technical Lead will have a list of all possible bridge preservation projects from the Asset Management Office. These bridge preservation projects are to be discussed between the Bridge Program manager, the Asset Management Office, and the Bridge Preservation Office prior to selecting and promoting the projects onto the 3-year plan. Once the 3-year plan has been published, the Region Project Managers make the request to the Bridge Program manager to promote the project in Project Online according to the FY that “PE” is noted in the 3-year plan.

3-year Plan Adjustments

In general, projects that are not on the 3-year plan are not to be initiated, worked on, or processed in any way. Projects are to be shown as “PE” in the 3-year plan on the year that the Region Project Managers are to ask the Bridge Program Manager for project promotion. Projects are to be shown as “CN” in the 3-year plan on the year that the projects are to be let to construction. If a project schedule is delayed to a point where the project promotion year, or the letting year set are in jeopardy, then the Bridge Program manager is to be notified as soon as possible in order to make financial adjustments for each FY.

Circumstances may arise when a bridge is in desperate need of preservation. In that case, the Structures Division is to notify the Bridge Program Manager that there is a critical project to be completed as soon as possible. The Bridge Program Manager will then coordinate with the Region Project Manager, Bridge Preservation Office, and the Asset Management Office to place the project in the nearest possible letting and adjust other projects as necessary. That project will then appear appropriately on the next publication of the 3-year plan.

Project Development and Delivery

Schedule

To deliver bridge preservation projects in an efficient time frame, the “Bridge Preservation Schedule Template” (Appendix A) offers suggested durations for each activity based on target letting dates. In general, 30-40% of the projects for any given state fiscal year are to be “Front-loaded” targeting project delivery for the August letting each year. The goal of “front-loading” projects is to allow for flexibility between fiscal years if projects come in under-budget. Then the overall budget for said fiscal year would be under budget and another project could be added at the back end of the year. Adjustments to project letting dates due to environmental impacts, scope of work, or other seasonal construction constraints are to be understood early in the scheduling of projects to reach the goal of 30%-40% front-loaded projects per FY. Otherwise, projects shall remain in the initially planned fiscal year according to the published 3-year plan, unless extenuating circumstances arise. Target letting dates are cooperatively set by the Bridge Program Manager, Estimating Office, Region Project Management, Bridge Preservation Office, and Asset Management Office based on structural priorities, workload, and budget availability.

In general, the Region Project Managers are to utilize the "Bridge Preservation Schedule Template" (Appendix A) for the scheduling of all activities. This template will be in place once the project has been promoted by the Bridge Program Manager and an initial schedule set by the Region Project Manager. According to the schedule, the first activity to take place will be Activity 1PM1. In conjunction with Activity 1PM1, the Bridge Preservation Technical Lead will complete their Structural Desktop Review (Activity 1ST1) as noted in the "Bridge Preservation Schedule Template" (Appendix A). This review (Activity 1ST1) begins the process of gathering information that is critical to the schedule, calculating the Preliminary Engineering Estimate (PE), and setting the Scope of Work. The information from the Structural Desktop Review will then confirm where a project fits in the 3-year plan according to the funds that are available, and the critical path activities. After the Structural Desktop Review, the initial letting date, PE costs, Scope of Work, and any other relevant information is to be sent by the Bridge Preservation Technical Lead to the Bridge Program Manager and the Region Project Manager. The Region Project Managers are to then upload all information into the shared project folder, notify the other disciplines of the location of said information, and initiate the other desktop reviews. Once the other desktop reviews have taken place, then the kick-off meeting will occur, leading to the initiation of other activities throughout the schedule. See Appendix A: Bridge Preservation Schedule Template for information regarding the remaining activities on the template.

If the schedule is to drastically change for any unforeseen reason, where the letting date set is in jeopardy, then the "Project Letting" start date cell is to be altered by the Region Project Manager via request from team members. The adjusted schedule and the reason for the changes shall then be sent out by the Region Project Manager to all parties that were involved in the kick-off meeting and the Bridge Program Manager to communicate the changes effectively.

