

REQUEST FOR PROPOSAL

Scope of Work Basic Contract

Design Consultant Services

CONTRACT DATE:

PROJECT NUMBER: IM 0703-348

PROJECT LOCATION: 2400 Medium Volt MCC Replacement

PROJECT CODE: 17148

March 11th, 2010

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1.0: PROJECT SUMMARY AND KEY EVENTS SCHEDULE

1.1 Project Information

- **Project Number:** IM 0703-348
- **Project Location:** 2400 Medium Volt MCC Replacement, Eisenhower Johnson Memorial Tunnels
- **Sub-account Number:** 17148
- **Requested Services:** Consultant Design Services
- **Source(s) of Funding for Design Contract:** FHWA and Senate Bill 1

1.2 CDOT Project Management and Coordination:

The Contract Administrator for this project is:

Mark Vessely, P.E.
Resident Engineer
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5601
Fax: (303) 512-5675
Mark.Vessely@dot.state.co.us

CDOT Project Management Team and Point of Contact:

Benjamin Acimovic, P.E.
Project Manager/Project Management Team
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5814
Cell: (720) 95106151
Fax: (303) 512-5675
Benjamin.Acimovic@dot.state.co.us

Tyler Weldon, P.E.
Project Management Team
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5682
Fax: (303) 512-5675
Tyler.Weldon@dot.state.co.us

Project Coordination:

- CDOT Project Management Team
- CDOT Tunnel Maintenance Staff
- Selected Project Consultant Design Firm
- Selected Project CM/GC Contractor or Construction Manager
- Federal Highway Administration (FHWA)
- Colorado Department of Public Health and Environment (CDPHE)

- The Consultant shall partner with the selected CM/GC Contractor, CDOT Management Team, and the CDOT Tunnel Maintenance Staff as part of the design team.

1.3 Key Events Schedule:

A. Public Notice Phase

- First Advertisement: March 11th, 2010

B. Short List Phase

- Submission of Statement of Interest (SOI)/Work Plan (WP) April 1st, 2010

Deliver **five (5)** hard copies along with **one (1)** electronic copy PDF file on a CD or flash drive of the SOI/WP to the Colorado Department of Transportation Contracting Office Randy Perkins, 4201 Arkansas Ave. 4th Floor, Denver, Colorado 80222.

- Short List Panel Meeting April 8th, 2010
- Short List Approval April 15th, 2010
- Notification of Short List Candidates April 15th, 2010

C. Selection Phase

- Selection Panel Meetings (Interviews) April 29th, 2010
- Chief Engineer/Approval May 6th, 2010
- Contractor Notification May 6th, 2010

D. Negotiation Phase

- Selected Contractor Submits Financial Package May 13th, 2010
- CDOT Audit Requested May 13th, 2010
- CDOT Audit Completed May 27th, 2010
- Cost Negotiation Meeting June 1st, 2010

E. Contract Approval/Execution

July 1st, 2010

2.0: PROJECT SPECIFIC INFORMATION

2.1 Project Background

The Eisenhower Johnson Memorial Tunnel (EJMT) is administered by CDOT and is a main artery for commercial transport and public travel on Interstate 70. The tunnel was constructed in two phases: The westbound bore or North Tunnel was completed in 1973 and the eastbound bore or South Tunnel was completed in 1979. The tunnel is located in the Colorado Rocky Mountains at an elevation above 11,000 feet.

In 2006 an electrical inspection report by Parsons Brinkerhoff Quade & Douglas, Inc. evaluated the electrical equipment at the EJMT and identified equipment that required replacement. Following the recommendations of that report, CDOT recently replaced the 480V motor control switchgear for the north bore of the EJMT. The replacement of the 2400V motor control centers (MCC) for the south bore was the next proposed equipment replacement. The motor control centers serve the supply and exhaust ventilation fans inside each bore of the EJMT.

Hatch Mott MacDonald and Parsons produced a conceptual design for the replacement of the 2400v motor control centers, provided a white paper studying the feasibility of sole sourcing the MCC equipment, and issued a preliminary report that evaluated replacement options. Their report evaluated each options of 4 options based on constructability, safety, operational capability, maintainability, space planning, cost, and impact to future construction schedules.

Following these reports and the completion of the conceptual design, CDOT evaluated multiple methods for project delivery. The previous 480V MCC switchgear replacement project was performed under the traditional design-bid-build. When compared to design-bid-build, the Construction Manager/General Contracting (CM/GC) method offers CDOT more contractor involvement in the design. Due to the operational, safety, and logistical restrictions in the East and West Portal ventilation rooms and the control that is required to be maintained by the tunnel operations staff, CDOT eliminated design-build as a delivery choice. After comparing the pros and cons of each delivery method, the CDOT Project Management team found that CM/GC was the most suitable method for this project.

2.2 CM/GC Introduction

CM/GC is a contracting method that involves the Contractor in the design process. The intent is to form a partnership with CDOT, the Design Consultant, and the Contractor. The goals of this partnership are to mitigate risk, improve the construction schedule, streamline the design process, and produce a project that adheres to the budget. An important role of the Contractor is to help acquire the constructability information to reduce risk in the design and construction phase. We anticipate the involvement of the Contractor will help reduce errors in design, improve constructability and meet budget goals.

The Design Consultant relies on the expertise of the Contractor to deliver an improved product in less time and at a lower cost than design-bid-build construction processes. The Design Consultant relies on the Contractor for the following expertise during the pre-construction phase:

- The skills and knowledge to estimate the quantities of materials, labor, and equipment needed for construction.
- The skills and knowledge to determine the tasks (work breakdown structure) needed to complete the Project and estimate the costs, duration, and sequence of these tasks.
- An understanding of the availability, cost, and capacities of materials, labor, and equipment.
- The skills and knowledge to identify potential risks (including financial risks) and methods to mitigate them during the design process.
- Provide information on constructability, phasing, and provide other design input.

