



## **Scope of Work for Tunnel Inspection and Asset Management Services**

### **I. GENERAL**

The goal of this project is to update the National Tunnel Inventory through inspections of state and local agency owned tunnels located in the State of Colorado and to report the conditions of the individual tunnels to the Colorado Department of Transportation, Staff Bridge and the owners.

Tunnels will be referred to as “structures” hereafter in this Scope of Work (Scope). Tunnel inspections will be referred to as the “work” hereafter in this Scope. The Colorado Department of Transportation will be referred to as the “Owner” hereinafter in this Scope.

It is anticipated that task orders will be written to this contract for a period of four years to perform the following:

- A. Inventory and inspection of tunnels in the state of Colorado.
- B. Continued support of the risk based asset management plan for tunnels.

### **II. DEFINITIONS**

- A. **AASHTO** – American Association of State Highway and Transportation Officials.
- B. **BRIAR** – Bridge Ratings, Inspections And Records
- C. **C-TIIM** – Colorado Tunnel Inventory and Inspection Manual
- D. **CDOT** – Colorado Department of Transportation.
- E. **ELECTRONIC DATA FILES** - *Electronic files containing inventory and inspection data for each tunnel in the CDOT Project Manager specified version of AASHTOWare Bridge Management, or other database format, specified by the CDOT Project Manager. Electronic sketches of structures in a MicroStation compatible format as needed. PDF files of all inspection reports. JPG files of structure photographs.*
- F. **ENGINEER** – CDOT Bridge Inspection Engineer or his/her designee.
- G. **ERF** – Essential Repair Finding
- H. **FHWA** – Federal Highway Administration.



- I. **FY** – Fiscal Year
- J. **MUTCD** – Manual on Uniform Traffic Control Devices
- K. **NEW STRUCTURES** – Structures not previously inspected such as newly constructed structures requiring initial inspection or structures found to be qualifying and without prior inspections.
- L. **NHS** – National Highway System.
- M. **NBIS** – National Bridge Inspection Standard – 23 CFR 650 Subpart C
- N. **NDT** – Non-destructive Testing
- O. **NTIS** – National Tunnel Inspection Standard – 23 CFR Part 650 Subpart E
- P. **BrMEI** – AASHTOWare Bridge Management Element Inspection form. A structure inspection form found within the inspection module of AASHTOWare Bridge Management, on which the applicable structure element condition states and comments are reported for each structure inspected.
- Q. **Project Manager** – CDOT Project Manager or their designee
- R. **SI&A** – Structure Inventory and Appraisal form. An inventory and appraisal form found within the AASHTOWare Bridge Management inspection module that contains information about a structure.
- S. **STRAHNET** – Strategic Highway Network

### **III. INSPECTION STANDARDS**

The work shall be carried out in accordance with the following documents and revisions thereto:

- A. C-TIIM Tunnel Coding Guide
- B. Specifications for the National Tunnel Inventory
- C. Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual
- D. Highway and Rail Transit Tunnel Inspection Manual



- E. Bridge Asset Management and Inspection Manual (BRIAR Manual)
- F. CDOT Pontis Bridge Inspection Coding Guide
- G. AASHTO Manual for Bridge Evaluation
- H. Bridge Inspection Reference Manual
- I. Other documents as defined by individual task orders.

#### **IV. CONSULTANT QUALIFICATIONS**

The consulting firm shall be pre-qualified to conduct bridge inspection work for the State of Colorado, Department of Transportation and meet the requirements of the NTIS. The one exception to this is that the Consultant shall have a geologist or geotechnical engineer available to evaluate the structural geology of the tunnel or other geological features as needed.

#### **V. PROJECT MANAGEMENT AND COORDINATION**

The Contract Administrator for the work is:

Behrooz Far P.E.  
Bridge Engineer  
Colorado Department of Transportation  
4201 East Arkansas Ave.  
Room 107  
Denver, Colorado 80222  
(303) 757-9309

The Bridge Inspection Engineer and Program Manager for the work is:

Lynn E. Croswell, P.E.  
Bridge Inspection Engineer  
Colorado Department of Transportation  
4201 East Arkansas Ave.  
Room 107  
Denver, Colorado 80222  
(303) 757-9188

The Project Manager for the work is:



Mark Stadig  
Staff Bridge Inspections Project Manager  
Colorado Department of Transportation  
4201 East Arkansas Ave.  
Room 107  
Denver, Colorado 80222  
(303) 757-9417

## **VI. PROJECT LOCATION AND QUANTITIES**

The project location will be statewide. The structures to be inspected will be identified within the individual task orders.

