Draft Scope of Work

I-25 North
Segment 5: CO 66 to CO 56
Design – Professional Services
Scope of Work

COLORADO
Department of Transportation

PROJECT NUMBER: IM 0253-285
PROJECT LOCATION: I-25 SEGMENT 5 - CO 66 to CO 56
PROJECT LIMITS: I-25 - CO 7 TO CO 1
PROJECT CODE: 24309

December 19, 2022

Colorado Department of Transportation
2829 West Howard Place
Denver, CO 80204

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INSTRUCTIONS

This Scope of Work is to serve as a template for the Colorado Department of Transportation (CDOT) to develop and negotiate solid contracts with Consultant teams on projects and tasks. The Consultant shall coordinate all activities, tasks, meetings, communications, and deliverables with the CDOT Project Director (CDOT PD) (or her or his designee) for this Project. All submittals will be through the CDOT PD or a designee, who will make appropriate distribution. Upon Notice to Proceed (NTP), the Consultant shall be responsible and will account for all efforts contained in the Final Scope of Work.

This Draft Scope of Work has been reviewed by CDOT and reflects a plan of approach based on the known goals and the Construction Manager/General Contractor (CMGC) delivery method. Selection factors used in determining the successful Proposer will be the ability of the Consultant to successfully implement the Project goals, evaluate work elements in an organized approach, assist in risk identification and management, propose design alternatives, and include the solutions into technically competent design plans and specifications. The Consultant will partner with the Owner (CDOT), CDOT representatives, the Construction Manager (CM), the Independent Cost Estimator (ICE), stakeholders, and other parties as a member of the integrated preconstruction team. This process will involve various design iterations as the design evolves into scope and construction packages that fit into the Project's budget and timeline constraints. This process may also produce new approaches or modification to the Project work elements so the Scope of Work may change. The Final Scope of Work submitted will be generated by CDOT personnel and be on CDOT letterhead.

SECTION 1 – SCOPE OF WORK AND PROJECT INFORMATION

1.1. SCOPE OF DESIGN SERVICES AND PROJECT LIMITS

CDOT is soliciting design services for the North I-25: SH 66 to SH 56 Project (the "Project") delivered using the Construction Management/ General Contractor (CMGC) delivery method. This section of the North I-25 corridor is also referred to as "Segment 5". The Project Approach limits extend south to SH 7 and north to SH 1. The selected Proposer (also referred to as "Consultant") will provide design engineering services that will follow the North I-25 Environment Impact Statement (EIS) and Record of Decision (ROD) 1 completed in 2011 and the ROD 1 Re-Evaluation that is yet to be completed.

1.2. PROJECT DESCRIPTION/SCOPE OF WORK

A. Project Need and Information

Population and employment growth in northern Colorado are rising at rapid rates. The North I-25 corridor provides critical community, regional, interstate, and international connections for the movement of people and goods. North I-25 through northern Colorado is facing unpredictable travel times and increasing crashes. To meet long-term travel needs, the Project must improve safety, mobility, and accessibility, as well as provide multi-modal alternatives.

i. The need for the Project can be summarized into four categories:
- Increased frequency and severity of crashes
- Increased traffic congestion leading to mobility and accessibility problems
- Aging and functionally obsolete infrastructure
- Lack of multi-modal alternatives

ii. The Project will:
- Increase user choice by adding an express lane in both directions
- Improve trip reliability and freight efficiency
- Reduce congestion, vehicle accidents, fatalities, and greenhouse gas emissions
- Improve geometry and replace aging infrastructure

The Record of Decision (ROD) 1 cleared work within Segment 5 in 2011. A southbound climbing lane between CO 56 and WCR 48 was constructed in 2015 through a Categorical Exclusion. The current design team has progressed the design to a conceptual level (15% design). The ultimate configuration, as stated in the EIS, will include three general purpose lanes and one express lane in each direction. This Project will focus on the first phase of the ultimate configuration and construct two general purpose lanes and one express lane in each direction, but design must be cognizant of the future lane expansion and accommodate this layout where possible.

The conceptual design is based on an optimized alignment and bridge refinements implemented on the Segment 6 Project (CO 56 to CO 402) to the north. The optimized design includes shifting the

mainline from the EIS alignment to reuse existing pavement, preserve right of way and optimize the East Frontage Road where possible, utilize center piers in the I-25 median, and minimize reconstruction on cross streets.

B. Project Elements – The major project elements can be summarized, but are not limited to:

i. Widen and/or reconstruct I-25 to add one 12’ express lane in each direction from just north of CO 66 to just south of CO 56 with a 4-foot painted buffer separating the tolled express lane from the general-purpose travel lanes.

ii. Update to current standard the horizontal and vertical roadway geometry and widen the inside shoulder to 10 feet and outside shoulder to 12 feet.

iii. Provide a 30-year pavement design life for two general purpose lanes, one express lane, buffer, and shoulders in each direction. Based on historical LCCA and pavement selection reports in North I-25 corridor, it is anticipated that the recommended pavement type for this work will be concrete or a composite section of asphalt and concrete. It should be noted that the CM will provide valuable feedback on traffic phasing, material availability, and pricing climate that may guide material selection and innovation that may be incorporated into the design.

iv. Install and integrate tolling and Intelligent Transportation Systems (ITS) equipment.

v. Fully reconstruct one interchange (WCR 34).

vi. Possibly add an interchange to WCR 38. Consultant may be involved with assisting the town of Mead and their consultant with the 1601 process. A full WCR 38 interchange design and construction may be added to the Project scope pending the 1601 process results.

vii. Replace or widen bridge locations, including:

1. I-25 over WCR32 (two existing bridges)
2. WCR34 over I-25 (one existing bridge)
3. I-25 over GWRR (two existing bridges)
4. WCR38 over I-25 (one existing bridge)
5. I-25 over Valley Road (two existing bridges)
6. Other minor crossings as needed for streams, irrigation ditches, drainage, etc.

viii. Incorporate multimodal options, such as carpool lots, future trail preservations, greenhouse gas reducing measures, etc.

ix. Develop a strategic approach to interim and ultimate corridor construction, identifying best-value opportunities to minimize

costs with the initial construction packages, while preserving and maintaining flexibility for future expansion and EIS compliance. These items include but are not limited to pavement thicknesses and jointing, bridge widths and span configurations, wall locations and heights, drainage crossings, utility avoidance/ relocations/ accommodations, right-of-way and easement acquisitions, frontage roads, and other items.

x. Analyze the frontage road use, future, and need, especially in conjunction with the High Plains Blvd. construction.

C. **Project Risks** - the major Project risks can be summarized into the following:

i. Funding amount and timing uncertainty
ii. Construction cost fluctuation
iii. Industry resource availability
iv. Project duration uncertainty
v. Traffic phasing
vi. Utility relocation/mitigation
vii. ROW acquisition
viii. Environmental clearance
ix. Floodplain impacts
x. Coordination with other major projects and stakeholders

1.3. CORRIDOR GOALS

This Project is intended to produce the following improvements in conjunction with other projects along the I-25 Corridor:

1. Provide a safe facility for the public as well as a safe work zone for construction and the travelling public.
2. Provide full geometric standard with a rural median.
3. Maximize scope of work with the available fiscal resources.
4. Ensure the longevity of the project, compatibility with the ultimate configuration and emerging technologies.
5. Improve mobility and traffic operations; increase multimodal connections.

1.4. PROJECT GOALS

A successful Project will:

1. Commit to the CMGC process by engaging the right team members at the right time to proactively problem solve, reduce risk, streamline design development, and construct a successful Project while showing a return on CMGC investment.
2. Utilize innovation while optimizing design and construction to maximize scope, provide best value, and not exceed the Fixed Limit of Construction cost.
3. Create a collaborative and transparent team culture that engages in open

conversation regarding project delivery (i.e., risk, constructability, reviews, material procurement, cost model, ROW acquisition, schedule, and third-party issues) throughout preconstruction and construction.

4. Be adaptable to variable funding and scope adjustments with the ability to change direction, adjust construction packaging, and deliver quickly.
5. Strategically phase work by identifying work areas and construction packages to minimize disruption to the traveling public, while balancing quality, cost, and schedule.

1.5. PROJECT FUNDING AND COST

Project funding of $350M has been identified through CDOT's 1-to-4-year plan and a Transportation Infrastructure Finance Innovation Act (TIFIA) loan. The expected total program cost in 2022 dollars is expected to be between $375M to $450M, which is primarily dependent on construction year, escalation, and scalability. Program costs include design, ROW, utilities, environmental, construction, management, and indirect costs. Given the delta between identified funding and expected program cost, the Project shall be scalable and able to be broken into discrete packages based on available funding at the time, while also maintaining synchronicity with future funding possibilities.