At the Request for Proposal (RFP) stage, the Contractor shall provide CDOT with a preliminary estimating model for estimating Project costs. The accepted estimating model will serve as a basis for all Opinion of Probable Construction Cost (OPCC) estimates in the program and the development of the proposed Guaranteed Maximum Price (GMP) at an agreed design milestone. The initial OPCC will be delivered within 30 days of Notice to Proceed.

During the design process the Contractor works with the Design Consultant and the CDOT Project Management Team to:

- Identify and mitigate risks.
- Continually update the project estimate.
- Participate in up to three formal reviews of the design at designated design milestones.
- Participate in risk analysis workshops at agreed-upon milestones.
- Provide up to three progressively refined OPCCs (estimates) at designated design milestones.
- Continually provide informal input on constructability, value engineering, and cost as requested.
- Provide open-book examination of cost model by CDOT, the program manager, and the designer.
- Prepare a Guaranteed Maximum Price (GMP) Proposal to CDOT with appropriate backup documentation.

Because this approach minimizes risk, the construction cost is expected to be less than with conventional design-bid-build projects. If the Contractor is awarded the Guaranteed Maximum Price construction contract, their role will be to construct the Project within the GMP and propose solutions that will help achieve the goal of staying within the budget. If the Project cannot be delivered within the allocated budget, CDOT retains the option to cancel the Project, reduce the scope, or deliver the Project by other means.

Early phasing may be considered for early procurement of long lead items or for long lead tasks that can be completed and turned over to another Contractor should negotiations for final construction cease. Early utility construction may be considered with the understanding that early phases are not a guarantee of selection for final construction. Early phases must be independent and severable from the final construction. Final construction will not begin until the design phase is substantially complete.

2.3 Project Scope of Work and Pre-Construction Activity List

The Design Consultant Scope of Work is described in detail in Appendix A of this RFP. Appendix B lists the responsibilities of all project team members including CDOT, the Contractor, and the Design Consultant.

3.0 REFERENCED ITEMS NEEDED BY CONSULTANT

3.1 CDOT Standards, Manuals, specifications, etc.

The Design Consultant shall obtain and utilize the most recent CDOT adopted references including standards and specifications, manuals and software or as directed by the CDOT/PM.

3.2 Applicable Design Standards

The following standards are applicable:

- Institute of Electrical and Electronic Engineers (IEEE);
- National Electrical Manufacturers Association (NEMA);
- National Electric Code (NEC) (NFPA 70);
- American National Standards Institute (ANSI);
- International Electrotechnical Commission (IEC);
- Underwriters' Laboratories, Inc. (UL);
- American Society for Testing and Materials (ASTM);
- National Electrical Safety Code (NESC);
- Occupational Safety and Health Administration (OSHA); and
- InterNational Electrical Testing Association (NETA)

3.3 References and Definitions

Project relevant references and definitions are located in Appendix C and D of this RFP. Additional references and definitions may be added if required or identified as vital to the project goals.

4.0: EXISTING FEATURES

4.1 Existing Conditions

The existing Johnson (South Tunnel) tunnel ventilation system consists of twelve fans, six supply and six exhaust, that are housed in East and West ventilation equipment rooms located at each end of the portal.

The South Tunnel ventilation fans are 2400V dual speed motor driven fans that have four operational speeds and are utilized for pollution ventilation and fire smoke control. There are four 2400V Motor Control Cabinets (MCC), two in each of the electrical equipment rooms. The MCCs have two speed, two winding starters for the 24 motors that support the 12 fans. The MCCs were manufactured by General Electric (GE). They are over 30 years old and are approaching the end of their determined useful life cycle.

The East electrical equipment houses three supply fan and three exhaust fan MCCs (each bank of three fans will be referred to as a single MCC line-up). This arrangement is replicated at the West Portal electrical room. Each fan is driven by two dual-speed motors, with motor one rated 600/100 HP and the second motor rated 200/25 HP.

The existing 2400V MCC line-up have been modified to include additional feeder circuits that provide feeds to transformers and distribution circuits in the tunnels cross cut electrical spaces. These circuits supply 277V tunnel lighting circuits. Part of the tunnel lighting is fed from the North Tunnel 480V system and part from the South Tunnel 2400V.

Refer to drawings 239141-E-303 East End Option 2 and 3 2400V MCC Location Plan and 239141-E-302 West End Option 2 and 3 2400V MCC Location Plan for layout of the existing MCC line-ups at the East and West electrical equipment rooms.

4.2 Existing Tunnel Ventilations Operation

The EJMT Fire Emergency Ventilation Study identifies the following modes of operating the ventilation system:

- Under conditions of good visibility, Monday to Friday, tunnel operators switch on two of the 200/25HP fans at the 25HP speed. During poor visibility and on Sundays and Holidays all 12 fans 600/100HP are operated at 100 HP;
- Ventilation requirements in the South (Johnson) Tunnel are generally lower than in the North (Eisenhower) Tunnel. A prevailing West to East wind moves in the direction of traffic in the South Tunnel and contributes to the tunnel ventilation.

