

Colorado Department of Transportation
Scope of Work for Bridge Preventative Maintenance
Project

The Bridge Preventative Maintenance (BPM) Project supports design, construction and management for bridge replacement and rehabilitation projects throughout the state. This project includes all design and management support activities for all CDOT specialty groups as well as additional consultant support. These specialty groups include, but are not limited to roadway, environmental, traffic, geotechnical, materials, bridge, hydraulic, utilities, and ROW. Consultant support is needed for these areas when internal help is not available.

Activities covered in this project include, but are not limited to, the following:

- Scoping, Planning, Cost Estimating
- Design support
- Design review
- Project management
- Construction Support

SCOPE OF WORK

BRIDGE PREVENTATIVE MAINTENANCE FY22-FY27

PROJECT NUMBER: SW02-755
PROJECT LOCATION: Statewide
PROJECT CODE: 24434

SCOPE OF WORK

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SECTION 1 -GENERAL INFORMATION

1 PROJECT BACKGROUND AND REQUIREMENTS

The purpose of the Bridge Preventative Maintenance (BPM) project is to assist Staff Bridge in identifying and delivering preservation action/preventive maintenance projects with staggered AD dates, identifying project packaging options of the structures selected for preservation/preventive maintenance and providing scoping costs for these projects. A 4 year list of projects (Structure Asset Management (SAM) Plan) funded by the Construction Bridge Program (CBP) funds is maintained as well as a list of potential projects (Project Recommendation List) from which projects can be filtered to the 4 year list as consecutive years are added.

Individual Task Orders on this contract will either be management oriented or design task oriented. Management task orders will be for the maintenance of the SAM plan (The 4-Year Project Plan) and list of potential projects as well as management of consultants or sub consultants doing the design and construction tasks or design oriented for the development and product of plans. Design task orders will be for the actually delivery of specific projects and details. The ratio between management and design on each Contract will be determined by the CDOT Staff Bridge BPM Project Manager and may not be equal between contracts.

STRUCTURE ASSET MANAGEMENT PROGRAM

A. Structure Data Collection and Programming

For each CDOT major structure, the consultant will collect available inspection data from CDOT and reference it into an application where the data will be processed to develop SAM Plans and STIP/Project Recommendation reports.

There is an existing application for the Major Structures (Bridges) in an excel format saved in CDOT ProjectWise. The application and future development includes the following tasks:

- Updating format as required to facilitate ease of use and reporting by the Asset Managers.
- Maintaining and refining the Bridge SAM Plan and STIP/Project Recommendation application
- Update the application with new inspection BrM data provided by CDOT.
- Update application to include updated Essential Repairs as Stand-Alone Projects
- Update application to include updated SAP project data
- Update application to include BE prioritization and Bridge Prioritization
- Coordinate Scour Cost Estimate and Priority updates
- Update the application to include additional treatments including but not limited to approach slabs and deck treatments.
- Review bridge prioritization and interaction with the application for deck and joint priority

- Back check cost estimate contingency percentage to evaluate estimate accuracy.
 - Update unit cost estimates based upon current cost projections
 - Develop new report format for Staff Bridge/OFMB as required
 - Update application to include a drop down list of predefined treatment types as defined by CDOT within the spreadsheet with no reference to plans
 - Documenting Cost Estimate Logic for each treatment including:
 - Selection Logic with criteria and multiple cases as needed with base assumptions
 - Treatment Cost Quantity Calculations with written formulas
 - Treatment Cost Logic including base assumptions
 - List of Pay items associated with the Treatment
 - Inspection Coding Definitions used to trigger the selection of the Treatment
- B. Selection and packaging of Bridges for the SAM Plan and the STIP/Project Recommendation List including conceptual cost estimate
- I. Surface Treatment (ST) packages - The Consultant will coordinate with the Regions and Staff Bridge Unit Leaders to incorporate CDOT provided Surface Treatment (ST) projects into the SAM Plan. The consultant will identify all treatment needs for the structures within the limits of each project.
 - II. Scour Mitigation packages - The Consultant will coordinate with the Bridge Asset Manager/Unit Leader, Region, Staff Bridge PM, and Staff Hydraulics to incorporate CDOT provided Scour Mitigation packages and cost estimates provided by others into the SAM Plan and the STIP.
 - III. Structure Repair Packages - The Consultant will coordinate with the Bridge Asset Manager/Unit Leader, and Region to select Structure Repair packages from the CDOT list of prioritized bridge repair needs and incorporate them into the SAM Plan and the STIP.
 - IV. Structure Preventative Maintenance packages - The Consultant will screen bridges in each region to select and package structures together. These selections will be added to the Project Recommendation List and then be vetted by the Region and Bridge Asset Manager/Unit Leader for incorporation into the SAM Plan on a yearly basis.
 - V. Develop a conceptual construction cost estimate for each package. The planning level conceptual construction cost will be developed by either the consultant or Staff Bridge depending on the project type. For a typical preventative maintenance, surface treatment or scour projects, cost estimate will be developed by the consultant from above discussed programming. For non-typical repairs and placeholder projects, cost estimate will be provided by Staff

