Region 3

Program Engineering East

Project Specific Contract

Scope of Work

Context Sensitive Solutions, Environmental and Design Services

21685 I-70 West Vail Pass Auxiliary Lanes

Estimated NTP: July 2020

Project: NHPP 0701-240

Subaccount #: 21685

SOW Date: June 17, 2020

CDOT Contract Administrator for Task Orders:
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Project Manager
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Contract Type: Cost Plus Fixed Fee

The complete scope of work includes this document (attached to the Contract for Consultant Services)

Contents

Project Specific Information

1. Project Background
   CDOT started the I-70 Corridor PEIS in 1999. The ROD was signed in 2011. The ROD identified auxiliary lanes and curve smoothing on I-70 Vail Pass MP 180-190 as part of the preferred alternative. The EA for the Vail Pass Auxiliary Lanes was started in October of 2016 and the FONSI is anticipated in November of 2020. The PEIS identified commitments that that State is to adhere to, including the CSS process. The EA was coordinated with an extensive stakeholder driven CSS process for collaborative decision making. The EA has identified commitments and specific mitigation measures that must be implemented as part of the design and construction on Vail Pass. The EA is a NEPA Tier II decision document.

   This project proposes to design some of the features identified in the EA to meet the purpose and need as well as implement the CSS process. The scope of the project will vary depending upon available funding. It is not anticipated that the entire EA will be designed as part of this Contract, but a smaller portion thereof, of the Proposed Action.

2. Project Limits
   a. The project limits are between MP 179.5-191.5 I-70 in Eagle and Summit Counties.

3. Project Funding
   The current available funding defined for the design and construction of the project is approximately $140.4M

4. Planned Improvements
   The planned improvements will include:
   a. $140.4M INFRA Grant Planned Improvements:
      i. Wildlife Fencing between MP 185-190
      ii. Widened Outside Shoulders throughout the corridor
      iii. Signage Improvements (ITS items) throughout the corridor
      iv. Variable Speed Limit Signs throughout the corridor
      v. Highway Closure System (Signs and utility work)
      vi. Eastbound Auxiliary Lane MP 184.8-190
         1. Recreation Trail Relocation for approximately two miles from MP 185 to MP 187 (including two bridges)
         2. Wildlife Underpasses (two larger and 4 small/medium)
      vii. Westbound Curve Modifications #1 MP 185.6-186.5
      viii. Westbound Curve Modifications #2 MP 187.3-188.9
      ix. Anti-Icing system on F-11-AM
      x. Lower Truck Ramp Reconstruction Westbound MP 182.0
      xi. Bridge Enterprise Structure Replacement F-12-AS
   b. The Full Project Proposed Action includes: *(This section is included for information only as design of this full scope is not included in this Scope of Work)* A smaller scope of work can be derived from these items, funding dependent.
      i. The Proposed Action Alternative will add a 12-foot auxiliary lane, both EB and WB, for 10 miles from approximately the EB I-70 on-ramp in East Vail (MP 180) to the WB off-ramp at the Vail Pass Rest Area exit (MP 190). Existing lanes will

be maintained at 12 feet and the shoulders would be widened to a minimum of 6 feet for inside shoulders and maintained at 10 feet for outside shoulders. All existing curves will be modified as needed to meet current federal design standards. Intelligent Transportation System (ITS) equipment will also be installed along the I-70 project corridor, consistent with recent study recommendations. Additional variable message signs (VMSs) will be installed at key locations to warn drivers of upcoming curves, grades, and incidents. Additional variable speed limit signs will be installed to manage driver speeds to conditions. Automated lane closure signage will be installed approaching the East Vail exit on EB I-70 and approaching the WB I-70 Vail Pass Rest Area exit to quickly and efficiently close lanes when needed.

ii. Additional elements of the Proposed Action include:
    1. The Vail Pass Recreation Trail will be directly impacted by the addition of the I-70 auxiliary lane and therefore relocated for approximately two miles from MP 185 to MP 187.
    2. Existing emergency truck ramps, located at approximately MP 182.2 and 185.5, will be upgraded to current design standards.
    3. Six wildlife underpasses between MP 186-190 and wildlife fencing throughout the corridor.
    4. Additional capacity will be added to the existing commercial truck parking area at the top of Vail Pass.
    5. Widened shoulders (minimum of eight feet of additional width beyond the 10' shoulder) at multiple locations to accommodate emergency pull-offs, emergency truck parking, and staging for tow trucks.
    6. Improved median emergency turnaround locations to accommodate emergency and maintenance turnaround maneuvers.
    7. Improved chain station located at approximately MP 182.5 with additional parking, signage, lighting, and separation from the I-70 mainline.
    8. Avalanche protection located at approximately MP 186.