4.3 Existing Tunnel Ventilation Restrictions

Tunnel operations must be maintained at all times. Based on the configuration above, one exhaust fan per MCC line-up and one intake fan per MCC line-up only may be out of service for extended periods for one end of the tunnel. The EJMT Tunnel Operations staff has confirmed the following operational restrictions for the existing tunnel ventilation system:

- If one of the three fans in an MCC line-up is out of service, smoke will be controlled by use of the remaining two fans in the line-up;
- Having one fan down per MCC line-up is acceptable (e.g. West Supply 5 and West Exhaust 5);
- A complete outage of any one complete MCC line-up should not exceed 10 hours. Only one complete MCC line-up per ventilation building is acceptable, and

- MCCs outages need to be planned to occur during weekdays to minimize the impact on tunnel users during high traffic volume periods.

It is noted that the East end MCC cubicle line-up has a spare cubicle. To achieve compatibility of floor space and cable connections, it is recommended that a spare cubicle will be also added to the new MCC. By NEC standards, 2400V MCCs require a clearance of 4 feet live to ground clearance and 5 feet live to live.

**Note: This information is available in the Eisenhower/Johnson Memorial Tunnel 2400V Medium Switchgear Conceptual Design Evaluation – Preliminary Report. Copies of this document may be obtained from Consultant Management section on the CDOT external website at <http://www.dot.state.co.us/Consultants/>.

4.4 Existing Utilities

Complete utility information will be available at the Design Workshop after selection of the Contractor and the Consultant for this project is complete and Notice to Proceed has been issued. For all information on the existing utilities in the EJMT that will be impacted by this project please contact Benjamin Acimovic at (303) 512-5814

5.0: PROJECT GENERAL INFORMATION

5.1 Notice to Proceed

Work will not commence until the written Notice-to-Proceed is issued by the State with certification from the Consultant that the work will be completed within the allotted time. Work may be required, night or day, on weekends, on holidays, or on split shifts. CDOT must concur in time lost reports prior to the time lost delays being subtracted from time charges. Subject to CDOT prior approval the time charged may exclude the time lost for:

- Reviews and Approvals.
- Response and Direction.

5.2 Project Coordination

5.2.1 Routine Working Contact

The routine working contact will be between the CDOT Project Manager (CDOT/PM), the Design Consultant Project Manager (C/PM), and the Contractor Project Manager (CMGC/PM).

5.2.2 Project Manager Requirements

Each Project Manager will provide the others with the following:

- A written synopsis or copy of their respective contacts (both by telephone and in person) with others.
- Copies of pertinent written communications.

5.3 Routine Reporting and Billing

The Consultant will provide the following on a routine basis:

Coordination:

Coordination of all contract activities will be conducted by the CDOT/PM. The C/PM shall keep regular contact with the CDOT/PM and the CMGC/PM on a weekly basis.

Periodic Reports and Billings:

The periodic reports and billings required by CDOT Procedural Directive 400.2 (Monitoring Consultant Contracts).

General Reports and Submittals:

In general, all reports and submittals must be approved by CDOT prior to their content being utilized in follow-up work effort.

5.4 Personnel Qualifications

The Design Consultant Project Manager (CMGC/PM) must be approved by the CDOT Contract Administrator. Certain tasks must be done by Licensed Professional Engineers (PE) or Professional Land Surveyors (PLS) who are registered with the Colorado State Board of Registration for Professional

Engineers and Land Surveyors. National Institute for Certification in Engineering Technology (NICET) or other certifications may be required for project inspectors, electrical technicians, and testers.

5.5 CDOT: Computer/Software Information

The Design Consultant shall utilize the most recent CDOT adopted software. The primary software used by CDOT is as follows:

- A. Drafting/CADD InRoads and Microstation with CDOT's formatting configurations and standards.
- B. Electrical InRoads and Microstation with CDOT's formatting configurations and standards.
- C. Estimating Microsoft Excel 2007 spreadsheet or other compatible software.
- D. Specifications Microsoft Word 2007
- E. Scheduling Microsoft Project 2007

5.6 Computer Data Compatibility

CDOT presently utilizes a data format which Design Consultants shall be required to use for submitting survey, photogrammetry, and the design data: InRoads

The data format used by the Design Consultant to submit surveying and photogrammetric data shall be as determined by the CDOT/PM in coordination with the respective Region PLS. The data format for submitting design computer files shall be compatible with the latest version of the adopted CDOT program. The Design Consultant shall immediately notify the CDOT/PM if the firm is unable to produce the desired format for any reason and cease work until the problem is resolved. Refer to Table 1, Submittals, for additional information regarding the InRoads and TMOSS formats and the acceptable transmittal media.

5.7 Design Data and Standards

A. General:

Appendix C is a list of technical references applicable to CDOT work. The Design Consultant is responsible for ensuring compliance with the latest CDOT adopted version of the listed references. Conflicts in criteria shall be resolved by the CDOT/PM.

B. Construction Materials/Methods:

The materials and methods specified for construction will be selected to minimize the initial construction and long-term maintenance cost to the State of Colorado. Non-typical construction materials and methods must be approved in writing by CDOT.

APPENDIX A: DESIGN CONSULTANT SCOPE OF WORK

A.1 Project Background

The project background is as described above in Section 2.0.

A.2 Project Description

During pre-construction, the Design Consultant shall develop and provide construction plans, specifications, and cost estimates at FIR, FOR, and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT). The Design Consultant shall partner with the Contractor and the CDOT Project Management Team.

A.3 Project Goals

This project is intended to produce the following improvements:

1. To produce the final design and specifications for the replacement of the 2400v Motor Control Cabinets (MCC's) at the EJMT.
2. To replace the 2400 medium volt motor control centers (MCC).
3. To facilitate and foster collaboration, communication, and partnership with all members of the project team.
4. Encourage Innovation and value engineering.
5. Accelerate Delivery of the Design and Construction Schedules.
6. Zero Change Orders on CM/GC Project.
7. To successful deploy the CM/GC method on a CDOT project.