Team Functionality

By laying out the Standard Operating Procedures for bridge preservation projects, these projects will function with entire teams and a Regional Project Manager like other programs. The "Bridge Preservation Schedule Template" (Appendix A) attempts to outline roles and responsibilities for the individuals involved. Flow charts have also been created to clarify responsibilities at certain stages of the project. These flow charts are individualized for the key team members throughout the project life and are shown in Appendix B.

The Bridge Preservation Office along with the consultants under contract are responsible for the design and the preparation of plans for bridge preservation projects on state-maintained bridges. Preservation projects are let to contract through the normal bid process and administered by the construction office. During the construction phase, the Preservation Office assists region construction personnel in construction inspection and in solving any problems that may arise.

Desktop Review Activities

In the general PDN activities, the desktop reviews are a way to create conceptual documents for a future project and to estimate how much budget is necessary to complete the project. This is altered within the "Bridge Preservation Schedule Template" (Appendix A) to adhere more to the bridge preservation program by using the desktop review as a way to establish the schedule, finalize the scope of work, establish the preliminary engineering estimate, and understand the critical path activities.

The desktop review activities (Activities 1EN1, 1RD1, 1RR1, 1UT1) are a way for the project team to familiarize themselves with the project for discussions at the kick-off meeting, and in turn have clarity for the project expectations moving forward. The project team shall submit their comment form, from the desktop review, to the Region Project Manager prior to the end date of their desktop review period. All participants of the desktop review shall come to the kick-off meeting able to answer questions from the Region Project Manager and Bridge Preservation Technical Lead regarding the scope of work, the estimates, and the schedule.

Kickoff Meeting

Once the project has been set up and the desktop reviews have been completed, each Region Project Manager will hold a Kickoff meeting (Activity 1PM3). During the kick-off meeting, the critical path activities need to be recognized and discussed. It is also preferable that a PowerPoint presentation be setup by the Region Project Manager to discuss the bridge, the scope of work, and the estimates, during the kickoff meeting. The "Bridge Preservation Project Commitment Document" (PCD) (Appendix D) is to be prepared prior to the kickoff meeting to use as a tool for discussion, and the PCD shall be finalized (Activity 2PM2) prior to the functional field review (Activity 2PM5). Applicable invitees listed as "Kickoff Meeting Invitees" in the Project Delivery Network (PDN) guide –

activity 1PM3, shall be invited to the kickoff meeting. It is also recommended to invite the respective district engineers to the kick-off meeting for clear communication.

Critical Path Activities

For many bridge preservation projects, the bridge would be constructed in a way that right-of-way acquisition is not necessary, there is no railroad involvement, and the environmental impacts are minimal. However, projects exist that could have one, if not all the considerations above. Throughout the development of the bridge preservation standard operating procedures, it was acknowledged that the activities outlined below can lead to delays in the delivery of a bridge preservation project. These activities are in place throughout the schedule and are to be completed according to the deliverables, notes, and end dates in the "Bridge Preservation Schedule Template" (Appendix A) when they are applicable to the project. If these activities are not applicable, then they are to be made inactive within the "Bridge Preservation Schedule Template" (Appendix A) by the Region Project Manager. The activities that are described as "Critical Path Activities" are as follows:

Right-of-way Acquisition:

Right-of-way acquisition may be required when the proposed footprint for construction is outside of the existing right-of-way. Through conversations with the Bridge Preservation Office staff and the Right-of-way Office, it was noted that typical right-of-way acquisition (with less than 5 parcels) takes anywhere between 10-14 months to process. This is a generalized statement and can differ from project to project. Each project with right-of-way acquisition required should be discussed in detail with the Right-of-way Office during the kickoff meeting to establish the expected duration and the project schedule shall be adjusted accordingly. The activities that relate directly to Right-of-way Acquisition in the "Bridge Preservation Schedule Template" (Appendix A)are as follows: Activities 1SY1, 2RW1, 2RW2, 3RW1, and 3RW2.