5. Project Goals

The purpose of the West Vail Pass Auxiliary Lanes Project is to improve safety and operations on Eastbound (EB) and Westbound (WB) I-70 on West Vail Pass. This Project is needed to address safety concerns and operational issues due to geometric conditions (steep grades and tight curves) and slow-moving vehicle and passenger vehicle interactions that result in inconsistent and slow travel times along the corridor. The project has the following goals:

a. Safety – Improve and maintain a safe travel corridor by minimizing crashes and mitigating other safety concerns.
b. Operations – Address roadway operations to improve travel reliability for all road users with a modern highway system.
c. Corridor Character & Aesthetics – Maintain the surrounding wilderness and visual and historic resources of the project corridor and minimize impacts to nearby residents and businesses
d. Enhanced Environment – Minimize impacts to environmental resources and identify opportunities to enhance the high-quality natural environment of the corridor
e. Recreation – Provide access for all residents and visitors to recreational opportunities.
f. Collaborative Decision Making – Uphold commitments from the I-70 Mountain Corridor Record of Decision and utilize partnerships with stakeholders to reach decisions

g. Implementability – Identify a preferred alternative that can be funded and constructed in phases.
h. Sustainability – Implement a solution that is effective to maintain and will meet the needs now and into the future.

6. Work Duration

The time period for this work described in this scope is estimated to begin June 17, 2020 and end October 1, 2025. The goals for completion of contract documents for construction vary based on the resolution of funding. As part of the INFRA application, CDOT has committed to construction between 2021-2024. The 3 unique CSS processes defined above in (3)(e) Planned Improvements must be completed prior to construction of any portion of road widening.

7. Multiple Packages
    a. As part of the INFRA grant application, the State has committed to three construction package milestones.
        i. Obligation/encumbrance of construction funds, no set dollar amount, by May 2021
        ii. Obligation/encumbrance of all of the INFRA Federal funds amount of $60.7M by May 2022.
        iii. Full obligation/encumbrance of ALL project funds by the end of calendar year 2022.

    The obligation/encumbrance of funds is defined as when the FHWA 1180 process has been completed. The process shall be anticipated to take up to 10 days. To start the 1180 process, all CDOT clearances, the final PS&E contract documents and the final engineer's estimate shall be completed for each package.

8. Collaboration
    a. This project will be delivered via Construction Management/General Contractor (CM/GC) procurement. The consultant will need to work in conjunction with the contractor to collaborate on innovation and constructability throughout the duration of the project, as well as follow the CM/GC process.

9. Consultant Responsibility
    a. All work shall be in accordance with CDOT's manuals, directives and generally accepted practices. All work shall follow the I-70 Mountain Corridor CSS process. The team shall work closely with CDOT's Project Manager. The Consultant shall supply Engineer signed and sealed reports and plans. The consultant shall implement the mitigation measures required as part of the I-70 West Vail Pass Auxiliary Lanes Environmental Assessment (EA).
    b. The consultant will develop an all-encompassing scope of the project and prepare a written recommendation of activities that coincide with the projects costs, goals and planned improvements.
    c. The Consultant is responsible for developing a complete (Plans, Specification and Cost estimate) package for advertisement (or CAP) of the planned improvements. The work will include (but not be limited to) the design of roadway and interchange improvements as well as structural and retaining wall design.
10. Personnel Qualifications
    a. The Consultant PM must be approved by the CDOT Contract Administrator.