A.4 Planned Improvements

This project is located on I-70, at milepost 213.651, in Summit County. The project will be located inside the EJMT (Eisenhower Johnson Memorial Tunnels) in the electrical control areas for the south bore.

A.5 Project Costs

The construction cost of this project is estimated to be between \$1,000,000 and \$2,750,000. The final negotiated GMP will determine the actual cost of the project construction.

A.6 Work Duration

The time period for the work described in this scope is approximately 360 calendar days.

A.7 Work Product

The Design Consultant work products are:

1. As-Built Field Verification Review.
2. Sole Sourcing Justification (If necessary).
3. Project Design Schedule in Microsoft Project with regular updates to reflect progress or changes.

4. Drawdown schedules.
5. Billing Estimates.
6. Bi-Weekly Progress and Coordination Reports.
7. Field Inspection Review (FIR) Plans, Specifications, and Estimate Package (30% Design)
8. Post-FIR Revision Memo
9. Final Office Review (FOR) Plans, Specifications, and Estimate Package (85% Design)
10. Post-FOR Revision Memo
11. AD/Bid Final Plans, Specifications, and Estimate Package (100% Design)
12. Quantities and Engineer's Estimate for each PS&E Package

A.8 Work Product Completion

All submittals, reports, and reviews must be accepted by the CDOT Contract Administrator or designee.

A.9 Additional Project Information

Additional information regarding this project is included in the following documents:
[List available pertinent documents]

1. Eisenhower/Johnson Memorial Tunnel 2400V Medium Voltage Switchgear Conceptual Design Evaluation (Hatch Mott Macdonald (September 2009)
2. Eisenhower/Johnson Memorial Tunnel Power Study (PB Americas for Colorado Department of Transportation (May 2007)
3. White Paper – Sole Sourcing of MCC Equipment (July 9, 2009)
4. Electrical Inspection Report Vol I, Parsons Brinkerhoff Quade & Douglas, Inc. (June 2006)
5. 2400V MCC 15% Plan Set
6. I-70-3(80) 220 As-Builts (EJMT Tunnel) Plan Set

Copies of these documents may be obtained from Design Consultant Management section on the CDOT external website at <http://www.dot.state.co.us/Consultants/>.

A.10 Scope of Work

This draft scope of work has been reviewed by CDOT and reflects a plan of approach based on the known goals. One factor determining the selection of is the ability of that Design Consultant to analyze the project goals, evaluate the work elements, and formulate a work plan. This process may produce new approaches or modification to the project work elements. Because of that, all Design Consultants should be aware that the Final Scope of Work for a project will be produced with input from the selected Design Consultant and the selected Contractor.

The Design Consultant will be part of the design team. As part of the design team, the Design Consultant shall provide construction plans, specifications, and cost estimates at FIR, FOR, and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT).

The Design Consultant tasks during the design phase include:

1. The Design Consultant shall attend initial project workshop. The Design Consultant shall be introduced to the project, the stakeholders, the EJMT Staff, the CDOT Project Team, and the selected Contractor. This workshop includes the following tasks:
 - a. Introduction to the project, the project team, and the project stakeholders.
 - b. Project status, goals, objectives, funding, preliminary schedule, etc.
 - c. Presentation of project elements.
 - d. Identifying project risks and developing an initial risk management plan.
 - e. Project site and equipment tour.
 - f. Scheduling of bi-weekly project, FIR, and FOR meetings.
 - g. Scheduling of important milestones and product deadlines.
 - h. Discussion of possible early delivery items.
 - i. Question and Answer Session.
2. The Design Consultant shall be a member of the project team that will include EJMT staff, Region 1 Mountain Residency Project Staff, the Design Consultant, and a CM/GC firm that will be selected concurrently. The Design Consultant shall work to collaborate with the CDOT project staff, EJMT Staff, and the Contractor during the design development and construction stages of the project. To facilitate partnering during design, CDOT anticipates co-locating the CDOT Project Manager, a representative from the Design Consultant, and a representative of the Contractor at a location in Golden, the EJMT, or other location agreed to by these individuals.
3. The Design Consultant shall check and field verify all applicable as-built plans of the Eisenhower Johnson Memorial Tunnels (EJMT) that concern the replacement of the 2400v Motor Control Centers.
4. The Design Consultant shall be required to prepare quantity and cost estimates during the course of the design phase.
5. The Design Consultant shall provide an Electrical Engineer that shall be part of the project team. The Electrical Engineer shall participate in design meetings; verify the tunnel electrical system as-built drawings accurately reflect the existing conditions; development all PS&E packages; and serve as a subject matter expert to CDOT during the installation and commissioning of the new MCC. The Design Consultant Electrical Engineer shall to assist the team during project development and construction.
6. The Design Consultant shall be required to attend all project design team meetings. The project team meetings are held to discuss project status, determine quantities, resolve issues, and coordinate work load. These meetings include but are not limited to:
 - a. Bi-weekly Project Team Progress Meetings.
 - b. Risk Assessment Meetings.
 - c. FIR (Field Inspection Review).
 - d. FOR (Final Office Review).
 - e. DOR (Design Office Review) if required by the Engineer.