Bridge.

- VI. The process or rationale should be included to show why a group of structures is recommended in one construction package/year instead of another. Key issues of a project or structure within a project will be noted.
 - VII. One purpose of the 4 Year Plan is to provide preliminary data and information regarding the items needed to complete the top portion of Form 128 that may require additional lead time and to complete a basic cost estimate and design schedule. This is a data gathering task to identify issues or project challenges that will be completed under a future task order to deliver bid documents for the projects. The selected consultant will not be responsible for environmental support to complete the Form 128 for this preliminary evaluation.
 - VIII. To the extent possible, structure funding candidates should be selected within ST project limits to minimize mobilization and traffic control costs. However, it is not required to select candidates from ST Projects and there may be benefits associated to develop Standalone Projects separate from ST Projects.
- C. Non-Destructive Testing (Bridge Deck Scanning) may be a separate Task Order for non-destructive testing to evaluate bridge decks and determine the extents of repairs that are needed.
 - D. SAM Plan and STIP development and Quality Review
The Consultant will help coordinate with each of the Staff Bridge Unit Leaders and Region representatives (as needed) to produce a 4-year SAM Plan of projects, a 10-year STIP and a Recommended Project or needs list including Structure Preventative Maintenance (SPM), Structure Repair (Repair), Surface Treatment (ST), and Scour Mitigation Projects (Scour) and priorities. The SAM Plan report is updated semi-annually by the consultant and will be maintained in CDOT ProjectWise in a pdf and excel file format. It shall be available for the Unit Leaders or Asset managers to make updates to funding and scope at will.

The STIP or prioritized list of potential work is estimated to be updated annually and will be maintained in CDOT ProjectWise in a merged pdf and excel file format with the SAM Plan.

Currently the Consultant is only involved with the tracking of the bridges for the SAM Plan and CBP funding. Future work may involve coordination with the Wall and Minor Structure Assets and their funding sources.

In order to optimize the project results, the Consultant will need to coordinate with Staff Bridge Inspection, Asset Management, Standards & Design units as well as the Bridge Portfolio Manager and Finals Engineers as to required products and roles and responsibilities for tracking, data

tracking of design budgets and expenditures.

3. The Consultant will attend meetings as requested by CDOT and send only the appropriate personnel as determined jointly by the Consultant and CDOT. It is anticipated that there will be meetings required:
4. Power Point Presentation meetings with the Regions at CDOT Headquarters
5. Meet with each Region for review of the SAM Plans and STIPs (assume 2 per Region)
6. Meet with each Region's Staff Bridge Unit for review of the SAM Plans and STIPs (assume 2 per Region) Consultants will track funding allocations and regional balances associated with the design funds.

2 PROJECT SPECIAL PROVISIONS & WORKSHEETS

From time to time, a need may be identified by the CDOT PM or the Consultant PM for a commonly used Project Special Provision or worksheet. They will be drafted and assembled in accordance with the CDOT Bridge Design Manual and CDOT Bridge Detail Manual, as well as all current and applicable bridge design standards and other CDOT standards and references. The Project Special Provision or worksheet will then be approved by CDOT Staff Bridge. The consultant will be responsible for coordinating the approval process.