b. 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 and testers.
c. All tasks assigned to the Consultant must be conducted by a qualified person on the Consultant team. The qualified person is a professional with the necessary education, certifications (including registrations and licenses), skills, experience, qualities, or attributes to complete a particular task.
d. 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:
    i. AC – Acoustical engineering
    ii. AR – Architecture
    iii. BR – Bridge Design
    iv. BI – Bridge Inspection
    v. CE – Civil Engineering
    vi. EL – Electrical Engineering
    vii. EN – Environmental Engineering
    viii. GE – Geotechnical Engineering
    ix. GL - Geological Engineering
    x. HD – Highway & Street Design
    xi. HY – Hydraulics
    xii. LA – Landscape Architecture
    xiii. MA – Management (Contract Admin)
    xiv. ME – Mechanical Engineering
    xv. MT - Materials Testing
    xvi. SA – Sanitary Engineering
    xvii. SE – Structural Engineering
    xviii. SO – Soils Engineering
    xix. SU – Surveying
    xx. TP – Transportation Engineering
    xxi. TR – Traffic Engineering
    xxii. VE – Value Engineering

11. Computer Software Information
    a. Earthwork - OpenRoads Designer – Bentley Systems
    b. Drafting/CADD - OpenRoads Designer – Bentley Systems with CDOT's formatting configurations and standards.
    c. Survey/photogrammetry - CDOT TMOSS, OpenRoads Designer – Bentley Systems, allowable systems in the CDOT Survey Manual
    d. Bridge - CDOT Staff Bridge software shall be used in either design or design check, refer to the CDOT Bridge Design Manual
    e. Estimating - Transport (an AASHTO sponsored software) as used by CDOT
    f. Specifications - Microsoft Word
    g. Scheduling - Microsoft Project
    h. 3D graphic imaging - As approved
12. Project Coordination
    a. The consultant will be required to provide primary coordination with the CDOT PM and specialty units as approved.

b. There is an extensive list of stakeholders for this project for each PLT, TT and ITF as well as local agencies that are interested in the project. This list will be supplied under separate cover.

13. Supplemental work
    a. Work on other investigations, coordination and design tasks as related to the project and as directed by the PM shall be limited to the available budget to complete them under the approved task order. The consultant shall not perform work out of scope without prior written approval from the PM. Per the contact, subconsultants and vendors may not go over task order or contract budget.
14. The following work products include all reports, studies, field investigations, and professionally engineered design of the following. The State shall retain all work products and backup materials, both in-progress or completed.
    a. Project Management
    b. Construction Plans, Preliminary Engineering Effort
    c. Landscaping Plans
    d. CSS Stakeholder Effort
    e. West Vail Pass SCAP (ITF)
    f. Aesthetic Guidance ITF
    g. CSS Design Criteria ITF
    h. ALIVE ITF Effort
    i. Recreation Path ITF Effort
    j. Public Meetings and Flyers
    k. Survey
    l. Wetlands/404
    m. Geotechnical Investigation
    n. FHWA Value Engineering Requirements
    o. Structural Engineering
    p. Highway Design and Traffic/Safety Engineering
    q. Hydraulics and Hydrology
    r. Environmental Compliance and EA Reevaluation
    s. ITS Components
    t. Utilities
    u. FHWA Controlling Criteria Variances
    v. Work Activity Assignments
    w. Submittals
    x. Invoice Formatting and Information
15. Additional Information
    a. I-70 West Vail Pass Auxiliary Lanes EA (Not yet available)
    b. Documentation of ongoing CSS Stakeholder Process on CDOT website for the 21685 I-70 W. Vail Pass Auxiliary Lanes Project
16. Existing Features
    a. 180.798 F-11-AW I-70 EB over Hillside
    b. 180.799 F-11-AX I-70 WB over Hillside
    c. 181.838 F-11-AU I-70 EB over Gore Creek and Frontage Road
    d. 181.839 F-11-AV I-70 WB over Gore Creek and Frontage Road
    e. 182.451 F-11-AS I-70 EB Black Gore Creek
    f. 182.452 F-11-AT I-70 WB Black Gore Creek
    g. 183.053 F-11-AQ I-70 EB Game Underpass

h. 183.054 F-11-AR I-70 WB Game Underpass
i. 183.808 F-11-AO I-70 EB Timber Creek
j. 183.809 F-11-AP I-70 WB Timber Creek
k. 184.431 F-11-AM I-70 EB Black Gore Creek
l. 184.432 F-11-AN I-70 WB Black Gore Creek
m. 184.927 F-11-AK I-70 EB Miller Creek
n. 184.928 F-11-AL I-70 WB Miller Creek
o. 185.291 F-12-AS I-70 EB Polk Creek
p. 185.292 F-12-AT I-70 WB Polk Creek
q. 190.095 F-12-AJ Over I-70 Shrine Pass Road
r. There are a significant number of cross culverts and various VMS signs.
s. CBC
t. Utilities:
    i. Fiber Optic
    ii. Communications
    iii. Water
    iv. Sewer
    v. Electric
    vi. And other unknown utilities exist
u. Water Features
    i. Black Gore Creek, Gore Creek, Polk Creek, Miller Creek, Timber Creek, Bighorn Creek, Pitkin Creek, Black Lake #1 and #2, and numerous unnamed tributaries
    ii. Sediment Collection Ponds