7. The Design Consultant shall be required to develop all plan submittals and provide PS&E packages. Plan submittals include but are not limited to:
 - a. The Design Consultant shall prepare Field Inspection Review (FIR) plans and cost estimates representing the 30% design stage.
 - b. The Design Consultant shall I prepare Final Office Review (FOR) plans, specifications, and cost estimates representing the 90% design stage.
 - c. The Design Consultant shall prepare AD/Bid plans, specifications, and cost estimates representing the 100% design stage.
 - d. Any Utility Relocation submittals.
8. The Design Consultant shall review reports, proposals, communications, and reviews produced by the CMGC contractor that include but are not limited to:
 - a. Constructability Reports.
 - b. Cost Savings Reviews.
 - c. Value Engineering Proposals.
 - d. Best Value Recommendations.
 - e. Formal Written Reviews for each Plan Set Review.
 - f. Opinion of Probable Cost Estimates
 - g. GMP Proposal.
9. The Design Consultant shall participate in risk assessment meetings and provide input on methods to reduce risks.
10. Provide recommendations to achieve the CM/GC goal of zero change orders.
11. Participate as determined in project action teams
 - a. Track and document risk and its cost and schedule impacts
 - b. Track and document innovation and its cost and schedule impacts
12. The Design Consultant shall prepare a Project Design Schedule in MS Project with regular updates (weekly) to reflect changes or progress.
13. The Design Consultant shall prepare Stamped Record plan sets stamped by a Professional Engineer.

APPENDIX B: SCOPE OF WORK PRECONSTRUCTION ACTIVITIES

This list establishes the Design Consultant's collaborative or full responsibility for and participation in the tasks which are indicated below by an 'X' in the Design Consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Selected work tasks shall be assigned only after coordination and consultation with CDOT and the selected Contractor. The Design Consultant should review this entire section to identify applicable material. Contact the Colorado Department of Transportation/Project Manager (CDOT/PM) if clarification is required.

The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice should be planned by the Design Consultant and coordinated with the CDOT/PM and the CMGC/PM. The time of their accomplishment will overlap and parallel paths of activity should be planned to finish the development phase in accordance with the shortest possible schedule. The type and number of meetings, documents, etc., will depend on the category and characteristics of the project work. A project plan shall be developed by the Design Consultant which satisfies the requirements of the project development. This plan must be approved by the Contract Administrator or designee before starting the work.

B-1: PROJECT INITIATION AND CONTINUING REQUIREMENTS

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
1. Initial Project Scoping Meeting (Workshop)	__X__	__X__	__X__
Identify scope elements, responsibilities and coordination necessary to complete the work.			
1. Project site tour and equipment inspection	__X__	__X__	__X__
2. Project Status, Goals, Elements, Objectives, Schedule Review	__X__	__X__	__X__
3. Identify Project Risks and Develop Initial Risk Management Plan	__X__	__X__	__X__
4. Review applicable environmental documents	__X__	__X__	__X__
5. Independent Design and Applicable As-Built Review	_____	__X__	__X__
6. Develop a Project Schedule and Assign Tasks	__X__	__X__	__X__
7. Schedule bi-weekly progress meetings, FIR, FOR, and Milestones	__X__	__X__	__X__
8. Identify Design Criteria	__X__	__X__	__X__
9. Discussion of possible early delivery items	__X__	__X__	__X__
10. Question and Answer Session	__X__	__X__	__X__
2. Progress Meetings			
a. CDOT, Contractor, and Design Consultant Project Managers	__X__	__X__	__X__

The managers will meet periodically as required (typically at two-week intervals). These progress meetings will be used to coordinate and track the work effort and resolve problems. The meetings will review the following:

CDOT Contractor Design
Other Consultant

- Activities required to be complete since last meeting (Action Items)
- Problems and Challenges encountered/anticipated and potential solutions
- Project Schedule Updates (Design and Construction)
- Action Items
- Coordination and Communication required with:
 - Team Members
 - EJMT Tunnel Staff
 - CDOT Specialty Units
 - Other

The CDOT/PM will provide meeting minutes that include details discussed, notes, and all action items relating to the meeting within one (1) week of the meeting.

b. Project Management ___X___ ___X___ ___X___

The CDOT/PM will coordinate all the work tasks being accomplished by all parties to ensure project work completion stages are on schedule. The C/PM and CMGC/PM shall coordinate all the work tasks being accomplished by their respective teams to make sure project work completion stages are on schedule.

c. Project Meeting Minutes ___X___ _____ _____

Project Meeting Minutes shall be completed and provided to the C/PM and the CMGC/PM within one week of the actual meeting

3. Project Development Process

a. Communication and Consensus Building ___X___ ___X___ ___X___

The CDOT/PM is responsible for the consensus building and facilitating the communication between all members of the project team. This does not dismiss the responsibility of all team members to communicate with the CDOT/PM and the CDOT Project Management Team when required or needed.

b. Weekly Update Newsletter ___X___ _____ _____

The CDOT/PM will publish a weekly update newsletter to document the weekly or bi-weekly progress of the schedule, estimate, team meetings, action items, and pertinent information for the FHWA, CDOT management, and project team members.

c. Contact List ___X___ _____ _____

Establish and maintain a computerized list of all appropriate interested parties for the communication process. The list will be used for notices regarding public meetings, mailings, newsletters, or other communication as appropriate.

- i. The information on the list shall include as a minimum:
 1. Full Name
 2. Firm or CDOT
 3. Mailing Address
 4. Email Address
 5. Phone, Cell, and Fax Numbers

CDOT Contractor Design
Other Consultant

- v. Available historic aerial photos of the corridor (e.g. USGS, Public Library, Etc)
- vi. Any pertinent records maintained by CDOT.
- vii. Analyze results of chemical analyses and records reviews and identify potential impacts to the construction from hazardous waste. Assess potential hazards to the public, tunnel staff, and construction workers and development mitigation options.