Representatives of the Consultants may need to take up residence for short periods of time in Staff Bridge to access the candidate lists, BrM (formerly PONTIS) database and structure documents. There are limited work areas in Staff Bridge so coordination will be important. Existing plans and other document gathering will be a combined effort by the Consultant Team and Staff Bridge, but the Consultant Team should assume that this is their responsibility with the assistance of, and brief training by those assisting in Staff Bridge. The Consultant Team should assume that the schedules of those assisting in Staff Bridge will limit the amount of assistance that they can provide in the gathering effort. New Standard Preventative Maintenance Worksheets will be developed and utilized to show details of the work that is repetitive at all bridges and across all Regions to facilitate the plan preparation. The Consultant shall coordinate the development of any new worksheets and their review and incorporation into the Staff Bridge worksheets. The details shown may not accommodate all the individual cases encountered.

Structure Selection Preservation Guidance:

Bridge preservation work will focus on structures with decks in good condition that are bare or lack a waterproofing membrane and bridges with leaking joints. Minor deck rehabilitation may be necessary, but it is the intent to try to choose bridges still in relatively good condition and try to stay below the 10% to 15% range, Class 2. Class 1 shall not be used unless Polymer Concrete overlays are used. It is desirable that structure candidates be chosen to avoid Class 3. Expansion device removal/replacement candidates should be chosen so that 0-2 Inch (Asphaltic Plug) or 0-4 Inch expansion devices can be used, as applicable. If a joint is leaking, new seals may be an option. If only the existing seal/gland of an existing old-style (steel angle armoring/anchoring) strip seal device is leaking it will most likely be beneficial to replace the entire device with the new-style strip seal device. Consideration should be made to program bridges involving long duration clearance actions in future years to facilitate expenditures of the available funding. It is desired that structures be selected on interstates or the highest AADT routes.

It shall be verified, from all available existing plans, for candidates selected from the Staff Bridge data-base driven spreadsheet and identified as needing waterproofing membrane, that waterproofing membrane is indeed absent.

The Staff Bridge Region Specialty Units, will review and provide comments back to the Consultant on the lists and plans provided by the Consultant as required under the task orders and the BPM Project Manager will provide BPM Project guidance.

3 PROJECT COORDINATION

A. Routine Working Contact

The routine working contact will be between the CDOT Staff Bridge BPM Project Manager (BPM PM) and the Consultant Project Manager (C/PM) or directly with the Region Unit Leaders depending on the task.

B. Consultant Project Manager Requirements

- 1) Manage all sub consultants and disciplines required to develop the BPM projects.
- 2) Obtain any existing knowledge pertinent to the projects and obtain other region specific information from key regional staff prior to performing any Structure Pre-scoping.
- 3) Kick-off Meeting.
- 4) Progress Meetings at Staff Bridge (as needed).
- 5) Provide a written synopsis or copy of their respective contacts (both by telephone and in person) with others.
- 6) Provide copies of pertinent written communications

4 ROUTINE REPORTING AND BILLING

The Consultant will provide the following on a routine basis:

A. Coordination

Coordination of all contract activities by the C/PM

B. Periodic Reports and Billings

The periodic reports and billings required by CDOT Procedural Directive 400.2 (Monitoring Consultant Contracts). In addition, periodic reports of program efficiencies by Region, Project, Fiscal Year and sub consultants will be provided by the C/PM. These will be geared toward analysis of efficient use of design and management funds based on construction funds. Invoice

format will be adjusted as required for easily acceptable data facilitating quality assurance.

C. Minutes of all Meetings

The minutes will be completed and provided to the BPM PM within five (5) working days after the meeting. When a definable task is discussed during a meeting, the minutes will identify the "Action Item", the party responsible for accomplishing it, and the proposed completion date.

D. General Reports and Submittals

Routine reporting will include regional allocations vs expenditures of design funds, BPM expenditures vs design project charges, and project scope and billing by treatment type. In general, all reports and submittals must be approved by CDOT prior to their content being utilized in follow-up work effort.

E. Bridge Location Work Plan and Quarterly Status

- i. The C/PM shall provide a work-plan, estimated cash flow, schedule and project controls for both design and construction phases to CDOT. A quarterly Progress Report, one page, suitable for presenting to the CDOT Transportation Commission, shall be submitted to the Staff Bridge BPM PM.
- ii. The consultant will be responsible for meeting all timeframes and deliverable items identified in their schedule and work plan that are within their scope. Items such as 3rd party review time and other critical path elements not within the Consultant's control should be given reasonable time in the schedule but will not be the Consultant's responsibility.