Project Management

The Consultant shall supply PM services that meet the following requirements:

1. The consultant shall provide the following for the overall interdisciplinary needs of the Project:
    a. Project Manager
    b. Engineering Task Lead
    c. Environmental Task Lead
    d. Public Involvement Task Lead
2. Attend CDOT PM check-in meetings with all Consultant PM and Task Leads present as needed
3. Provide monthly progress reports and invoicing, track progress of deliverables against the developed schedule, ensure internal project controls are being followed. If the project falls behind schedule, provide a plan to get back on track.
4. Maintain the CDOT Project webpage with appropriate updates.
5. Provide Project Management efforts in following areas at a minimum:
    a. Risk Management – develop and execute a plan for risk management which will include the following:
        i. The plan for how to identify, track, analyze and respond to project risks,
        ii. Track risks and provide recommendations to either avoid, transfer, mitigate or simply accept individual risks to the project scope, schedule and budget
    b. Roles and responsibilities
        i. Maintain the contact list for the project and all stakeholders
        ii. Document decision making hierarchy for the project
    c. Scope Management – develop and execute a plan for scope management including collecting requirements, defining and validating project scope as well as a plan for assessing scope changes.
    d. Contract Management – develop and execute a plan for contract management including working with the CDOT PM to develop the task orders.
        i. The plan shall include planning, managing and controlling the costs for the prime consultant and the subconsultants to stay on track, on task and under budget.
        ii. Task orders will be written to define the task order scope. Notify the CDOT PM about potential out of scope items.
    e. Cost Management –
        i. Develop the quantities required for the construction cost estimate at major project milestones. Since this project will be delivered via CM/GC, this project will have an independent cost estimator to complete the actual construction estimate.
    f. Schedule Management – develop and execute a schedule management plan including:
        i. The plan to develop, maintain and communicate the project schedule for the time and resources on the project.
        ii. The schedule shall be a detailed Microsoft Project Schedule tracking all major milestones, CSS process and deliverables for the design process, CSS process and the CM/GC process. Hold schedule as a baseline and track items. If the schedule is at risk of slipping, notify the CDOT PM and recommend options for schedule recovery.

g. Change Management – develop and execute a change management plan that will include the following
    i. Define how project deliverables and documentation will be controlled, changed an approved. Note how changes could impact the project scope, schedule and budget
    ii. Identify who should approve of the changes and how they will be communicated and documented
h. Communication Management – develop and execute a communication management plan. The plan shall include the following:
    i. The processes that are required to ensure timely and appropriate planning, collection, creation, distribution, management, control and monitoring of project information.
    ii. Ensure that project information is consistently distributed in a timely manner to the team members that need it in the appropriate format
    iii. Meeting planning –
        1. Establish the frequency of meetings and the most effective team members to invite and attend
        2. A goal is defined for each meeting
        3. For major meetings establish a meeting plan template defining who, what, where, when, why, how, etc.
        4. For all stakeholder meetings, including public, PLT, ITF, small group stakeholder and others the following shall apply:
            a. A public involvement liaison shall participate and be present
            b. Public Meetings shall require distribution of post cards and newspaper advertisements prior to the meeting to make the public aware of the meeting
            c. Provide an individual employee to specifically record notes and meeting minutes
            d. Specific Coordination Meetings shall be planned for major stakeholder meetings like PLT, TT, ITF and Public meetings.
    iv. Track crucial project decisions in a communications log
    v. Provide communication as appropriate with internal CDOT Specialty units, coordinate first with the CDOT PM about protocol for reaching out
    vi. Contact and coordinate project needs with internal CDOT personnel as well as other exterior agencies as noted in the Project Coordination Section.
    vii. Document and report to CDOT PM when items have been submitted for review and log and track responses.
    viii. Project Newsletters: Create and provide graphical email updates to the PLT and ITF stakeholders. Graphics shall be gathered from the entire project effort to report back on each discipline/action that is progressing.
i. Quality Management – Develop and execute a quality management plan for all project deliverables. The plan shall include quality assurance and quality control:
    i. Ensure accuracy and elimination of errors reducing the need for rework
    ii. 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
    iii. Provide contract documents that take into consideration constructability and maintainability