The sources of funding for the Project may include Senate Bill 260, Infrastructure Investment and Jobs Act (IIJA), Local Agency funds, Regional Priority Program, Bridge Enterprise Program, Permanent Water Quality Program, safety funding, federal funding, Division of Transit and Rail, Colorado Transportation Investment Office (CTIO) funding, state and/or federal grants, or any future transportation ballot initiatives.

1.6. PROJECT DURATION, CRITICAL PATHS, AND MILESTONES

The time period for the Project work described in this scope is approximately two years for design and 3 to 4 years for construction. Depending on funding amount and timing, these time periods will be extended or shortened. CDOT anticipates developing multiple separate construction packages to complete construction in the corridor. The Consultant should expect to have design and construction overlap in the likely scenario of concurrent packages. If grant funding or other forms of money with conditional spending is received, additional project milestones may be incorporated into the Project.

Notable timeline constraints to be considered for the Project:

- ROW acquisition
  - At least one year for complete Acquisition; up to 63 impacted parcels with likely 20-30 acquisitions
- Floodplain permitting
  - One affected floodplain (North Creek)
  - Possible CLOMR/LOMR (up to two years to complete)
- Utility relocation
  - Multiple Little Thompson Water District's and other districts water lines
  - Multiple fiberoptic facilities, notably Zayo & CDOT
  - Large overhead electric transmission line and other electric lines

  - Multiple irrigation Ditches
  - Multiple oil and gas Infrastructure
- Environmental considerations
  - Eleven historic properties
  - Wetlands, endangered species
- Other major regional project coordination
  - Portions of High Plains Blvd approximately ½ mile east of I-25
  - The 1601 Process for WCR 38 interchange in coordination with the Town of Mead.
  - The Turion Development (between WCR 38 and WCR 44, east of I-25)

1.7. PROJECT CDOT/OWNER'S REPRESENTATION TEAM AND ROLES

The core Segment 5 Project team is similar to the Segment 6 project. The CDOT team is as follows:

- Abra Geissler, PE - Project Director
- Ben Rowles, PE - Construction Oversight Manager
- James Zufall – Design Oversight Manager

1.8. PROJECT ADMINISTRATION

The Contract Administrator for this Project is:

Cardon Brandt
North I-25: SH 66 to SH 56 Project
2829 W Howard Place
Denver, CO 80204
Cardon.Brandt@state.co.us

CDOT Project Director and Primary Point of Contact:
Abra Geissler, PE
Segments 5 and 6, Project Director
11372 Business Park Circle
Firestone, CO 80504
abra.geissler@state.co.us

1.9. PROJECT COORDINATION

The Consultant shall partner with the CM and the CDOT Management Team as part of the Project team. The following groups will be part of the Project partnership and will be required to coordinate with each other:

- Federal Highway Administration (FHWA)
- CDOT Executive Oversight Committee
- CDOT Region 4 Project Management Team
- CDOT Specialty Groups, including
  - Region 4 Maintenance
  - Region 4 Materials
  - Region 4 Traffic
  - Region 4 Hydrology and Hydraulics
  - Region 4 Survey
  - Region 4 Environmental

  - Region 4 Right-of-Way
  - Region 4 Utilities
  - Region 4 Civil Rights
  - CTIO
  - DTR
  - Staff Structures
  - Head Quarter's Water Quality Group
- Project CMGC Contractor and associated Subcontractors
- Project Document Controls Team
- ICE /CDOT Engineering Estimates and Market Analysis (EEMA) Group
- Adjacent Project Teams (i.e., Segments 4 and 6 and local agency project teams)
- I-25 Corridor Management Team
- Stakeholders, Local Agencies, and Third Parties, including:
  - Weld County
  - Town of Mead
  - Town of Berthoud
  - North Front Range Metropolitan Planning Organization (NFRMPO)
  - Denver Regional Council of Governments (DRCOG)
  - Great Western Railway (GWRR) (Owned by OmniTrax)
  - Colorado State Patrol
  - Emergency Management Agencies
  - Ditch Companies
  - Land Developers along the Corridor
  - School Districts
  - Post Offices
  - Little Thompson Water District
  - Others
- U.S. Army Corps of Engineers (USACE)
- Colorado Parks and Wildlife (CPW)
- Federal Emergency Management Agency (FEMA)
- U.S. Fish and Wildlife Service (USFWS)
- Utility Providers
- Oil and Gas Companies
- Colorado Department of Public Health and Environment (CDPHE)
- Colorado Water Conservation Board (CWCB)
- Others, as necessitated by the Project

1.10. PROJECT CO-LOCATION OFFICE

To enhance collaboration during the pre-construction and construction phases, co-locating is required with the CDOT Team and representatives from the CM, at 11372 Business Park Circle, Firestone. Colocation of Key Personnel is important, as it provides a collaborative work environment to share, enhance, and expedite brainstorming and decision making that is needed on large projects, such as Segment 5. Additionally, the design speed and quality are enhanced, which will save the Project large amounts of money when considering starting construction at a "best value" time,

rather than when the design is complete. Another benefit of a shorter design delivery is it saves on construction escalation rates.

Partial telecommunicating is an option. The Consultant will provide all computers, electronics, and items for workstations to have a fully functioning design team.

1.11. PRELIMINARY DESIGN INFORMATION

The Segment 5 conceptual design and other project information can be found at: https://www.codot.gov/business/consultants/advertised-projects

The information provided is meant to inform proposal teams of critical items to be aware of when pursuing the Consultant role on the project, such as scope elements, project alignment, ROW impacts, utility presence, frontage road strategy, Project timeline and cost, and discussions with local agencies

The use of these files is purely at your own risk and for your own benefit and should not be used for design.

1.12. DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM REQUIREMENTS

There will be a DBE pre-construction contract goal for the Project, the percentage goal will be stated in the **Request for Proposal (RFP).**

SECTION 2 – CONSULTANT RESPONSIBILITIES, DUTIES AND WORK PRODUCTS

2.1. CONSULTANT GENERAL INFORMATION

All work shall be in accordance with CDOT's latest manuals, directives, and generally accepted practices. The Consultant shall supply Engineer signed and sealed electronic plans and reports and collaborate with the NEPA effort by including mitigation measures within the design process. The Consultant will develop an all-encompassing scope of the Project and prepare a written recommendation of activities that coincide with the Project costs, goals, scope, and planned improvements. The Consultant is responsible for developing complete Plans, Specifications, and Cost Estimate (PS&E) packages for Construction Agreed upon Price ("CAP") negotiations of the planned improvements.

Additionally, the Consultant is required to develop concepts and associated quantities to assist with CDOT decision making. The work will include, but is not limited to, the design of the roadway and interchange improvements, structural and retaining wall design, environmental support, and traffic, hydraulic, geotechnical, drainage/ hydraulics, survey, utility, and water quality design. The Consultant must work in conjunction with CDOT, the CM, ICE, and stakeholders to collaborate on innovation, constructability, schedule, and risk throughout the duration of the project in addition to following the CMGC process. The Consultant shall be prepared for the following duties:

- Provide a Consultant Team capable of providing project deliverables on time, more information on the requested design team is given in the **RFP**
- Attend and participate in project meetings

- Meet project milestones
- Create and maintain project CPM schedules for design. Upon contract award, the Consultant will create a detailed design, ROW, and utility Baseline Schedule for the Project based on the most current documents available with input from CDOT. After the Baseline Schedule is created, the Consultant will be required to submit updated schedules when construction packaging is decided or any other notable change to the Project occurs, and otherwise as directed by CDOT. The Consultant will incorporate the detailed design schedule into the project-wide schedule managed by the CM.
- Develop concepts and quantities for cost estimates
- Participate in public outreach meetings
- Provide environmental support to the CDOT environmental team to complete the re-evaluation. Incorporate mitigation measures into plans and specifications
- Provide Subsurface Utility Engineering (SUE) research, field investigation, utility coordination, and sealed plans, and/or support if CDOT has already procured a SUE
- Attend site meetings and site visits, documenting critical dimensions, conditions, discussions, and decisions
- Provide FIR, FOR, and final project design, specifications, and quantities for estimates
- Provide a robust Quality Control plan specifically focused on the mitigation of error and omission risk
- Work with the CM to provide phasing and detour concepts that will meet project goals
- Track project action items, decisions, risks, and deliverables
- Provide support for graphical and contract needs
- Assist with the Value Engineering meeting and report
- Assist the I-25 Corridor Management team with the annual corridor financial report updates and other corridor updates

2.2. PERSONNEL QUALIFICATIONS

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. All tasks assigned to the Consultant must be conducted by a qualified person within the team with the necessary education, certifications (including registrations and licenses), skills, experience, qualities, and attributes to complete a particular task. Key Personnel, as outlined in **the RFP,** constitutes an agreement by the Proposer to make these people available to complete the services of the contract at the level the Project requires. CDOT requires that these Key Personnel be engaged to perform their specialty for all services required by this contract, and they shall be retained for the life of this contract to the extent practicable and to the extent that such services maximize the quality of work hereunder.