Railroad Property Acquisition:

Historically railroad property acquisition has potential to delay project delivery and is avoided when possible. However, times exist when Railroad acquisition (air-rights or ROW) is necessary to complete a bridge preservation project. More recently, there lies a desire to acquire air-rights through resurfacing projects and/or bridge preservation projects when no records of air-rights exist for a certain location. Through conversations with Bridge Preservation staff and the Railroad Office, it was noted that any form of railroad acquisition, for either air-right acquisition, or other railroad right-of-way acquisition takes around 2 years to process. This is a generalized statement and can differ from project to project. Each project with railroad involvement required should be reviewed by the Railroad Coordinator during activity 1RR1 and discussed in detail during the kickoff meeting to establish the expected duration and the project schedule shall be adjusted accordingly. The activities that relate directly to Railroad Acquisition in the "Bridge Preservation Schedule Template" (Appendix A)are as follows: Activities 1SY1,1RR1, 1RR2, 3RR1, and 3RR2.

Environmental Impacts:

On occasions, abnormal environmental impacts/ permits could affect the project delivery schedule. Environmental impacts are typically understood early in the project during the environmental desktop review (Activity 1EN1) and should be discussed thoroughly at the kickoff meeting to understand the full extent of impacts to the project delivery. In general, a TEER document is required for bridge preservation projects rather than a NEPA document since bridge repair projects are state funded. However, there are times that certain environmental permits take longer to complete which would adjust the project delivery schedule. Each project should be reviewed by the Environmental Technical Lead during activity 1EN1 to understand the environmental impacts and seasonal constraints (if applicable) and discussed in detail during the kickoff meeting to establish the expected duration and the project schedule shall be adjusted accordingly. Another aspect that can cause delays in project delivery relative to environmental impacts for bridge preservation projects is scope of work adjustments. If the scope of work is to change, or additions made to the scope of work throughout the life of the project, the environmental office shall be made aware as soon as possible to mitigate the likely schedule delays. The activities that relate directly to environmental permitting in the "Bridge Preservation Schedule Template" (Appendix A) are as follows: Activities 1EN1, 2EN2, 2EN3, 2EN4, 3EN1, 3EN2, 4EN1.

Utility Coordination:

During project delivery, utility coordination is completed by activities through each stage. The timeframes allotted for utility activities are based on the overall PDN activities and through discussions with Bridge Preservation Staff. The utility impacts for any given project should be discussed in detail during the kickoff meeting to understand how long the coordination/ relocation process could take, and the project schedule shall be adjusted accordingly. The activities that relate directly to utility coordination in the "Bridge Preservation Schedule Template" (Appendix A) are as follows: Activities 1UT1, 1UT2, 3UT1, and 3UT2.

Field Review Meetings (Functional, Plan-in-hand, PS&E)

Field reviews (Activities 2PM5, 3PM2, and 4PM2) are completed by the Region Project Managers utilizing the "Meeting Notes Template" (See the "Agenda and Meeting Notes Template" here: PDN Templates). This form includes fields to be completed to specify the project risks, estimates, and other project conditions. It is also preferable that a PowerPoint presentation be developed by the Region Project Manager to discuss each bridge, scope of work, estimates, etc. during the respective meeting. The meeting will be guided by the comment resolution form (See the "Comment Resolution Form Template" here: PDN Templates) which is filled out by the team members during the review period (task 1.0 of activities 2PM5, 3PM2, and 4PM2). In general, all discussions made during field review meetings are recorded by the Region Project Managers for documentation of design decisions and other information. The meeting minutes are then sent out to all attendees to communicate the project expectations moving forward to the protect team.