iv. The consultant completing the work shall provide quality assurance practices to reduce defects in work products. If the consultant completing the work is not the prime consultant, the prime consultant shall complete an additional quality assurance practice to ensure the goal of the work product has been met.

j. Action Items and Deliverables tracking: Track action items and note date assigned, date completed, item, and who assigned to. Provide management of Consultant team tasks and team members, including sub consultants and vendors, and work or task leads. Report progress to CDOT PM. Deliverables are part of the project schedule but require their own communication tool for tracking progress. Create a separate deliverable tracking log indicating planned due date verses actual date submitted. Report progress to CDOT PM.

6. Routine Reporting and Billing
    a. Coordinate all activities with the CDOT PM
    b. See requirements for monthly billing in the Invoice Formatting and Information section
    c. Reports and submittals. In general, all reports and submittals must be approved by the COT PM prior to their content being utilized in follow up work effort.
    d. Provide Vendor backup as part of all executed Task Orders

Construction Plans, Preliminary Engineering Effort

1. The goal of the Construction Plans is to take into account all variables and tasks into a unified concept for advertisement to bid or CAP for Construction purposes.
2. The Construction Plans shall be coordinated with the ongoing CSS stakeholder processes.
3. This project is a CM/GC project and the Consultant need only provide quantities for the cost estimates. Cost estimating will be performed by an independent cost estimator hired by the State. However, the consultant should plan on the preparation of cost estimates as requested.
4. When applicable, the engineering and overall process must take into account ALL of the proposed improvements as part of the EA and plan for their future implementation and mitigation measures such that one improvement does not preclude a future improvement.
5. Traffic engineering expertise must be utilized for continued evaluation of options and alignments as well as interactions of the additional highway improvements, such as the chain station, truck parking, ITS Components and lane drop/exit at MP 190.
6. Provide specific expertise for the design of the Anti-Icing System on F-11-AM.
7. Provide specific expertise for the design of the re-construction of the runaway truck ramps.
8. Perform site reconnaissance making note of critical dimensions as verified in the field. Take photos and record site visit in memo.
9. Provide Avalanche Mitigation expertise for design and layout of avalanche fence
10. The Consultant shall act as the Engineering in Responsible Charge for all Traffic Control Needs for design field work as required to complete this SOW. Consultant shall supply a vendor for traffic control services. Submit an MHT to CDOT PM for review. Coordinate field work with CDOT Maintenance and Construction to avoid conflicts.
11. Follow the latest version of the CDOT Project Development Manual for project delivery procedures and requirements.
12. Follow all CDOT and FHWA required design guidelines and Procedural Directives.
13. SCOPING: Host a formal project scoping meeting. See also “Work Activity Assignments” section.
    a. This Project requires the early identification of all required variables at the initial scoping meeting. The Consultant shall be familiar with all of the mitigation requirements the EA, the scope of improvements and the CSS process.
    b. Establish and layout the plan to deliver the project to construction Prepare preliminary quantities
    c. Prepare preliminary plan and profile of improvements
    d. Applicable traffic data and traffic review of scope items
    e. Environmental considerations
    f. Establish and confirm the design requirements
        i. Typical sections
        ii. Horizontal and vertical alignment
        iii. Detour alignment
        iv. Drainage and hydraulics
        v. Approach of project
        vi. Aesthetic features
        vii. Pedestrian and bicycle facilities
        viii. Landscaping
        ix. Lighting
        x. Major structures
        xi. Minor structures

xii. Walls
xiii. Pedestrians/recreation
xiv. Signs/miscellaneous
xv. Safety
xvi. ITS components
xvii. Traffic control
xviii. Access control
xix. Source of materials
xx. Roadway and roadside clearances
xxi. Erosion control
xxii. Pavement options
xxiii. What is the wetland process? Individual permit or PCN?