If the Consultant or a subconsultant decides to replace any of its Key Personnel, the Consultant shall notify the Project Director in writing of the desired change. No such changes shall be made until at least two qualified replacement

candidates are recommended by the Consultant and a replacement is approved by the Project Director or their designated representative. Failure of the Consultant to comply with the requirements of this provision may be cause for CDOT's termination of the Contract. If, during the term of the contract, the Project Director or their designated representative determines that the performance of the approved Key Personnel is not acceptable, a notification shall be sent to the Consultant. The notification shall include a reasonable timeframe to correct such performance. Thereafter, the Consultant may be required to reassign or replace such Key Personnel. If the Project Director or its designated representative notifies the Consultant that certain Key Personnel of a subconsultant should be replaced, the Consultant shall use its best efforts to replace such Key Personnel within a reasonable time, but not to exceed fifteen working days from the date of the notice

This contract requires that the prime firm or any member of its team, be pre-qualified in the following disciplines for the entire length of the contract:

- AC – Acoustical Engineering
- AR – Architecture
- BI - Bridge Inspection
- BR – Bridge Design
- CE – Civil Engineering
- EL – Electrical Engineering
- EN – Environmental Engineering
- GE – Geotechnical Engineering
- GL – Geological Engineering
- HD – Highway & Street Design
- HY – Hydraulics
- LA - Landscape Architecture
- MA – Management (Contract Admin)
- ME – Mechanical Engineering
- MT - Materials Testing
- SE – Structural Engineering
- SO – Soils Engineering
- SU – Surveying
- TP – Transportation Engineering
- TR – Traffic Engineering
- VE – Value Engineering

2.3. COMPUTER SOFTWARE INFORMATION

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

- Earthwork - OpenRoads Designer – Bentley Systems
- Drafting/CADD - OpenRoads Designer – Bentley Systems with CDOT's formatting configurations and standards
- Survey/Photogrammetry - CDOT TMOSS, OpenRoads Designer – Bentley Systems, allowable systems in the CDOT Survey Manual
- Bridge - CDOT Staff Bridge software shall be used in either design or design check, refer to the CDOT Bridge Design Manual
- Estimating - Transport (an AASHTO sponsored software) as used by CDOT

- ArcView for Water Quality data
- LIMS
- Bentley (a/k/a ProjectWise, Deliverables Management, Share)
- Specifications - Microsoft Word
- Scheduling - Microsoft Project or Primavera
- Water Quality Data – ArcView
- 3D graphic imaging - As approved
- B2GNow System for DBE/ESB tracking and prompt payment
- Bluebeam Revu

The data format for submitting design computer files shall be compatible with the latest version of the adopted CDOT software as of Notice to Proceed for the contract. The Consultant shall immediately notify the Project Director if the firm is unable to produce the desired format for any reason and cease work until the problem is resolved.

2.4. PROJECT COORDINATION AND MEETINGS

A. **Kick-Off Workshop** - A Kick-Off Workshop will be held at the onset of the preconstruction phase to emphasize the importance of partnering within the CMGC delivery method by focusing on team building and roles, Project understanding, and Project goals. This workshop is mandatory for all Key Personnel. This workshop will be facilitated by CDOT or its representative and will cover at a minimum the following items:

- Introduction to the Project, the CMGC delivery, partnering, Project stakeholder engagement, and roles and responsibilities identification to be used as the basis of a more detailed Responsible, Accountable, Consult, and Inform (RACI) breakdown. Subconsultants performing major work contributing to the design should be in attendance.
- The Team will review Project status, vision, goals, objectives, funding, preliminary preconstruction schedule, definition of success, roles, and responsibilities, current design, etc.
- Initial discussion of innovations, phasing, and risk mitigations being proposed by the CM, Design Consultant, and ICE
- Meeting identification, including tasks, frequency, attendees, meeting goals and working groups for various elements of the Project.
- Initiate working groups for various elements of the Project. Strategy, timing, and approach for the Project Innovation and Value Engineering Workshop.
- Identify strategy, timing, and approach for the Project Innovation and Value Engineering Workshop.

B. **Value Engineering (VE) Workshop** – The VE Study will include independent Subject Matter Experts (SME) that will analyze the Project and work that has been done to date. The purpose of this workshop is to consider any CM innovations or design refinements for the Project and incorporate value engineering principles to the Project. The Consultant shall include this effort in their Contract scope, including a moderator and report writer. The time of the VE study will be determined at the Kick-Off Workshop and is expected to be a three-to-five-day effort with additional time for a report summarizing activities, suggestions, and process. The approach, agenda, format, and duration for the workshop will be developed in collaboration with CDOT, the CM, ICE, and the Consultant.

C. Design Meetings

Host meetings at FIR, DOR, and FOR levels; these meetings are needed for all construction packages, refer to CDOT's design manual for detailed explanation of meeting items, preparation, and work products.

a. Scoping Meeting – Preparation for this meeting will require identification of appropriate variables at the initial scoping meeting, establish and layout the plan to deliver the project to construction, prepare a plan for preliminary quantities, and prepare preliminary plan and profile of improvements so the CM can provide a green sheet for the project. Discuss appropriate items to consider, explore, and analyze throughout design progression to ensure a successful project.

b. FIR Meeting - The purpose of the meeting will be to ensure the project is on track from a design and cost standpoint. Plan-level design and specifications shall be at least 30% complete showing integration of design disciplines with identified improvements. The Consultant shall provide a detailed preliminary cost estimate.

c. Optional Design Office Review (DOR) - The DOR package shall incorporate all the ongoing design and cost estimating efforts. This 60% design review may or may not be needed depending on size and/or complexity of the construction package. Generally, the DOR will be in roll plot form with associated specifications. The Consultant shall provide a 60% cost estimate.

d. FOR Meeting – The FOR will present the 90% complete plans, specifications, and cost estimate. FOR plans should be a culmination of design progression throughout the pre-construction phase. The FOR-level plans will be used for the Opinion of Probable Construction Cost process.

D. Other Meetings – The Consultant shall expect to participate heavily in discipline-specific meetings, project management meetings, workshops associated with innovations, risk, schedule, cost, alternatives, etc. Meetings will be used to set the Project vision, analyze how Project progress is aligning and tracking with Project Goals, and to aid CDOT with making decisions to progress design.

E. Executive Management Team Meetings – CDOT, the CM, and the Consultant will meet with the EMT on an approximate quarterly basis to communicate Project progress and to discuss scope, risk, and funding health.

2.5. WORK PRODUCTS

The following work products include all reports, studies, field investigations, and professionally engineered design of the following. The Consultant shall follow the latest version of the CDOT Project Development Manual for project delivery procedures and requirements and follow all CDOT and FHWA-required design guidelines and Procedural Directives. CDOT shall retain all work products and backup materials. The Consultant work products and activities may include:

- Project Management and Coordination
- Preliminary Engineering Effort
- FHWA Value Engineering Requirements
- Utility Coordination / Final SUE Work
- Schedules
- Meeting Minutes
- Survey
- Wetlands / 404

- Permanent water quality and temporary water quality and stormwater permitting
- Geotechnical Investigation
- Structural Engineering
- Highway Design and Traffic/Safety Engineering
- Hydraulics and Hydrology
- Environmental Compliance and EA Reevaluation
- ITS Components
- FHWA Controlling Criteria Variances
- Work Activity Assignments
- Field Inspection Review (FIR) 30% Plans and Estimates
- Design Office Review (DOR) 60% Plans and Estimates
- Final Office Review (FOR) 90% Plans, Specifications, and Quantities for estimates
- AD/CAP Plans, Specifications, Cost Estimate
- Construction Plan Package(s)
- Professional Engineer Stamped Record Sets
- Design Support During Construction
- Submittals
- Invoice Formatting and Information
- Greenhouse gas initiatives and mitigation reports
- New interchange documents (Interchange Access Request, etc.)
- Others, as necessitated by the Project needs and current requirements

When applicable, the engineering and overall process must consider ALL of the proposed Project Scope Elements as part of the EIS and plan for their future implementation and mitigation measures so one improvement does not preclude a future improvement, such as accommodating a future general purpose lane or other improvements. Traffic engineering expertise must be utilized for continued evaluation of options and alignments as well as interactions of the additional highway improvements. All work required to complete this Scope of Work requires the use of English Units.