The following is a breakdown of current vehicular tunnels located in the state of Colorado:

- 22 State owned (On-System), 4 complex tunnels with full time staff
- 11 Local Agency owned (Off-System)

## **VII. PROJECT DURATION**

- A. The work shall commence on the date specified in the notice to proceed and shall be completed as specified in the individual task orders.
- B. Completion of the work is defined as (1) having submitted all structure inspection reports in the required format to the Project Manager or his/her designee for review, (2) the Project Manager or his/her designee having reviewed and approved the reports and (3) presentations of the final reports given to CDOT.

## **VIII. CONSULTANT RESPONSIBILITY**

- A. The consultant shall provide verification of Inspector Qualifications to the Project Manager.
- B. The Consultant shall update, as needed the risk based tunnel asset management plan.
- C. The Consultant shall be responsible for the complete, timely inspection and reporting of all structures identified in individual task orders.



- D. The Consultant shall furnish all electronic equipment such as computers, laptops, tablets or other as necessary to complete the work.
- E. The Consultant shall submit completed inspection reports to the Project Manager as defined in individual task orders.
- F. The Consultant shall conduct the work in accordance with all governing safety rules and regulations applicable to the work.
- G. The Consultant shall provide for their own lane closures, working with the appropriate maintenance sections and Region Traffic Engineers to close lanes when required. A list of contacts will be provided to the Consultant upon request.
- H. The Consultant will provide all necessary inspection and testing equipment, personal protective equipment (PPE), vehicles for transport and access to properly and adequately perform the work described herein.

## **IX. INSPECTION REQUIREMENTS**

- A. Inspections and structure evaluations will be performed per the requirements of the NTIS and CDOT in accordance with the most recent editions of the following:
  - 1. Specifications for the National Tunnel Inventory.
  - 2. Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual.
  - 3. Bridge Asset Management and Inspection Manual (BRIAR Manual).
  - 4. The CDOT Structure Inventory Coding Guide.
  - 5. AASHTO Manual for Bridge Evaluation.
  - 6. C-TIIM Tunnel Coding Guide.
  - 7. Other documents as defined by individual task orders.
- B. For tunnels not staffed, the Consultant shall meet with each maintenance coordinator and the Project Manager prior to beginning work in the maintenance section. This meeting is to identify themselves to the coordinator, to learn of issues identified by maintenance, to present their plan



of action to the coordinator, to determine any traffic control needs, and to obtain any additional information pertinent to the inspection.

- C. For tunnels staffed full time, the Consultant shall meet with each tunnel operations staff and the Project Manager prior to beginning work on the tunnel. This meeting is to identify themselves to the staff, to learn of any issues identified by the staff, to present their plan of action to the staff, to determine any traffic control needs, and to obtain any additional information pertinent to the inspection.
- D. Inventory digital color photographs are required for each structure as defined by individual task orders.
- E. Supplemental digital color photographs and sketches shall be taken and/or developed as necessary to give a clear understanding and documentation of distressed conditions.
- F. Digital cameras shall be a minimum of 8-megapixel resolution capabilities and be Global Positioning System (GPS) enabled. Photos shall be submitted in the Joint Photographic Experts Group (jpg) format. The photos shall be submitted on a compact disk (CD), DVD or flash drive or as directed by the Project Manager or his/her designee.
- G. Completed inspection reports shall be submitted to the Project Manager or his/her designee within 90 days after the inspection date, the date the inspection was started.
- H. Each inspected structure shall be located using GPS equipment to obtain longitudes and latitudes as defined by individual task orders.
- I. Non-destructive testing may be required to determine the condition of tunnel components.
- J. Should destructive testing be necessary, pre-approval of the Project Manager or his/her designee will be required.