g. Review construction requirements
h. NEPA Commitments
i. Maintenance concerns
j. ROW
k. Survey
l. Traffic and safety issues
m. Utility
n. Contract
o. Geotechnical and Geohazards
p. Coordination of all disciplines
q. Avalanche Mitigation
r. ITS components
s. Other
t. Reference 23 CFR Part 625, Design Standards for Highways

14. DOR: Host a formal Design Office Review Meeting
    a. The purpose of the meeting will be to ensure the project is on track. Plan level shall be at least 20% complete showing integration of all identified improvements.
    b. Provide a detailed preliminary cost estimate.
15. FIR: Host a formal Field Inspection Review Meeting.
    a. The FIR package shall incorporate all of the ongoing ITF efforts.
    b. This shall be a "40%" design development issue package that provides plan sheets and details for all of the planned improvements items and also includes:
        i. Title Sheet
        ii. Standard Plans List
        iii. Typical Sections
        iv. General Notes
        v. Summary of Approximate Quantities
        vi. Tabulation Sheets
        vii. Plan and Profiles
        viii. Wall layouts
        ix. Structure layouts
        x. Storm water plans
        xi. ITS concepts and coordination
        xii. Preliminary construction Phasing
        xiii. Traffic Control
        xiv. SWMP

xv. Custom Detail Concepts as required for construction

c. Identify required Project Specifications
d. Provide a preliminary detailed cost estimate with summary of approximate quantities

16. FOR: Host a formal Final Office Review of the plans, specifications and cost estimate
    a. Address all comments from the FIR plan set
    b. Update all plans and specs to a “90%” design development issue level.
    c. Submit all required reports at this time
    d. All ITF efforts shall be completed at this time
17. Final PSE: Provide a final Plans, Specs and Estimate for review prior to final AD set. 99% Design Development Plans
18. Final AD set of plans. 100% construction documents

Landscaping Plans

1. The goal of the Landscaping Plans is to incorporate the guidance from the Historical Context Aesthetic ITF into a construction plan set. Take into account USFS guidelines, PEIS guidelines and CDOT guides. Follow the guidance in the latest version of CDOT's Landscape Architecture Manual. Landscape Architecture efforts must be a multi-disciplined approach to ensure that landscape features and aesthetic guidelines are incorporated into the project. Engagement starts at the beginning of the project and continues throughout scoping, planning and final design. The Landscape Architect/Visual resource specialist should be included in all design conversations to insure that the expanded roadway meets the aesthetic/visual quality as required.
2. Provide Landscape Architecture with visual resources expertise.
3. CDOT has committed to creating an Aesthetics Issue Task Force (ITF) during final design of the project. This ITF will be responsible for developing project-specific aesthetic guidance that builds on the MOU and Crest of the Rockies Aesthetic Guidance and incorporates the historic context of West Vail Pass. This commitment shall be represented in the Landscaping plans.
4. Plans shall take into account temporary irrigation needs to establish new vegetation.
5. Provide a list of native plants and seeding for upland areas appropriate for the elevation and climate.
6. Provide plans as part of the Construction Plan effort, scoping, FIR, FIR, PSE, AD
7. Adhere to mitigation requirements of the EA.
8. Provide renderings, sketches, paintings, had drawings of concepts for review and use in the project. Coordinate with CDOT PM.
9. Important considerations such as context sensitive design approaches and the original design's attention to the natural environment are critical foundational elements in realizing a safer roadway that doesn't depart from the success of the original design's aesthetic composition. Central to this approach is an understanding of how the design could impact the unique visual environment of West Vail Pass. Consultation of previous documents will be an important resource during final design, such as "I-70 in a Mountain Environment", 106 Programmatic MOU, I-70 Mountain Corridor Context Sensitive Solutions, Crest of the Rockies Design Segment, Vail Pass Area of Special Attention and others.
10. Work in close coordination with the historic resource specialist to develop design-specific solutions for both visual resources and landscape architecture. Take into account the historical design practices such as:
    a. Earthwork practices and guidance
    b. Rock cut sculpting
    c. Vegetation clearing techniques
    d. Revegetation practices
    e. Retaining wall design
    f. Bridging and spanning practices
    g. Trails and bike paths
11. Provide aesthetic related guidance as it relates to the infrastructure improvements such as:
    a. Alignment
    b. Slope cut and fill
    c. Disturbance
    d. Rock cuts
    e. Bridge Structures

f. Sound attenuation

12. Provide guidance on visually-associated design practices; consultation expectations include but are not limited to the following. Meet the expectations of the MOU.
    a. Develop a VIA
    b. Consider USFS Scenic Integrity Objectives
    c. Review of drainage structures, bridge abutments or other permanent features
    d. Apply best practices to the design, such as low contract features