In addition to the deliverables described above, the following are also required:

- Final PSE: Provide final Plans, Specs and Estimate for review prior to final AD/CAP set. 99% Design Development Plans
- Final AD/CAP set of plans. 100% construction documents

2.6. WORK ACTIVITIES

The following activities are set up to support the successful completion of Work Products stated in **Section 2.5** that will lead to the effective delivery of the Project. The Consultant shall incorporate the following activities, techniques, processes, and approaches when formulating and developing the plans, specifications, and reports.

A. Project Management

The consultant shall provide the Key Personnel as identified in the **RFP** for the overall interdisciplinary needs of the Project, this includes attending applicable meetings, providing monthly progress reports, monthly invoicing, tracking progress of deliverables against the developed schedule, and ensuring internal project controls are being followed. If the project falls behind schedule, the Consultant shall provide a recovery plan to meet all project milestones.

Additionally, the Consultant will assist with maintaining the CDOT Project webpage with appropriate updates.

1. Risk Management Log – develop and execute a plan for risk management which will include the following:
    - Identify, track, analyze and respond to Project risks
    - Recommendations to either avoid, transfer, mitigate or accept each risk to the project scope, schedule, or budget
2. Scope Management – develop and execute a plan for scope management, including collecting requirements, defining, and validating project scope, identifying the base scope based on funding and pricing, and a plan for assessing scope changes and prioritization.
3. Contract Management – develop and execute a plan for contract management including working with the CDOT PM to develop task orders.
    - Planning, managing, and controlling the costs for the prime consultant and the subconsultants to stay on task and meet the budget goals.
    - Writing the task orders to define the task order scope.
    - Notifying the CDOT Project Director about potential out of scope items.
4. Cost Management – develop the quantities required for the construction cost estimate at major project milestones, and a design estimate at major milestones. Since this project will be delivered via CMGC, this project will have an independent cost estimator that will complete the actual construction estimate for project milestones, but the Consultant will work with the CM to develop high-level cost estimating on specific cost-benefit analysis to aid in decision making.
5. Schedule Management – develop and execute a schedule management plan including:
    - The plan to develop, maintain and communicate the project schedule for the time and resources on the project, including quarterly drawdowns for the project life.
    - The schedule shall be a detailed schedule using Project or Primavera that will track all major milestones, deliverables for the design process, and tied to CM/GC deliverables. The schedule shall be used as a baseline to track progress. If the schedule is at risk of slipping, notify the CDOT Project Director and recommend options for schedule recovery.
6. Change Management – develop and execute a change management plan that will include the following:
    - Define how project deliverables and documentation will be controlled, changed, and approved. Note how changes could impact the project scope, schedule, and budget.
    - Identify who should approve the decisions and changes on the Consultant team and how they will be communicated and documented.
7. Quality Management - Develop and execute a quality management plan for all project deliverables. The plan shall include quality assurance and quality control to:
    - Ensure accuracy and reductions of error and omission reducing the need for rework
    - Provide interdisciplinary oversight ensuring that the documents

capture not only the correct detail but are tied to the larger overall picture/concept of the project
- Provide contract documents that take into consideration constructability and maintainability
- Provide quality control practices to reduce defects in work products.
- Provide a quality process in which all deliverables and construction documents will be considered to have a high level of quality, especially when considering error and omission.
- Provide a plan for what information to receive from the CM to aid in a complete plan set and how that information will be obtained.
- Complete an additional quality assurance practice to ensure the goal of the work product has been met if the consultant completing the work is not the prime consultant.

8. Communication Management – develop and execute a communication management plan. The plan shall include the following:
   - The processes that are required to ensure timely and appropriate planning, collection, creation, distribution, management, control and monitoring of project information.
   - How to ensure project information will be consistently distributed in a timely manner to the team members that need it in the appropriate format.
   - Include the following in reference to Meeting planning:
     - Participate in establishing the frequency of meetings and the most effective team members to invite and attend, as well as meeting goals
     - For major meetings establish a meeting plan template defining who, what, where, when, why, how, etc.
     - For all stakeholder meetings, a Consultant liaison shall be available to participate as needed, and take meeting minutes
   - Track crucial project decisions in a communications log
   - Provide communication as appropriate with internal CDOT Specialty units as directed by the CDOT Project Director
   - Contact and coordinate project needs with CDOT personnel and additional entities as appropriate
   - Document and report to CDOT Project Director when items have been submitted for review and log and track responses.
   - Project Newsletters: Create or assist with graphical email updates. Graphics shall be gathered from the entire project effort to report back on each discipline/action that is progressing.
9. Action Items, Deliverables, and Decisions tracking:
   - Track action items, deliverables, and decisions and note date assigned, date completed, item description, and who is responsible in three separate tracking logs. Provide management of consultant team tasks and team members, including sub consultants and vendors, and work or task leads.
   - Report progress to CDOT Project Director. Deliverables are part of the project schedule but require their own communication tool for tracking progress.
10. Document Control Platform

- Explore and recommend various document control platforms to be used throughout the duration of the preconstruction and construction phases
- Should have strong organizational capabilities that include access control, collaboration, search functionality, mega data storage, etc.
- Consultant will migrate the files to CDOT's ProjectWise system at project end or through duration of the project, as needed

11. Routine Reporting and Billing
    - Coordinate all activities with the CDOT Project Director
    - Adhere to the latest CDOT requirements for monthly billing
    - Reports and submittals. In general, all reports and submittals must be approved by the CDOT PM prior to their content being utilized in follow-up work effort.
    - Provide Vendor backup as part of all executed Task Orders

SECTION 3 – DISCIPLINE-SPECIFIC CONSULTANT RESPONSIBILITIES

The following discipline-specific work is needed to ensure a successful design. All tasks assigned to the Consultant must be conducted by a qualified person within the team with the necessary education, certifications (including registrations and licenses), skills, experience, qualities, and attributes to complete a particular task.

3.1. ENVIRONMENTAL

CDOT Region 4 will be completing the NEPA Reevaluation, T&E surveys, special status species surveys, wetland surveys, noise evaluation, HazMat, Environmental Justice, and development of the Noxious Weed Management Plan. Support needed from the design team includes:

1. Provide design graphics and design details to support the reevaluation.
2. Coordinate with CDOT Region 4 to include mitigation measures detailed in the EIS, ROD, and Reevaluation in the design and specifications.
3. Provide History and Archeological Resources support for the reevaluation.
    a. The North I-25 Project Programmatic Agreement among the FHWA, the Colorado State Historic Preservation Officer, and the CDOT was signed and executed in December 2011 and amended in 2022. The Programmatic Agreement set forth a process by which CDOT, on behalf of FHWA where applicable, will reevaluate effects to existing and new cultural resources as construction projects are funded and designs are refined.
    b. Support needed to provide expertise to address a new evaluation by conducting a field survey of the North I25 APE for historic resources. Determine whether new or existing historic properties (Olson Farms) require new determinations of eligibility and reevaluate determinations of effect to NRHP-eligible or listed properties if eligibility or impacts are different from what was described in the North I-25 EIS and ROD1 and concurred upon by the SHPO. Prepare an historic technical report outlining project components, historic context, and determinations of eligibility and project effects as well as a SHPO letter for CDOT consultation with SHPO and consulting parties on findings of Section 106 eligibility and effects. Prepare any Section 4(f) documentation as

well as OAHP Form 1421 for submission of the historic technical report. Work with the CDOT Region 4 Historian to obtain any necessary approvals.

c. Conduct an intensive pedestrian survey for archaeological resources within the APE. Prepare an archeological report outlining survey results, potential impacts, both direct and indirect, to archeological resources and recommend mitigation strategies to avoid, minimize, or mitigate impacts. Prepare correspondence as necessary for the CDOT Staff Archeologist to submit to the SHPO.