F. DELIVERABLES (Beginning November of 2021 is based on NTP in July. Actual date subject to change upon actual NTP.)

(List of deliverables in order of anticipated delivery)

- i. The Recommended Projects List in print format and the electronic Excel format base list
- ii. Estimate of Total Conceptual Construction Cost for each bridge, Total Conceptual Construction Cost for each Project and Total Conceptual Construction Cost for each Region, (in standard Excel format)
- iii. Approximate Schedule for the design and plan preparation of all bridges in the Recommended Project List
- iv. Statewide and regional BPM cash flow for both design and construction phases.
- v. Assist with compiling regional structure investment summaries by obtaining repair/rehabilitation lists from Staff Bridge unit leaders and bridge replacement lists from the Bridge Enterprise.

- vi. Written Quarterly Progress Report
- vii. All meeting minutes and phone call logs with synopsis.

5 PERSONNEL QUALIFICATIONS

All work will be performed under the direction of, and certified, by a Licensed Professional Engineer (PE) who is registered with the Colorado State Board of Registration for Professional Engineers.

6 PROJECT DESIGN DATA AND STANDARDS

A. General

Appendix A is a list of technical references applicable to CDOT work. The consultant is responsible for ensuring compliance with the latest CDOT adopted version of the listed references. Conflicts in criteria shall be resolved by the Staff Bridge BPM PM and/or Region Staff.

SECTION 2 - PRECONSTRUCTION TASK DESCRIPTIONS

The Consultant shall provide a design team with experience in providing all the tasks that are typical of CDOT design projects including Bridge, Project Management, Roadway, Traffic, Drainage, Materials/Geotech, ROW/Survey, Utilities/SUE, Environmental, and Traffic Control. Design Task Orders will be written to support Preconstruction and Construction Tasks. Depending on the type of projects and availability of internal staff, the typically required tasks may include, but are not limited to the following:

1 BRIDGE DESIGN

This work includes plan preparation for bridge preservation and repair work. Information available in the CDOT Bridge Inspection Reports and As-Constructed Bridge Plans shall be used. Work shall be done in CDOT Projectwise and be based on the detailing manual requirements. Any typical worksheets developed for bridge preservation work shall be vetted, approved and incorporated into the Staff Bridge Worksheets by the Consultant for future work to streamline and minimize costs.

Consultant will prepare quantity calculations and project cost estimates at the conceptual and preliminary of project development. An independent set of quantity calculations will be developed, and the two sets compared to meet the contingency and accuracy percentages described in Section 35 of CDOT Bridge Design Manual.

Consultant will develop construction specifications as required by design. Construction specifications consist of the CDOT Standard Specification for Road and Bridge Construction, the Standard Special Provisions, and the Project Special Provisions. Common construction specifications shall be vetted, approved and incorporated into the Staff Bridge Project Special for future work to streamline and minimize costs.

If requested, the Consultant will provide an Inspection Sketch for each Major Structure per the CDOT Bridge Detailing Manual.

Standardized Workhours for design tasks and treatment types will be developed to facilitate scopes, work hour estimates and level of efforts.

2 PROJECT GENERAL PLANS AND SPECIFICATIONS

As requested for Stand Alone Projects, the Consultant will develop the following Project Plan Sheets and Specifications in coordination with the Region.

Project plan sheets:

- Title Sheet(s)
- Standard Plans List
- General Notes
- Summary of Approximate Quantities (FIR/FOR SAQ provided by Consultant. Region to provide output from TrnsPort to be back checked and incorporated into the final AD SAQ sheet by the Consultant.)

Specifications:

- Standard Special Provisions
- Notice to Bidders
- Commencement and Completion of Work
- Contract Goal (Combined)

- On the Job Training Contract Goal
- Revision of Section 100 Items including Safety Critical Work if applicable
- Force Account Items

The Consultant will compile and package the plans for the FIR, FOR, and AD submittals. The Consultant will compile and package the Specifications for the FOR and AD submittals. All plans, specifications and project deliverables will be stored and attributed in CDOT Projectwise at milestone delivery dates.

3 Roadway and Traffic Control Design

As requested, the Consultant will provide Roadway and Traffic Control Design including the following plan sheets.

Project plan sheets:

- Roadway Tabulations
- Roadway Plan
- Traffic Control Plan
- Signing and Striping Plan

Project Special Provisions:

- Revisions of Sections 627 & 630
- Traffic Control Plan – General

4 MATERIALS/GEOTECH

The Consultant shall provide bridge deck coring and chloride testing per CDOT LRFD Bridge Design Manual Section 33.1.3

5 SURVEY DATA RESEARCH/Right-of-Way

Identify if the preventative scope of work will impact ROW. If so, additional work may be required as necessitated by ROW personnel availability.