CSS Stakeholder Effort

1. The goal of the CSS Stakeholder effort is to respect the I-70 Corridor PEIS CSS process as required for the endorsement of the proposed stakeholder process followed throughout the Design leading up to construction start.
2. The consultant team shall provide expertise and leadership to manage and guide CDOT through the CSS process. The CSS process shall be incorporated into the design process to ensure that the correct decisions are made at the right time, with both the design and CSS process complementing each other while allowing for each to move forward in a timely unimpeded manner with no backtracking.
3. This section covers the PLT meetings, TT meetings and other CSS Stakeholder meetings as required to complete the CSS process and integrate it into design. Some other more intensive CSS efforts are covered in separate sections, such as SCAP, Aesthetics, CSS Variance, Recreation Path, etc.
4. This project will follow the I-70 Mountain Corridor CSS Process. The Consultant shall guide CDOT through this process and manage all the meetings and materials.
5. Provide the required Project Work Plan, Stakeholder Involvement Plan and Public Information Plan.
6. The Charter and Success factors may need to be re-visited now that the SOW has changed from EA to design.
7. Additional details about the process can be found on the State's website.

West Vail Pass SCAP (ITF)

In order to update the SCAP, the following areas of expertise are assumed to be required at a minimum:

(1) Project Management
(2) Civil Engineering Hydraulics and Hydrology, with roadway design and grading experience
(3) River sedimentation and geomorphology
(4) Wetlands expertise to document how and where to protect, enhance, and/or restore existing wetlands/riparian areas, and provide coordination of sediment pond locations
(5) Aquatic ecology to address the interactions between I-70 and Black Gore Creek
(6) Aquatic Monitoring Report review and interpretation along with recommendations for possible future monitoring efforts
(7) PEIS CSS Stakeholder Involvement
(8) Wildlife expertise for coordination of pond locations with wildlife passages and protection. Wildlife expertise for discussion on water quality impacts to wildlife in the river, such as fish, macroinvertebrates, and aquatic mammals.
(9) Environmental consultation for consistency with the EA and overall West Vail Pass Auxiliary Lanes project

1. Scope of Work Notes:
    a. The West Vail Pass Auxiliary Lanes project is not within an MS4 area, but CDOT has committed to the implementation of permanent water quality measures as part of the Proposed Action from the EA. This effort shall pre-plan those features so that they are not implemented as an afterthought but conform seamlessly to all of the proposed improvements as part of the West Vail Pass Auxiliary Lanes project by way of the updated SCAP.
    b. The SCAP shall identify and recommend appropriate source control mitigation strategies, including design, implementation, and monitoring for anticipated environmental impacts likely to occur as a result of the improvements. Not all mitigation is to be completed by CDOT as part of the West Vail Pass Auxiliary Lanes project but can be performed through partnerships.
    c. The SCAP shall consider maintenance practices of the roadway and removal of sediment.
    d. The focus of the SCAP shall be drainage improvements and sediment source controls as well as other items noted in the Outline described in section 9.g. below. Illustrate how I-70 connects to the surrounding environment in an ecological context providing for balance between safety of the traveling public and water quality of Black Gore Creek, riparian areas, wildlife and other aspects as outlined in the EA and this SOW.
    e. The SCAP shall incorporate I-70 from MP 180-190 +/- as well as OLD US 6 from MP 182-185.5, the recreation path from MP 185.5 to Black Lakes, and Black Lakes and Black Lakes Road to the interchange at MP 190.
2. Follow the CSS process in the creation of the SCAP
    a. Water quality and support toward delisting 303(d) segments
    b. Outline the process for collaboration
    c. Create system for management and mitigation over the life of the West Vail Pass Auxiliary Lanes project and after completion
    d. Identify realistic opportunities for specific issues and sustainability

e. Compare past activities and apply lessons learned, such as the Straight Creek Report
f. Follow and implement the requirements as directed by CDOT in the SWEEP MOU.