4. Conduct noxious weed surveys to support documentation needed for CDOT to develop the Noxious Weed Management Plan. Surveys should be conducted consistent with the Department of Agricultural data standards. Surveys should document the following:
   a. Document locations of observed invasive, non-native plant species recorded with a Global Positioning System (GPS) unit (Trimble GeoXH mapping-grade GPS)
   b. Map the gross area of the infestation with a polygon that encompasses all the infested areas at a given location. If just a few plants are present, use either a point or lines to represent the infested area. Documenting the location and population size of the species is required
   c. Provide photo points for reference
5. Air Quality, provide expertise to address the short-term impacts associated with mobile construction equipment for this Project, pursuant to CRS 43-1-128, Parts 4(a), 4(b), and 4(c), that requires CDOT monitor criteria pollutant emissions. The monitoring requires capturing a baseline of pollutant emissions before construction, monitoring PM emissions during construction, and creating a plan to publicly report PM concentrations and mitigate air quality impacts on communities adjacent to the project.
6. The Colorado Discharge Permit System General Permit (CDPS) for Stormwater Discharges Associated with Construction Activities (CDPS-SCP) requires the development and implementation of a SWMP to maintain and protect water quality conditions from their stormwater discharges. Consultant to develop the Stormwater Management Plans and aesthetic plans, as required.
7. Consultant to provide Permanent Water Quality (PWQ) Pond expertise, PWQ design, and PWQ plans in accordance with the latest laws, regulations, and practices. The northern portion of the project is within CDOT's MS4, WCR 40 north to CO 56. Coordination with CDOT Region 4 on the PWQ treatment permit requirements and applicability within designated MS4 areas is required. Prepare and submit a PWQ report to CDOT Region 4 at FIR (30-percent level) Plan Package. The PWQ report shall include the following:
   a. All assumptions, circumstances influencing design, applicable design standards and/or requirements, and design criteria-related decisions
   b. Design decisions based on sound engineering principles and associated documentation
   c. All related references, including maps, figures, and plans, provided in an appendix to the reports
   d. Documentation of tributary flows from areas outside of each defined construction segment

e. An exhibit showing the construction work in relation to the MS4 boundary area
f. A table with seven column headings, which shall be: Basin, Color, Basin ID, Type of PSQF used to Treat Area, Required Impervious Area to be Treated, Increased Impervious Area Treated, and Comments; at the bottom of the table, sum the columns for Required Impervious Area to be Treated and Increased Impervious Area Treated.

3.2. GEOTECHNICAL INVESTIGATION

1. Incorporate geotechnical mitigation requirements from the EIS into project design and recommendations.
2. The elements of the work shall include recommendations for Pavement Design set forth in the latest CDOT Pavement Design Manual including a life cycle cost analysis, pavement analysis, and recommendation.
3. Other recommendations to include foundations, retaining walls, culverts, and embankments.
4. The consultant shall follow the guidelines set forth in the latest CDOT Geotechnical Design Manual for the preparation of the Geotechnical Investigation Report. Including, but not limited to:
   a. Standards for CDOT Geotechnical Worktable 2-1
   b. Accepted Geotechnical Software for CDOT Projects Table 2-2
   c. A full literature review
   d. Field Reconnaissance
   e. Minimum Requirements for Subsurface Explorations Table 3-2 for:
      i. Pavement Design
      ii. Foundations
      iii. Retaining Walls
      iv. Culverts
      v. Landslide Evaluation
      vi. Cut Slopes
      vii. Embankments
      viii. Topsoil for revegetation
      ix. PWQ infiltration areas
   f. Follow the prescribed methods for subsurface exploration.
5. Refer to the latest CDOT Bridge Design Manual for other requirements and requirements for geology sheets.
6. Provide information on site conditions, subsurface conditions, groundwater, and geochemical properties with recommendations for spread footings foundations, drilled shafts, driven piles, and different wall types such as mechanically stabilized earth, typical cantilevered, soil nail/shotcrete, and other types as required by the Structural Engineer. Exploratory information, such as classifications, moisture, density, resistance values, pH, sulfides, and strength parameters through soil sampling and borings.
7. The Geotechnical Report shall include bore logs, summary of laboratory testing, retaining wall foundation recommendations, shallow foundation recommendations, deep foundation recommendations, global stability analysis, heave/settlement, construction recommendations, lateral resistance values. Coordinate with the Designer for any potential other needs prior to starting work. The report will include Engineering Geology sheets indicating location of borings.

8. Borings are anticipated to be advanced into competent bedrock through cobbles and boulders. Soil and bedrock samples will be collected by in-situ testing and sampling methods outlined in Section 3.6 of the CDOT Geotechnical Design Manual. Selected soil samples will be tested to determine classifications, moisture, density, resistance values, pH, sulfides, and strength parameters. All work shall be conducted per current health and safety requirements including OSHA and CDPHE guidelines regarding worker safety, monitoring, containerizing, labeling, and disposing of soil and water from field investigations.
9. Review geotechnical hazard maps provided as part of the EIS and provide appropriate recommendations as needed in collaboration with the CDOT Geohazards Program.
10. The report shall identify geotechnical hazards in the vicinity of the project and shall determine if these features will be impacted by construction. In the event disturbance is anticipated due to construction, mitigation to reduce the risks of disturbance to the sensitive area shall be recommended.
11. Identification of geotechnical issues and concerns associated with locations.
12. Provide a draft report for CDOT specialty unit and PM review prior to issuing the final stamped version. Final engineer stamped versions are required.
13. Provide for the minimum FHWA and CDOT required number of borings/test holes per wall, bridge, poles, or other features as required. Alternate field collection methods such as geophysics and cone penetration testing can be used in place of borings at CDOT's approval.
14. A pavement type analysis memo for reconstructed pavement tie-ins

3.3. HIGHWAY DESIGN, SAFETY, AND TRAFFIC ENGINEERING

1. Provide geometric highway design and traffic engineering expertise for the Project Scope Elements.
2. The Consultant shall follow the latest version of the CDOT Roadway Design Guide, AASHTO A Policy on Geometric Design of Highway and Streets 2018, and the MUTCD.
3. Provide for Traffic and Safety Engineering recommendations.
4. A preliminary alignment has been designed for the proposed improvements, which has been provided for reference. The Consultant shall confirm or modify the alignment to provide the most cost effective and safest layout that still meets the Project Goals. The safety revision and optimization effort shall be documented in a final memo.
5. Provide traffic engineering expertise for crash reduction evaluation.
6. Provide detailed site grading expertise for the identifications of walls and conforming the roadway to the adjacent landscape. Coordinate efforts with the geotechnical, structural, and other areas of expertise as required to complete the Project.
7. Provide a Traffic Engineering plan for management of traffic during construction for phasing purposes. Evaluate the current Region 4 Lane Closure Strategy and make recommendations for implementation on the Project.
8. Coordinate with Structural Engineer for Structure Selection Report requirements.
9. Provide recommendations for and layout of ITS, lighting, and overhead signing components.

3.4. HYDRAULICS/HYDROLOGY

1. The Consultant shall adhere to guidelines in CDOT's Drainage Design Manual and applicable Procedural Directives for drainage and Bridge design work.
2. Prepare Hydrology and Hydraulic Design Reports and hydrology/hydraulic analysis. Follow the CDOT Drainage Design Manual and refer to chapter 10, Bridges.
    a. The following sections should be close to final at FIR Design: Introduction, Hydrology, Existing Structures and Design Discussion. Discussion should include CDOT and local criteria the project intends to meet.
    b. All design assumptions and related design decisions shall be documented.
    c. The Appendix shall contain:
        i. Hydrology/hydraulic worksheets
        ii. Drainage construction plan sheets.
        iii. Water Quality report and PWQ worksheets
    d. Perform internal QA/QC on all hydrologic, hydraulic and floodplain information prior to submittal to CDOT
3. Data Collection and Hydrology:
    a. Determine the watershed hydrology and establish waterway flows, waterway geometrics
    b. Utilize historical data: research flood history and previous designs in the project proximity; obtain data from other sources (e.g., MHFD, CWCB, CDOT Maintenance, and residents).
    c. Complete project site visit(s) to evaluate channel/overbank roughness coefficients, channel stability, vegetation, Ordinary High Water, allowable high water, etc. Document the site visit(s) with photos
    d. Perform a risk analysis
4. Hydraulics Design Activities:
    a. Complete Preliminary Design of major drainage structures:
        i. Complete hydraulic analysis and water surface profiles.
        ii. Determine required hydraulic size/skew of major structures/channels.
        iii. Locate and place the bridge crossings. Coordinate with CDOT Region 4 for input on the alternative evaluation to come to a consensus on the recommended plan.
        iv. Determine minimum low chord elevation per CDOT criteria.
        v. Determine 100-yr and 500-year water surface elevations.
        vi. Determine scour for design storm, the 500-year event, incipient overtopping condition, and maximum scour-inducing storm (if applicable).
        vii. Assess channel erosion protection for structures.
        viii. Present designs of any necessary deck drainage or other drainage off the structure.
    b. Review data and information developed under the preliminary hydraulic investigation and update per FIR decisions
    c. Complete Final Design for major drainage structures.
        i. Finalize hydraulic analysis, elevations, flow lines, water surface profiles and hydraulic information.
        ii. Finalize configuration, size and skew of major structures and channels.