6 UTILITY SURVEY/IDENTIFICATION

Determine what utilities exist in the project vicinity, the general location of the utility with reference to the bridge, the contact information for that utility, obtain any plans from utility owners and provide key maps. Additional utility investigation and potholing may be required depending on the extent of work performed, the consultant shall provide this support as requested to meet the SUE requirements.

7 HYDRAULIC SURVEY/IDENTIFICATION

Determine what hydraulic issues may exist in the repair or replacement area. As requested, the Consultant shall add riprap protection or otherwise improve existing drainage conditions.

8 RAILROAD

If a RR is present, identify if the scope of preventative maintenance work will require access to RR ROW or if RR Flagging will be required to perform work. If so:

- A. Obtain ROW plans within 1 mile of the project along the track.

- B. Identify if RR access roads are present.
- C. Identify if RR drainage structures are present.
- D. Obtain existing plans for horizontal/vertical clearances.
- E. Identify any existing horizontal/vertical clearance issues compared to current standards.
- F. Photo document crossing.
- G. Provide Existing C&M agreements and easement agreements.
- H. Coordinate with the region utilities coordinator to obtain a maintenance consent letter with the RR one month prior to the project AD date.

9 ENVIRONMENTAL SUPPORT

As needed, the Consultant will coordinate with the CDOT PM, Staff Bridge Unit Leader, Region Environmental Unit, and Resident Engineer or designated representatives in a pre-scoping meeting to come to an understanding of the construction activities and determine with CDOT the Environmental Approach including roles and responsibilities.

The Consultant will support the Region Environmental Manager as needed in filling out the top half of form 128.

The necessary supporting documentation will be provided to the Region Environmental Unit for each environmental resource.

Environmental resources include:

- Air Quality
- Noise
- Hazardous Waste (ISA Checklist)
- Threatened or Endangered Species Habitat Assessment
- Migratory Birds and Raptors (survey within ½ mile buffer)
- Waters of the US/Wetland Delineation Survey
- Nationwide Permit and/or Preconstruction Notice
- Section 4(f) Evaluation
- Integrated Noxious Weed Management Plan
- Senate Bill 40 (SB 40) Certification

The Consultant will coordinate with the Region as needed to provide environmental plan notes and specifications associated with environmental resources present.

The Consultant will coordinate Best Management Practices with the Region and provide Storm Water Management Plans (SWMP) using the latest CDOT templates.

6 THIRD PARTY REQUIREMENTS

- A. Local Agencies involved
- B. Provide a list of local agency contacts
- C. Provide a list of permits required
- D. Adjacent projects that may be occurring
- E. Other third party requirements

7 DELIVERABLES

- A. Project Management
- B. Meeting Summaries
- C. Bridge Inspection and Layout Sketches as requested
- D. Chloride Testing as requested
- E. Environmental Support as requested
- F. Plans, Standard Worksheets, Specifications, Preliminary Cost Estimate, and Comment Resolution for FIR/FOR Submittals
- G. Plans, Standard Worksheets, and Specifications for AD Submittals
- H. Field Information Package for each Structure
- I. Bridge Final Submittal

SECTION 3 - CONSTRUCTION TASK DESCRIPTIONS

- A. Submittal Review
- B. RFI support
- C. Final Inspection Walkthrough

APPENDIX A REFERENCES

1) AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) PUBLICATIONS (using latest approved versions):

A. Roadside Design Guide

2) COLORADO DEPARTMENT OF TRANSPORTATION PUBLICATIONS (using latest approved versions):

- A. CDOT Design Guide (all volumes)
- B. Project Development Manual
- C. Erosion Control and Storm Water Quality Guide
- D. Field Log of Structures
- E. Drainage Design Manual
- F. CDOT Survey Manual
- G. CDOT Design Guide, Computer Aided Drafting (CAD)
- H. Local Agency Manual
- I. Right-of-Way Manual, Chapter 2, Plans and Descriptions Procedures and General Information
- J. Utility Manual
- K. Bridge Design Manual
- L. Bridge Detailing Manual
- M. Bridge Website – Technical Memos, Form Letters

3) Conceptual Flowchart of BPM work