Turn-in Dates/Submittals

The "Bridge Preservation Schedule Template" (Appendix A) provides the general layout for project timeline based on critical path activities and assures team members enough time to complete their tasks.

The submittals that are noted by activities 2RD1 (9.0 and 12.0),3RD1(4.0), and 4RD1 (2.0) are to be completed by the Bridge Preservation Technical Lead / Consultant and turned into the Region Project Manager. The Region Project Manager is to then submit the appropriate documentation from activities 2RD1, 3RD1, and 4RD1 according to the Roadway Design guidelines (Roadway Design Guidelines). The submittals regarding activities 2RD1 (12.0) and 4RD1 (2.0) shall be submitted after all comments have been resolved/ addressed from the field review meeting on the plan set, quantities, and estimates.

The final turn-in dates and submittals at the end of stage 4 follow the same general timeline and deliverables as shown in the instructional bulletins regarding the current fiscal year turn-in dates and letting schedule. The future turn-in dates will be similar in nature and released in future instructional bulletins (TDOT IB's).

The submittals listed in this section of the document are the responsibility of the Region Project Managers. All submittals, uploads, and email coordination shall follow the guidelines as shown on the TDOT Roadway Design Guidelines as well as any future Instructional Bulletins.

Estimates

The Consultants/ Designer will be responsible for the development of the construction cost estimate. Bridge Preservation Technical Leads are responsible for the review of the estimates received from the consultant and turning the estimates over to the Region Project Manager.

These construction estimates shall follow the Roadway Design Guidelines in Chapter 1 (Section 4) for each official submittal noted in the "Bridge Preservation Schedule Template" (Appendix A). When possible, calculations of quantities should be made using Design Guideline and Standard Drawing formulas. Calculation of quantities are also completed by using measurements made during the initial site visit, existing plans, inspection reports, etc. The preliminary construction estimate, which is determined after the Kick-off Meeting (Activity 1PM3), is to be submitted by the Bridge Preservation Technical Lead to the Bridge Program Manager and the Region Project Manager who would then submit in accordance with section 1-402.01 of the Roadway Design Guidelines. The official plan-in-hand and PS&E packages(Activities 3RD1 (4.0) and 4RD1 (2.0) are to include their respective estimates in accordance with section 1-402.04 and 1-402.05 of the Roadway Design Guidelines. The estimates shall be complete and exhaustive of all construction costs to the best of the designer's knowledge and ability at each stage. These estimates submitted at each stage are to track the project and confirm that the finances are in line with what is expected for any given year.

These estimates will also be used to understand, and in turn, give better preliminary construction estimates to improve the 3-year plan year-over-year.

Communication Plan

During the site visit, scoping of a project, and kickoff meeting discussions, traffic control should be heavily discussed. When possible, bridge preservation projects should have a "phased construction approach" to reduce traffic disruptions throughout construction. However, if construction methods require bridge closures and/or underpass closures, a clear communication plan needs to be established separate from the Transportation Management Plan (TMP). The Bridge Preservation Technical Lead is responsible for communicating the forthcoming closure(s) with the Regional Communication Officer as well as the Headquarters Communications Director throughout the project life. The plan should be discussed over email and should clearly state the bridge location, the length of time the closure is anticipated, the number of closures to occur, the Region Project Manager to contact, and the anticipated letting date. If additional information is required, the Regional Communication Officer will make that request. Throughout the project life, the Regional Communication Officer and the Communications Director shall be notified of any changes to the project timeline or closures that are taking place. The meeting minutes/notes from the Kick-off meeting, Functional Design plan field review meeting, Plan-in-hand field review meeting, and PS&E field review meeting shall all be sent to the Region Communication Officer and the Communications Director.