iii. Coordinate final water surface profiles and final low girder elevation for selected structures.
iv. Finalize channel scour profiles for design year and 500-year scour for selected structures.
v. Finalize channel erosion protection limits and mitigation measures for selected structures and provide appropriate details.
vi. Finalize deck/structure drainage in coordination with CDOT Staff Bridge or their designee.
vii. Complete final design for all drainage details required for major drainage structures.

d. Recommend culvert pipe sizes, type, shape and material for proposed construction detours.
e. Identify erosion and sedimentation problems with solutions in place, including but not limited to erosion and scour countermeasure designs, analyses, and reports.
f. Conduct 2-D modeling
g. Design revetment(s) if required
h. Provide additional information as required by Region 4 Hydraulics Engineer
i. Provide preliminary design information, as noted above, for the FIR meeting

5. Provide required plans per the CDOT Drainage Design Manual as well appropriate project specifications, including
   a. Drainage Notes
   b. Drainage Tabulation Sheets
   c. Drainage Plan Sheets
   d. Drainage Profile Sheets
   e. Drainage Detail Sheets
   f. Bridge Hydraulic Information Sheets
   g. Floodplain Information Sheet (as described below)
   h. Provide digital linework from all drainage and floodplain analysis in GIS Shapefiles, AutoCAD/Civil3D drawings, or MicroStation/InRoads drawings. All CAD or MicroStation drawings must be compressed into a single drawing. All surfaces (DTMs, TINs, Rasters, etc.) must be separated and labeled clearly for archiving and rediscovery
6. Coordination between Hydraulics, Geotechnical and Bridge Engineer will be required for FIR/DOR/FOR submittal timing
7. Floodplain Assessment
   a. Identify location of regulatory floodplains and floodways published by FEMA and local agencies, and planned changes to those boundaries for Bridge Replacements
   b. Prepare a local floodplain development permit for all work in floodplains and floodways, as required by state and federal law.
   c. Determine level of FEMA/CWCB coordination for a LOMR or LOMC, if required
8. Prepare a Floodplain Information Sheet for the final approved plan set.
   a. Show and clearly label the current effective 100-yr floodplain and floodway boundaries, and the 500-year floodplain.
   b. Show and clearly label all cross sections and Base Flood Elevation (BFE) lines published on the current effective FIRM (note; all elevations must be

reported in the same vertical datum identified on the current effective FIRM).

c. Show and clearly label any fluvial hazards, buffer zones or erosion management zones.
d. Show the limits of disturbance for all permanent and temporary activities, and label as such.
e. Add notes to indicate the waterway name, jurisdiction and community number, panel number, date of current effective information, a sentence describing which local code requires permits, a sentence for permitting and no rise compliance, and a note recognizing that flooding may occur outside the SFHA.

3.5. STRUCTURAL ENGINEERING

1. The Consultant shall provide Structural Engineering services for the design and construction of walls, bridges, and other structural items as required including structure selection reports, wall selection reports and plan sheets. Provide cost effective innovation in collaboration with the construction manager and coordinate with the CDOT PM and CM for alternative selection. Collaboration with the aesthetic and landscaping requirements is to be expected.
2. The Consultant shall follow the latest CDOT Bridge Design Manual Policies and Procedures.
3. The Consultant shall follow the latest Bridge and Tunnel Enterprise (BTE) Guidelines for service life for applicable structures.
4. The Consultant shall provide a bridge-specific preventative maintenance plan or “Owner’s Manual”, which identifies the recommended type, timing, and cost of future preventative maintenance treatments in accordance with BTE Guidelines.
5. Due to the size of this project, recurring monthly meetings with a Staff Bridge representative prior to each milestone will be required for all FIR, DOR and FOR meetings.
6. The preliminary design for major and minor structures, walls, and other miscellaneous structures within CDOT ROW shall be conducted as required to ensure that CDOT obtains a structure layout and type selection that achieves the project’s objectives and minimizes revisions during the final design and construction phases.
7. The Structure Selection Report is due by DOR or 60% design if there is no formal DOR.
8. Coordinate required recommendations with the geotechnical engineer.
9. The general scope of work includes, but is not limited to:
    a. Bridge Replacement
    b. Wall Design
    c. Overhead sign Structures
    d. Poles
    e. Fence
    f. Any additional major/minor structures
10. Participate in the survey SOW needs.
11. Provide cost-effective innovation and alternative selection
12. Participation in CM constructability, innovation, materials, and phased construction ideas to provide a best-value solution.

3.6. SURVEY & ROW

1. A LiDAR survey has been obtained for the existing pavement, as well as a complete general terrain survey compiled with conventional techniques. Additional detail may be needed or desired around structures or other improvement locations. The Consultant shall review the existing information and recommend areas that may need additional detail. Any additional survey efforts must be approved by the CDOT PM.
2. The Consultant is to provide complete ROW Plan development services for any property acquisition. Prepare legal descriptions for any private property acquisitions. It is the intent of this SOW to follow the guidelines of the latest version of the CDOT Survey Manual. The manual defines the minimum specifications that shall be followed while performing surveys in order to secure an optimum degree of statewide uniformity in surveying, and to establish and maintain survey standards. It is a reference source for statewide surveying policies, procedures and information required to complete this SOW.
3. Verify existing CDOT Control. Additional control may need to be added to the existing CDOT Control.
4. The surveyor shall coordinate and provide all other needs, such as surveying wetland flags, geotechnical borings or other field delineated areas by others to complete this SOW.
5. If existing SUE plans must be supplemented, the surveyor shall obtain utility locates and field survey markings. Field survey the top of utilities at locations that are potholed. Coordinate with a pothole company for timing of survey.
6. The consultant shall complete CDOT PM Form 1217 to determine the precise survey limits.
7. Attend Pre-Survey Conference.
8. Prepare and obtain “Permission to Enter Property” forms for the purpose of surveying within private ownership parcels.
9. Acquire a Special Use Permit from CDOT to survey within the right-of-way and travel lanes. This process includes the preparation of a traffic control plan, Method of Handling Traffic (MHT), which conforms to the Manual on Uniform Traffic Control Devices (MUTCD) and CDOT M&S Standards and Policies and a certificate of insurance naming the Colorado Department of Transportation as additionally insured. Submit the MHT to the CDOT PM and for Special Use Permit. If the surveyor already has a standing Special Use Permit with the State, still submit the MHT to the CDOT PM for review. The Consultant PE shall be the Engineer in Responsible Charge of the MHT.
10. Land Survey/Boundary Survey will include tying aliquot, property, and other land monuments to the control survey. Prepare a combination Project Control / Land Survey Control Diagram showing graphical representation of the found aliquot, property and land monuments and their relationship to the project control. Tabulation of the coordinates and physical description of the found monuments and other physical evidence will be included.
11. Determine Existing Right of Way
12. Prepare TMOSS Topographic survey of designated areas
    a. Wetlands will be marked by Environmental Consultant and coordinated with the survey crew in the field on site. Flagged wetlands shall be surveyed.
    b. Designate and locate the Ordinary (visible) High Water Mark of waterways

c. If existing SUE plans must be supplemented, provide utility locates for design purposes and survey located underground and above ground utilities. Provide coordination with local utility companies. Provide inverts of manholes as is best reasonably possible.
d. Provide potholing for establishment of utility profiles and survey locations and depths to utilities.
e. Survey all inverts of the storm sewer system and measure culvert size. Survey inverts/rims of all storm sewer inlets and manholes. Make note of pipe direction and sizes as they enter and exit the storm sewer system.
f. Coordinate with CDOT Hydraulic Engineer for cross sections, bathymetry and flow lines of the rivers. Locate existing bridge limits, bridge high chords and low girders. Accomplish existing drainage site surveys for designated median ditches and bridges in accordance with the Drainage Design Manual. Confirm sufficiency of existing topographic survey of the waterway, overbanks, and floodplain areas upstream and downstream to limits determined by the Region Hydraulic Engineer or his/her designee. Incorporate statewide LiDAR data from State of Colorado resources whenever available at https://coloradohazardmapping.com/lidarDownload
g. Provide a DGN file of the existing Right of Way Model.
h. Locate Geotechnical Borings.