## **X. REPORTING**

- A. All inspection data shall be submitted electronically.
- B. Completed inspection reports shall be submitted to the Project Manager or his/her designee.



- C. All inspection reports shall include the inspector's original or electronic signature and the appropriate date.
- D. As necessary, supplemental sketches, photos, plans, etc. shall be prepared and included as part of the inspection report to document the structures condition.
- E. Electronic report shall be submitted electronically in the AASHTOWARE Bridge Management version specified by the Project Manager and compatible with a Microsoft Windows based computer system. At this time, the tunnel inspection and inventory data is being maintained on an Xcel spreadsheet, and will need to be migrated into the tunnel inspection portion of AASHTOware Brm. Electronic files may be e-mailed, CDs, DVD or flash drive at the consultant's option.

## **XI. SERVICES AND MATERIALS AVAILABLE FROM CDOT**

The following services and materials will be available to the consultant from CDOT:

- A. CDOT Structure Inventory Guide, CDOT Tunnel Inspection and Inventory Manual (C-TIIM), CDOT Pontis Bridge Inspection Coding Guide, AASHTOWare Bridge Management User's Manual, and BRIAR Manual.
- B. CDOT Staff will be available for reference on coding, or other related concerns.
- C. Most current designated STRAHNET and NHS routes (identified in the database).

## **XII. FINAL REVIEW**

- A. Each electronic structure folder will be reviewed by the Project Manager or his/her designee for completeness and consistency. Each incomplete or inconsistent report will be returned to the consultant for review and for corrections
- B. The consultant shall hold a final report presentation meeting with CDOT when all inspection work is completed and reports have been accepted by the Project Manager or his/her designee. This presentation shall occur no later than 60 days from the date that the final reports are accepted.



- C. The Project Manager or his/her designee may accompany the consultant during field inspections or visit the office of the consultant to review procedures and inspection reports and to verify billings.

### **XIII. METHOD OF PAYMENT**

These contracts will be paid for on a cost plus fixed fee basis. The consulting firms will bill for their actual costs, using the negotiated rates, incurred while performing the work. Consultants will bill monthly and include a project status update with each billing.





**APPENDIX A**  
**IDENTIFICATION OF ESSENTIAL REPAIR FINDINGS**

- A. **PURPOSE:** This appendix establishes the procedures of the Colorado Department of Transportation (CDOT), Staff Bridge Branch regarding the general subject of essential repair findings (ERF) for tunnels. Essential repairs are the repairs necessary to ensure the safe and continued service of the department's structures.
- B. **TYPICAL CONDITIONS:** The following represents typical but not all-inclusive inspection findings, which are considered to be an ERF.
1. A portion of the tunnel may fall and injure a person or damage property.
  2. Other conditions as defined in the individual task orders.
- C. It shall be the responsibility of the inspection team leader performing an inspection to be alert for conditions other than identified above which may also be considered an ERF. Such a finding shall be reported to the Project Manager or his/her designee upon return from the inspection or, if deemed necessary, immediately by telephone or in person.
- D. The criticality of the deficiency will result in one or more of the following actions with an importance described as follows:
1. Immediate closure.
  2. Restricted traffic usage.
  3. Urgent repairs.
- E. **SPECIAL ACTIONS REQUIRED OF THE INSPECTION TEAM LEADER:**
1. The team leader shall notify the Project Manager or his/her designee by phone, or in person, when the actions identified as 1 (Immediate closure) or 2 (Restricted traffic usage) above are appropriate. He or she should describe the unsafe condition and recommend immediate steps to be taken to insure safety to the traveling public. The consultant shall follow-up all verbal communication in writing within 3 business days.
  2. The consultant shall notify the Project Manager or his/her designee in writing, within one week, when the action identified as 3 (Urgent repairs) above is appropriate. This notice should include comments and photographs relative to an appropriate repair. This does not mean that the consultant must provide a design for the repair.
  3. The team leader shall provide written confirmation to the Project Manager or his/her designee for any action required above. E-mail confirmation with



supporting documentation shall be sent to the Project Manager or his/her designee with “cc” to other(s) as directed by the Project Manager or his/her designee on all essential inspection finding correspondence.