Active Transportation Recommendations

The state Active Transportation Lead shall receive the yearly published 3-year bridge preservation program and compare the project lists with state and local bicycle and pedestrian plans during the desktop review period. The Active Transportation Lead shall also consult with municipalities and regional TDOT staff to attempt to fulfill any requests for any given project. The Active Transportation Lead should also address the needed repair and/or installation of curb ramps or elevating the curb ramps to meet ADA guidelines when encountered in the bridge preservation program. The Active Transportation Lead then makes recommendations during the kickoff meeting to the Bridge Preservation Technical Lead for bike/pedestrian and/or curb ramp upgrades to be included in the bridge preservation plans. The Bridge Preservation Technical Lead then determines the feasibility for the inclusion of the improvements within the bridge preservation plans.

Appendices:

Appendix A: Bridge Preservation Schedule Template

Once a project is placed on the 3-year plan, the Bridge Preservation Schedule Template will be used for any given bridge preservation project. This schedule template will guide the project through the letting date. When opening the scheduling tool, fictitious dates will be populated. By utilizing the "Project Start Date" tool (Project tab>Project Information>Place Start Date in the respective drop-down list and choose "Project Start Date" from the drop-down list of the "Schedule from:" feature) the start/finish dates for all activities will automatically populate based on the predecessors. Next, make the "Critical Path Activities" that are not applicable to the scope of work inactive. Typical activities that could be made inactive if they are not required are as follows: 1RR1,1SY1, 1UT1, 1RD2 (4.0, 5.0),1UT2,1RR2, 2RW1, 2RW2, 2EN4, 2UT1 (2.0), 3EN1, 3UT1, 3UT2, 3EN2, 4EN1, 3RW1, 3RW2, 3RR1, and 3RR2. Other activities that are already underscored as inactive shall remain inactive in the schedule unless extreme circumstances arise. Next, based on the funding for each FY, and selecting a letting date that is achievable, place the letting date in the "Project Letting" Start date cell. Confirm that all activities in the schedule are achievable for the letting date selected and adjust the letting date if necessary. This schedule is to be shared after the kickoff meeting with all invitees to provide clarity for the project timeline, responsibilities, and completion/ submittal deadlines.

Appendix B: Flow Charts

The flow charts listed in Appendix B are intended to guide the project through each stage. Roles and responsibilities are prepopulated but can be altered when necessary. These flow charts are not an exhaustive list of all activities to be completed, therefore the Bridge Preservation Schedule should be adhered to.

Appendix C: Example Bridge Preservation Plans

These are plans that can be used as a guide during plan development to show what is typically included in a bridge preservation plan set at the end of each stage of project development.

Appendix D: Bridge Preservation Project Commitment Document

The project commitment document is similar in nature to the typically used PDN project commitment document (PCD) with an emphasis on bridge preservation projects. This document is to be prepared after the kick-off meeting by the Region Project Manager then sent out with the meeting minutes after the kick-off meeting. All project team signatures are to be completed prior to the functional field review meeting (Activities 2PM5). For further clarification on the “Bridge Preservation Project Commitment Document”, see activity 2PM2 in the overall PDN document.

Appendix E: Typical Bridge Repair Item Numbers

This reference to be used to pull item numbers to generate the plans and estimates that are typically associated with bridge preservation projects. This list is not exhaustive of all bridge preservation item numbers, and if questions arise on what item numbers to use for a bridge preservation project, discuss with the regional Bridge Preservation Technical Lead.

This item number list does not include roadway items that are typically associated with a bridge preservation project. Items not included would be items associated with traffic control, EPSC measures, paving, striping, etc.

Appendix F: Bridge Preservation Preliminary Checklist

This is to be used as a checklist for the Consultant and the Bridge Preservation Technical Lead to use during the functional plan production to make sure all necessary bridge preservation information is provided on the preliminary bridge plans (Activity 2ST2) for the completion of other activities. This checklist is not an exhaustive list for all aspects that are necessary for the preliminary plans and some aspects of the checklist do not apply to all projects. This is intended to be used as a guide for the design team.