13. Obtain Title Commitments for any private properties from which ROW or easements may be required.
14. Provide Survey Report
15. Prepare right-of-way plans in CDOT format for impacted private properties based on title commitments. Attend a right-of-way plan review meeting (ROWPR) with the appropriate staff personnel from CDOT and finalize the right-of-way plans and legal descriptions for CDOT authorization.
16. Stake the proposed parcels and easements for appraisal purposes. A one-time staking effort may be assumed.
17. Once the proposed parcels have been acquired and CDOT has provided the recorded deeds, monument the new right-of-way lines within the project limits and deposit the final right-of-way plans in the Weld County Clerk and Recorder's office.
18. All Survey deliverables shall be submitted in MicroStation Open Roads (ORD) format.

3.7. RAILROAD

Coordinate the following activities through the CDOT Project Director as directed by the CDOT Railroad Coordinator and in accordance with Great Western Railway (GWR) and the Public Utility Commission (PUC)

1. Develop and package railroads submittals:
   a. 30% Plan including estimate of Flagging hours
   b. 60% Plan including all comments from Railroad, design plans and calculations, Geotechnical Report, Project Specifications and/or Special Provisions, Drainage Report and Plan and Construction Phasing
   c. Final Plans including all comments from Railroad, design plans and calculations, Geotechnical Report, Project Specifications and/or Special Provisions, Drainage Report and Plan and Construction Phasing
2. Define construction responsibilities between the railroad and highway including Temporary Access Exhibit for GWR to review and one round of comments.

3. Develop cost estimates
4. Prepare Public Utilities Commission application and associated exhibits as required for PUC Application, if applicable
5. Prepare Construction Maintenance Agreements (C&M) and exhibits as required for CDOT.
6. Prepare Utility License Agreements if needed

3.8. Intelligent Transportations Systems (ITS)

1. ITS components shall be designed such that they are fully integrated into the CDOT ITS Network.
2. The Consultant shall coordinate with the CTIO and CDOT ITS to determine the equipment and infrastructure needed for the Project Scope Elements.
3. The Consultant shall provide design plans for all required utility installations for all ITS components of the project.
4. Provide all required expertise for areas requiring lighting and electronic components.
5. Provide one-line diagrams as required for power sources.
6. As part of the scoping process, prepare an assessment of all the utility needs and all ITS and Network Services.

3.9. UTILITY COORDINATION

1. CDOT will may elect to manage the SUE under a separate contract or within this Consultant contract, before the time of contract execution, a determination will be made on SUE management. At a minimum, the Consultant will aid with:
2. Meeting with all utility providers and collect utility key maps for all utilities in the project area, identify all known utilities: including lighting, irrigation, ITS, storm sewer, ownership, type, size and special conditions should utility relocation be required, and research and obtain copies of utility easements (public and private) and utility franchise agreements to determine conditions under which the utility was established in its present location (e.g. by revocable permit or by a privately owned easement.
3. Coordinating or managing the SUE documentation according to latest SUE standards, various levels will be appropriate based on location, size, and type of work and utility
4. Obtaining utility locates and field survey markings. Field survey the top of utilities at locations that are potholed.
5. Identifying needed boring locations and coordinating investigation
6. Identifying, organizing, and supporting utility agreement
7. Providing 3D modeling that involves the use of CADD to depict the precise horizontal and vertical profile of each utility in areas of high conflict.

3.10. OTHER

- Stakeholder and Public Outreach Assistance
    - Stakeholder Coordination and Public Outreach; summarize conversations and needed agreements in Subject Background Assessment Recommendation (SBAR) letters
- Contract Management and Assistance
    - Intergovernmental Agreements and Memorandum of Understanding
    - Utility and Ditch agreements
    - Task Order management

- Invoices
- Survey (to date, a lidar survey has been obtained for the Project)
- Design Support During Construction, including responding to Request for Information submittals from the contractor
- Other Submittals, as needed

3.11. SUPPLEMENTAL WORK

Work on other investigations, coordination, and design tasks related to the project and as directed by the Project Director shall be limited to the available budget to complete them under the approved task orders. The Consultant shall not perform work out of scope without prior written approval from the Project Director. Per the contract, subconsultants and vendors may not go over task order or contract budget without proactively reallocating funds with approval.

SECTION 4 – GENERAL INFORMATION

4.1. NOTICE TO PROCEED

Work shall not commence until the written Notice-to-Proceed is issued by CDOT. Work may be required, night or day, and/or weekends, and/or holidays, and/or 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 time lost for:

- Reviews and Approvals
- Response and Direction

4.2. ROUTINE REPORTING AND BILLING

The Consultant shall provide the following on a routine basis:

1. Coordination - Coordination of all contract activities
2. Periodic Reports and Billings as required by CDOT Procedural Directive 400.2 (Monitoring Consultant Contracts) and must comply with the Consultant Invoicing Guidelines, including:
   a. Monthly drawdown schedules
   b. Form 1313
   c. Invoice with similar format to the original PCW
      i. Noting each employee, time worked, multiplier, Fee
      ii. Sum total hours worked and labor, subtotal fixed fees, subtotal sub-consultants, subtotal vendor under prime (sub consultants should note their own vendors on their invoices), provide invoice total, total billed to date and total amount left on TO for Prime, Sub and Vendor for ease of tracking
      iii. Provide columns next to employees ensuring Consultant has reviewed for:
         1. Employee on original TO
         2. Employee on MPA and date
         3. Employee added to TO by letter and date
         4. Employee added to MPA Date and documentation
      iv. Provide a header for the invoice noting SAP OL#, SAP PO#, Invoice Date, Invoice #, Project # and subaccount #, current billing period, TO# and any other pertinent information

d. Progress Report shall be submitted per the contract documents. The progress report shall also summarize all the work performed by the Prime, Sub Consultants and Vendors. Provide header as noted in 2c. Each item below requires a section in the Progress Report.
   i. Report on Progress of each work activity or milestone identified in the contract, to show the amount of work accomplished during the current month and the amount of work accomplished overall.
   ii. A report on the time scheduled for each work activity or milestone identified in the contract to show planned time completion and actual times used to do the work.
   iii. A description of the cause for delays beyond the planned completion of time of work activities or millstones contained in the project.
   iv. A report on the cost incurred to date on each work activity or milestone contained in the contract and a comparison to the cost estimates for such activity or milestone. Monthly billings will include a monthly budget forecast sheet showing invoicing from start estimated through completion tracking the project budget to verify the burn rate of prime, subs, and vendors to ensure they are on track and on task.
   v. If requested and/or needed, a description of possible remedies to get activities or milestones that are behind schedule, back on schedule, and to get activities or milestones that are exceeding cost estimates, back within planned costs.
   vi. Documentation of meetings that were held during the subject time period.
   vii. A report on the participation of DBE sub-consultants.
e. Letter(s) adding employee(s) to task order with all required information (should have been approved by CDOT PM prior to any work done by employee per HQ Contract/Agreement Unit-see Add Employee Process document)
f. Labor backup – Prime, Sub-consultants and Vendors shall submit detailed hourly back up of effort noting time/date of activities and number of hours or costs, usually in the form of timesheets. Lodging backup shall be submitted through ODC backup.
g. ODC backup
   i. Provide a summary of ODC Cover sheet including the purpose of trip, Date of Trip, Who went
   ii. Include mileage logs, per diem and/or meals documents (listing of days and rates or receipts for actuals), lodging receipts, receipt or documentation of other ODC items including vendor receipts/invoices.
h. Sub-consultant billings and Vendors - should have the same documentation as prime, except Form 1313, which is optional.

APPENDIX A: PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX

The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice are important to a successful project. Knowing and successfully implementing roles and responsibilities between the owner, designer, CM, and ICE is critical. The below table is a communication tool to use as a basis for discussion in alignment of project activities and responsible parties. These roles may change based on Proposers and entire team members' skills, experiences, and resources.

APPENDIX A: PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
INITIAL PROJECT SCOPING MEETING (WORKSHOP)			
A. CMGC AND PARTNERING INTRO SESSION	2	2	1
B. PROJECT SITE VISIT AND INSPECTION	2	2	1
C. PROJECT STATUS, GOALS, ELEMENTS, OBJECTIVES, DESIGN SCHEDULE REVIEW	C	C	C
D. IDENTIFY PROJECT RISKS AND DEVELOP INITIAL RISK MANAGEMENT PLAN AND RISK REGISTER	C	C	C
E. REVIEW APPLICABLE ENVIRONMENTAL DOCUMENTS (ROD, FONSI, ETC.)	2	2	1
F. AS-BUILT REVIEW	1	1	
G. DEVELOP PROJECT SCHEDULE AND TASKS	C	C	C
H. SCHEDULE BI-WEEKLY PROGRESS, FIR, FOR, AND MILESTONES MEETINGS	2	1	2
I. IDENTIFY DESIGN CRITERIA	2	1	2
J. DISCUSSION OF POSSIBLE EARLY DELIVERY AND LONG LEAD TIME ITEMS	1	2	2
K. ANALYSIS OF PROJECT PHASING AND MULTIPLE PS&E PACKAGES	1	2	2
L. DEVELOP DOCUMENT REVIEW AND NAMING CONVENTION STANDARDS	2	1	2
L. QUESTION AND ANSWER SESSION	2	2	1
PROGRESS MEETINGS			
A. CDOT/PM, C/PM, CMGC/PM	C	C	C
B. PROJECT MEETING MINUTES	2	1	2

The managers and team members 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:

- 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
  - 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 week of the meeting.