4. Existing Electrical and Mechanical Systems

Analyze existing conditions, equipment, project site, and the proposed design options relative to the following:

- a. Ventilation Systems
- b. Safety Systems
- c. Electrical and Mechanical Systems

5. Construction Requirements

Analyze/investigate the following:

- a. General Construction Impact (of temporary nature)
- b. Utilities

When specified, the effect on utilities will be investigated. Work with the Region Utilities Engineer and CDOT Maintenance to collect the utility location maps for all utilities in the area.

B-2: PRELIMINARY DESIGN

1. Electrical Engineering and Design

CDOT/PM will coordinate all design activities with required CDOT specialty units, tunnel staff, the Contractor, the Design Consultant, and other outside entities. Design Consultant is responsible for the electrical design, plans, specifications, and estimate packages at each formal review.

- a. Utility Coordination
- b. Electrical Design and Systems Integration Development
- c. Electrical Design
- 1. Check and field verify all applicable as-built plans of the EJMT that concern the replacement of the 2400V MCC. An As-Built Verification Review report shall be prepared After field verification is complete.

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
2. Provide construction plans, specifications, and cost estimates at FIR, FOR, and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT).	_____	_____	___X___
3. Plot/Develop all required information on the plans in accordance with all applicable CDOT policies and procedures and all included industry standards for electrical design.	_____	_____	___X___
4. Use design model/plans to produce preliminary quantities	_____	_____	___X___
d. Constructability Reviews and Reports	_____	___X___	_____
e. Construction Phasing Plan	_____	___X___	___X___
A construction phasing plan shall be developed for all projects which integrates the construction of all the project work elements into a practical and feasible sequence.			
f. Value Engineering Proposals	_____	___X___	_____
g. Cost Savings Reviews	_____	___X___	_____
h. Preliminary Construction Schedule	_____	___X___	_____
i. Long Lead Time GMP Submission and Proposal	___X___	___X___	_____
j. Long Lead Time Negotiations	___X___	___X___	_____
k. Long Lead Time Item Procurement	___X___	___X___	_____
l. Opinion of Probable Construction Cost Estimate (FIR)	_____	___X___	_____
2. Preparation for the FIR (Field Inspection Review)	___X___	___X___	___X___
a. Coordinate, complete, and compile the plans with inputs from other branches: materials, hydraulics, environmental, traffic, right of way, maintenance, safety, and Staff Bridge if applicable.	___X___	_____	___X___
b. Prepare the preliminary cost estimate for work described in the FIR plans based on estimate quantities.	_____	___X___	___X___

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
c. The FIR plans and specifications shall comply with CDOT Requirements and shall include: title sheet, typical sections, General notes, plan/profile sheets, and preliminary layouts.	_____	_____	___X___
d. The following items will be mandatory for the FIR plans:			
• Preliminary Electrical Wiring Diagrams			
• Cabinet Design			
• All applicable Electrical Design			
e. The plans shall be submitted to the CDOT/PM and the GMGC/PM for preliminary review at least 10 days prior to the FIR.	___X___	_____	___X___
f. The plans will be reproduced by CDOT.	___X___	_____	_____
g. The CDOT Project Management Team and the Contractor will provide written reviews of the FIR PS&E package.	___X___	___X___	_____
h. The Construction Phasing will be included in the FIR plan Set.	_____	___X___	___X___
i. Prepare FIR Estimates.	_____	_____	___X___
j. Prepare FIR Opinion of Probable Construction Cost Estimate.	_____	___X___	_____
k. CDOT Form 1048 – Project Scoping Procedures Completion Checklist.	___X___	_____	_____
3. Field Inspection Review	___X___	___X___	___X___
a. Attend the FIR			
b. The FIR meeting minutes shall be prepared by the CDOT/PM and distributed as directed.			
c. The FIR original plan sheets shall be revised/corrected in accordance with the FIR meeting reviews and comments within thirty (30) working days.			
d. Design decisions concerning questions and comments received at the FIR will be resolved in cooperation with the CDOT/PM, C/PM, and the CMGC/PM. The C/PM shall document the decision and transmit the documentation to the CDOT/PM for approval.			
e. A list of all deviations from the standard design criteria along with written justification for each one shall be submitted to the CDOT/PM.			
4. Post-FIR Revisions and Memo	_____	_____	___X___

The Design Consultant shall complete the revisions required by the FIR before this phase of work is considered to be complete. A Post-FIR memo will be produced by the Design Consultant to document and confirm that the changes discussed at the FIR have been completed and integrated into the design.

<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
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B-3: FINAL DESIGN

1. Final Design	__X__	__X__	__X__
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CDOT/PM will coordinate all design activities with required CDOT specialty units, tunnel staff, the Contractor, the Design Consultant, and other outside entities. Design Consultant is responsible for the electrical design, plans, specifications, and estimate packages at each formal review.

2. Electrical Engineering and Design	_____	__X__	__X__
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a. Utility Coordination	_____	_____	__X__
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b. Electrical Design and Systems Integration Development	_____	_____	__X__
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c. Electrical Design	_____	__X__	__X__
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1. Provide construction plans, specifications, and cost estimates at FIR, FOR and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated Control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT).	_____	_____	__X__
--	-------	-------	-------

2. Plot/Develop all required information on the plans in accordance with all applicable CDOT policies and procedures and all included industry standards for electrical design.	_____	_____	__X__
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3. Use design model/plans to produce preliminary quantities.	_____	_____	__X__
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4. Plans should include all of the following that are applicable:

- a. *Circuit type and voltage of power source*
- b. *Location of power source (coordinated with the utility engineer)*
- c. *Size and location of electrical conduit*
- d. *Locations of power sources(s)/lighting control center(s) (if appropriate)*
- e. *Location of direct burial cable*
- f. *Size of wiring and/or direct burial cable*

d. Constructability Reviews and Reports	_____	__X__	_____
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e. Value Engineering Proposals	_____	__X__	_____
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f. Cost Savings Reviews	_____	__X__	_____
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g. Tentative Construction Schedule	_____	__X__	_____
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	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
3. Project Review	___X___	___X___	_____
a. Update Project Schedules (Construction and Design)			
b. Coordination of Activities			
c. Finalize design decisions, variances, and justifications			
4. Materials Engineering (Electrical):	_____	___X___	___X___
Finalize and provide the justification report for the sole sourcing Of the MCC switchgear (if required).			
5. Construction Phasing Plan	_____	___X___	___X___
A final construction phasing plan will be developed which integrates the construction of all project work elements into a practical and feasible sequence.			
6. Obtain permits	___X___	___X___	_____
This activity is concurrent with final design and must be completed prior to the advertisement for construction. Coordinate between the agencies, the Region Environmental Manager and the CDOT/PM and prepare and submit application and design information to the Region Environmental Manager to obtain all applicable permits. Obtaining all other required permits will be designated the responsibility as per the CDOT standards and specifications.			
7. Plan Preparation for the Final Office Review	___X___	___X___	___X___
a. Coordinate packaging of the plans.	___X___	___X___	_____
Collect plans from all design elements and collate the plan package. Include all applicable items listed in the Project Development Manual. Calculate plan quantities and prepare the tabulations and Summary of Approximate Quantities.			
b. In addition to the plan sheets, the specifications and special provisions will be included in the FOR PS&E package.	___X___	___X___	_____
c. This will consist of those unique Project Special Provisions which have to be written specifically for items, details and procedures not adequately covered by CDOT's Standard specifications and Standard Special Provisions. Also a list of the Standard Special Provisions which are applicable to the project shall be prepared. The Project Special Provisions shall be provided in the CDOT format and submitted with the project plans.			
d. Prepare FOR Estimates	_____	_____	___X___
e. Prepare FOR Opinion of Probable Construction Cost Estimate	_____	___X___	_____
f. Item numbers, descriptions, units, and quantities shall be listed and submitted to the CDOT/PM.			
g. Submit the FOR Plans, Specifications, and Estimate Package to the CDOT/PM and CMGC/PM for preliminary review prior to FOR meeting.	___X___	_____	___X___
h. FOR plan Reproduction () Sets	___X___	_____	___X___

<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
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i. The CDOT Project Management Team and the Contractor will provide written reviews of the FOR PS&E package.	___X___	___X___	_____
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8. Final Office Review	___X___	___X___	___X___
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- a. Attend the FOR meeting.
- b. The FOR meeting minutes shall be prepared by the CDOT/PM and distributed as directed.
- c. The FOR original plan sheets shall be revised/corrected in accordance with the FOR meeting reviews and comments within thirty (30) working days.
- d. Design decisions concerning questions and comments received at the FOR will be resolved in cooperation with the CDOT/PM, C/PM, and the CMGC/PM. The C/PM shall document the decision and transmit the documentation to the CDOT/PM for approval.
- e. A list of all deviations from the standard design criteria along with written justification for each one shall be submitted to the CDOT/PM.

9. Post-FOR Revisions and Memo	_____	_____	___X___
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The Design Consultant shall complete the revisions required by the FOR before this phase of work is considered to be complete. A Post-FIR memo will be produced by the Design Consultant to document and confirm that the changes discussed at the FIR have been completed and integrated into the design.

10. GMP Proposal and Negotiations	___X___	___X___	_____
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- a. Notify CDOT/PM at a point where a GMP proposal can be sufficiently prepared. _____ ___X___ _____
- b. Prepare and submit the Construction GMP Proposal. This GMP will include the final Opinion of Probable Construction Cost Estimate. _____ ___X___ _____
- c. Submit an electronic EBS to the CDOT/PM. _____ ___X___ _____
- d. Review the Construction GMP Proposal. ___X___ _____ _____
- e. Negotiate a final GMP. ___X___ _____ _____

11. Construction Plan Package	___X___	___X___	___X___
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The bid plan construction contract package shall consist of the revised FOR plans and will completely describe the work required to build the project including project special provisions and detailed quantities.

- a. Final engineering package. The Contractor, Design Consultant, and CDOT Project Team shall submit 2 copies, in 3-ring binders of the following:
 - 1. All project calculations or worksheets: _____ _____ ___X___
 - 2. All final reports and their approvals: _____ ___X___ ___X___

APPENDIX C: REFERENCES

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

- a. A Policy on Design Standards-Interstate System
- b. A Policy on Geometric Design of Highways and Streets
- c. Guide for Design of Pavement Structures
- d. Standard Specifications for Highway Bridges
- e. Guide for the Design of High Occupancy Vehicle and Public Transfer Facilities
- f. Guide for the Development of Bicycle Facilities
- g. Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Part 1, Specifications and Part II, Tests
- h. Highway Design and Operational Practices Related to Highway Safety
- i. Roadside Design Guide

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

- a. CDOT Design Guide (all volumes)
- b. CDOT Bridge Design Guide
- c. CDOT Bridge Detailing Manual
- d. Bridge Rating Manual
- e. Project Development Manual
- f. Erosion Control and Storm Water Quality Guide
- g. Field Log of Structures
- h. Cost Data Book
- i. Drainage Design Manual
- j. CDOT Quality Manual
- k. CDOT Survey Manual
- l. CDOT Field Materials Manual
- m. CDOT Design Guide, Computer Aided Drafting (CAD)
- n. Erosion Control and Storm water Quality Guide
- o. Standard Plans, M & S Standards
- p. Standard Specifications for Road and Bridge Construction and CDOT Supplemental Specifications
- q. Item Description and Abbreviations (with code number) compiled by Engineering Estimates and Marked Analysis Unit, CDOT
- r. Right-of-Way Manual, Chapter 2, Plans and Descriptions Procedures and General Information
- s. The State Highway Access Code