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
1. PROJECT DEVELOPMENT PROCESS			
Project Management	2	2	1
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			
Communication and Consensus Building	C	C	C
The CDOT/PM is responsible for the consensus building and facilitating 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.			
Weekly Update Newsletter	2	2	1
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 public, FHWA, CDOT management, and/or project team members.			
Maintain Updated Contact List	2	1	2
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.			
2. MEETINGS			
• **Graphics support and presentations**	2	1	1
Each project team member is responsible for the graphics, documents, reports, plans, specifications, and written reviews from each specific scope of work item. Presentation of these documents and their reviews will be available on the shared project server after the meeting has been adjourned.			
• **Provide Local Office**	1	2	2
The CDOT/PM will obtain and maintain an office within the project area to conduct small group meetings and provide displays/information to the public. This office may have workspaces for project team members, meeting rooms with graphics support and capacity for the entire team to attend. Additional offices or meeting spaces may be considered at the Project Workshop.			
• **PM Updates on Progress**	C	C	C
The CDOT/PM, CMGC/PM, and the C/PM will all update the team members at the scheduled meetings as to their progress on deliverables, challenges, and the feedback/comments they need.			
• **Project Discussion**	C	C	C
The team members need to come prepared to discuss all reservations, ideas, and challenges to the project. Open and honest dialogue is the key to the success of project delivery.			

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
2. PRELIMINARY DESIGN			
Preliminary Roadway, Geometric, Structural, Environmental, SWMP, etc. Design	2	1	2
CDOT/PM will coordinate all design activities with required CDOT specialty units, the Contractor, the Design Consultant, and other outside entities. Design Consultant is responsible for the civil and structural design, plans, specifications, and estimate packages at each formal review.			
• Environmental - gathering data, analysis, and mitigation development	2	2	1
• Environmental clearances		2	1
• ROW, specialty, and local clearances		2	1
• Hazardous material investigation		1	2
• CDOT processes (forms, clearances)			1
• Utility coordination	2	1	2
• Conduct field survey of project area.	C	C	C
• Field and project research	C	C	C
• Construction requirements	C	C	C
• Innovation development, proposal, and tracking	C	C	C
• Check and field verify all applicable as-built plans	1	1	
• Provide construction plans, specifications, and estimates	2	1	
Plot/develop all required information on the plans in accordance with all applicable CDOT policies and procedures and all industry standards for civil, electrical, ITS, and structural design.			
• Develop construction cost model for Engineer Estimator and ICE	1		
• Develop and calculate quantities	2	1	2
• Risk Register development	1	2	2
• Initiate and Track DBE/ESB and Subcontractor Plan	1		2
• Constructability reviews and reports	1	2	2

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
• Construction Phasing Plan	1	2	2
• Innovation and alternative design proposals	C	C	C
• Cost savings reviews	1	2	2
• Preliminary construction schedule	1	2	2
• Long lead time CAP submissions and proposals	1	2	2
• Long lead time negotiations	1		2
• Long lead time item procurement	1		
• Opinion of probable construction cost Estimate #2	1	2	
30% milestone FIR (Field Inspection Review) Preparation			
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.		1	
The 30% milestone plans and specifications shall comply with CDOT requirements and shall include: title sheet, typical sections, general notes, plan/profile sheets, and preliminary		1	2
The plans shall be submitted to the CDOT/PM and the CMGC/PM for preliminary review at least one week prior to the FIR (30% milestone)		1	
Prepare the Engineer's Estimate for work described in the 30% milestone plans based on estimate quantities.	1	2	
Prepare the 30% preconstruction milestone		1	
CDOT Form 1048 – Project Scoping Procedures Completion		2	1
Field Inspection Review Meeting			
Review 30% milestone PS&E package and provide written reviews, comments, and redlines.	1	2	1
Attend the FIR.	C	C	C
Provide post-FIR revisions and memos.	2	1	2
Provide a list of all deviations from the standard design criteria and written justification for each.		1	2
Update DBE/ESB and Subcontractor Plan.	1		2
Update Risk Register and Cost Model.	1	C	C

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
Final Roadway, Geometric, Structural, Environmental, SWMP, etc. Design		1	
CDOT/PM will coordinate all design activities with required CDOT specialty units, the Contractor, the Design Consultant, and other outside entities. Design Consultant is responsible for the civil and structural design, plans, specifications, and estimate packages at each formal review.			
• Environmental - gathering data, analysis, and mitigation development		2	1
• Final environmental clearances			1
• Final environmental permits		2	1
• ROW, specialty, and local clearances		2	1
• FIPI justification for sole sourcing		1	2
• Final utility coordination		1	2
• Develop and calculate final quantities	2	1	
• CDOT processes (forms, clearances)		2	1
• Update Risk Register, formal risk assessment meeting	1	2	2
• Constructability reviews and reports	1	2	
• Construction Phasing Plan	1	2	
• Value Engineering proposals	1	2	2
• Final construction requirements		1	2
• Innovation development, proposal, and tracking	1	2	2
• Cost Savings reviews	1	2	2
• 90% preconstruction milestone/Final Office Review (FOR) Construction Schedule	1	2	2
• Long lead time CAP submissions and proposals	1	2	
• Long lead time negotiations	1		2
• Long lead time item procurement	1		
• Opinion of Probable Construction Cost Estimate #2	1	2	
• Provide 90% preconstruction milestone construction plans, specifications, and estimates		1	2
• Develop and calculate final quantities	2	1	

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
90% Milestone/FOR (Final Office Review) Preparation			
Coordinate, complete, and compile the 90% milestone plans with inputs from other branches: materials, hydraulics, environmental, traffic, right of way, maintenance, safety, and Staff Bridge if applicable.		1	
The 90% milestone plans and specifications shall comply with CDOT requirements and shall include: title sheet, typical sections, general notes, plan/profile sheets, and preliminary layouts.		1	2
The plans shall be submitted to the CDOT/PM and the CMGC/PM for preliminary review at least one week prior to the 90% milestone.		1	2
The 90% milestone plans will be reproduced electronically by CDOT		2	1
Prepare the Engineer's Estimate for work described in the FOR plans based on estimate quantities.	1	1	2
Prepare the 90% preconstruction milestone	1	1	2
90% milestone/FOR (Final Office Review) Meeting			
Review 90% milestone PS&E package and provide written reviews, comments, and redlines.	1		1
Attend the 90% milestone meeting.	C	C	C
Post-90% milestone revisions and memo		1	2
Provide a list of all deviations from the standard design criteria and written justification for each.		1	2
Provide a 90% milestone Construction Plan.	1	2	
Obtain final environmental and access permits.		2	1
Finalize construction cost model for Engineer Estimator and ICE.	1	2	2
Update DBE/ESB and Subcontractor Plan.	1		2
Update Risk Register.	1	2	

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PRECONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX - CONTINUED

CONSTRUCTION MANAGEMENT SERVICES	CONTRACTOR	*DESIGNER*	*CDOT/ OTHERS*
PHASE: PRE-CONSTRUCTION			
CAP Proposal and Negotiations	1		
Notify CDOT/PM at a point where CAP proposals can be sufficiently prepared.	1		
Supply cost model and assumptions to ICE and Engineer Estimate.			1
Supply EBS and Construction Contract Checklist to CMGC Contractor.	1		
Prepare and submit construction CAP proposals.			1
Procure independent cost estimate.	1		
Submit an electronic EBS to the CDOT/PM for each phase.			1
Review the construction CAP proposals and compare them to Engineer's Estimate and ICE.	2		1
Negotiate final CAPs for each phase.	1		1
CMGC and CDOT have three attempts to negotiate assumptions and prepare CAP estimates. After the third opening, CDOT reserves the right to prepare the bid package for advertisement.			

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APPENDIX B: CONCEPTUAL DESIGN

APPENDIX C: OTHER PROJECT INFORMATION