- t. Utility Manual
- u. TMOSS Generic Format
- v. Field TMOSS Topography Coding
- w. Topography Modeling Survey System User Manual
- x. Interactive Graphics System Symbol Table

3. **CDOT PROCEDURAL DIRECTIVES** (using latest approved versions):

- a. No. 400.2 Monitoring Consultant Contracts
- b. No. 501.2 Cooperative Storm Drainage System
- c. No. 514.1 Field Inspection Review (FIR)
- d. No. 516.1 Final Office Review (FOR)
- e. No. 1217a Survey Request
- f. No. 1304.1 Right-of-Way Plan Revisions
- g. No. 1305.1 Land Surveys
- h. No. 1601 Interchange Approval Process
- i. No. 1700.1 Certification Acceptance (CA) Procedures for Location and Design Approval
- j. No. 1700.3 Plans Specifications and Estimates (PS&E) and Authorization to Advertise for Bids under Certifications Acceptance (CA)
- k. No. 1700.5 Local Entity/State Contracts and Local Entity/Consultant Contracts and Local Entity/R.R. Contracts under C.A
- l. No. 1700.6 Railroad/Highway Contracts (Under Certification Acceptance)
- m. No. 1905.1 Preparation of Plans and Specifications for Structures prepared by Staff Bridge Branch

4. **FEDERAL PUBLICATIONS** (using latest approved versions):

- a. Manual on Uniform Traffic Control Devices
- b. Highway Capacity Manual
- c. Urban Transportation Operations Training – Design of Urban Streets, Student Workbook
- d. Reference Guide Outline – Specifications for Aerial Surveys and Mapping by Photogrammetric Methods for Highways
- e. FHWA Federal-Aid Policy Guide
- f. Technical Advisory T6640.8A
- g. U.S. Department of Transportation Order 5610.1E
- h. Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques
- i. ADAAG Americans With Disabilities Act Accessibility Guidelines

5. **AREA:**

- a. Manual for Railway Engineering

APPENDIX D: DEFINITIONS

- 1) AASHTO- American Association of State Highway & Transportation Officials
- 2) ADT- Average Daily Traffic in Number of Vehicles
- 3) ADAAG- Americans with Disabilities Accessibility Act Guidelines
- 4) BAMS- Bid Analysis and Management Systems
- 5) CAP- CDOT's Action Plan
- 6) CDOT- Colorado Department of Transportation
- 7) CDOT/PM- Colorado Department of Transportation Project Manager – The CDOT Engineer responsible for the day to day direction and CDOT Consultant coordination of the design effort.
- 8) CDPHE- Colorado Department of Public Health and Environment
- 9) CEQ- Council on Environmental Quality
- 10) COG- Council of Governments
- 11) COGO- Coordinate Geometry Output
- 12) CONSULTANT- Consultant for this project
- 13) CONTRACT ADMINISTRATOR- Typically a Region Engineer or Branch Head. The CDOT employee directly responsible for the satisfactory completion of the contract by the Design Consultant or Contractor. The contract administration is usually delegated to a CDOT Project Manager.
- 14) C/PM- Design Consultant Project Manager – The Design Consultant Engineer responsible for combining the various inputs in the process of completing the project plans and managing the Design Consultant effort.
- 15) CMGC/PM Contractor Project Manager – The Contractor Project Manager also known as the Construction Manager/General Contractor firm responsible for completing all CM/GC services on this project.
- 16) FHPG- Federal Aid Highway Policy Guide
- 17) FHWA- Federal Highway Administration
- 18) FIPI- Finding In Public Interest
- 19) FIR- Field Inspection Review
- 20) FOR- Final Office Review

- 21) GPS- Global Positioning System
- 22) MPO- Metropolitan Planning Organization (i.e. Denver Regional Council of Governments, Pikes Peak Area Council of Governments, Grand Junction MPO, Pueblo MPO, and North Front Range Council of Governments).
- 23) MS4- Municipal Separate Storm Sewer System
- 24) NEPA- National Environment Policy Act
- 25) NGS- National Geodetic Survey
- 26) NICET- National Institute for Certification in Technology
- 27) NOAA- National Oceanic and Atmospheric Administration
- 28) PAPER SIZES- See Computer-Aided Drafting Manual (CDOT); Table 6-13 and Table 8-1
- 29) PE- Professional Engineer registered in Colorado
- 30) PM- Program Manager
- 31) PLS- Professional Land Surveyor registered in Colorado
- 32) PRT- Project Review Team
- 33) PS&E- Plans, Specifications and Estimate
- 34) PROJECT- The work defined by this scope
- 35) ROR- Region Office Review
- 36) ROW- Right-of-Way: A general term denoting land, property, or interest therein, usually in a strip acquired for or devoted to a highway
- 37) ROWPR- Right-of-Way Plan Review
- 38) RTD- Regional Transportation Director
- 39) T/E- Threatened and/or Endangered Species
- 40) SH- State Highway Numbers
- +
41) TMOSS- Terrain Modeling Survey System
- 42) TOPOGRAPHY- In the context of CDOT plans, topography normally refers to existing cultural or man-made details.
- 43) UD & FCD- Urban Drainage and Flood Control District
- 44) USCOE- United States Army Corp of Engineers

Note: For other definitions and terms, refer to Section 101 of the CDOT Division of Highways Standard Specifications for Road and Bridge Construction and the CDOT Design Guide.