3. Meeting Summary:
    a. Host and coordinate all ITF meetings to complete the SCAP and SWEEP effort.
4. SCAP Outline: Consultant shall create a SCAP outline to ensure that all areas of expertise are accounted for. Submit the draft and final outline to CDOT PM for review and approval. The SCAP shall cover all the mitigation as noted in the EA Water Quality Technical Memo. The sections below are a summary of the anticipated required areas to be included in the SCAP and may not reflect the draft or final outline.
    a. Executive Summary
    b. Introduction and Purpose and Scope
        i. How will the SCAP be implemented
        ii. West Vail Pass Auxiliary Lanes Project Description
        iii. Purpose and Need
        iv. Background
        v. Study Area
        vi. Stakeholder Coordination/CSS/CDOT Environmental Process
        vii. Project Approach
        viii. Previous Studies
        ix. Regulatory Framework and Stream Water Quality Regulations
    c. History of Black Gore Creek and Gore Creek SCAP efforts
        i. Stakeholder Groups and CDOT involvement
        ii. Past efforts
        iii. What is the current impairment of Black Gore Creek, Gore Creek, and connected tributaries within the project area and how did they become impaired and how have they recently been doing?
        iv. Efforts to date associated with keeping Black Gore Creek, Gore Creek, and connected tributaries clean
        v. 303(d) status
        vi. Existing issues
        vii. Original Environmental Assessment efforts from 1967
        viii. Requirements from the PEIS Water Resources Technical Report
    d. Corridor Description
        i. Watershed
            1. Current condition of stream features within corridor
            2. Determine modeling requirements per CDOT 98-1 Water Quality Template?
            3. Determine level of watershed impairment?
        ii. Review of existing storm drain system
        iii. Review of current control measures
            1. preliminary high-level recommendations for revisions to decrease erosion and other control measures directly related to the storm sewer system and layout.
        iv. River Morphology and Hydrology
            1. Floodplain discussion
            2. Basin characteristics
            3. Hydrologic analysis
        v. How should existing culverts on I-70 and Old US 6 be treated or repaired?

vi. Effects of I-70
    1. Pollutants
    2. Snowmelt-runoff
    3. Rainfall-runoff
vii. Literature Review
    1. The following is a list of anticipated resources to be reviewed:
    2. Black Gore Creek Sediment Source Monitoring prepared for Eagle River Watershed Council
    3. United States Forest Service (USFS) Rocky Mountain Region 5-Year Monitoring and Evaluation Report (October 2002 – September 2007) for the White River National Forest
    4. Addition and current USFS sampling locations and data if CDOT R3 has received in support of SCAP update schedule.
    5. Interstate 70 Mountain Corridor Storm Event/Snowmelt Water Quality Monitoring prepared for the Colorado Department of Transportation (CDOT)
    6. I-70 Water Quality Data Reports by Clear Creek Consultants including all water quality data and summary data for water flow, turbidity, temperature, conductivity and precipitation.
    7. CDOT Region 3 maintenance records including but not limited to: traction sand/salt application with estimates of overall percent sand vs. salt/ice deicer, street sweeping, stormwater control measure maintenance and dredging including annual sediment basin and other sediment cleanout along the corridor.
    8. Colorado Water Quality Control Division monitoring data.
    9. Monitoring data collected during the preparation of the I-70 West Vail Pass Auxiliary Lanes EA
    10. Other monitoring data collected by CDOT Headquarters Hydrologic Resources Section or obtained by CDOT Region 3.
    11. Fish-community assessment in Gore Creek, Colorado, 1998 and other relevant fish surveys
    12. Other documents provided by CDOT
    13. Other documents discovered by the Consultant
viii. Environmental implications, such as spawning percent fines thresholds, etc.
ix. Engineering implications
x. Existing Monitoring Programs
    1. Interpretation of past results and how it applies to the future of Black Gore Creek, Gore Creek, and connected tributaries and the implementation of this SCAP
xi. Climate and Hydrology
    1. Specific section on impacts of climate change and impacts to future design/sediment control measures
xii. Water quality monitoring data
xiii. Sediment loadings

e. Environmental Considerations and Requirements
    i. Required Legislation, SWEEP
    ii. Water quality
    iii. Aquatic biota

iv. Wetland and riparian areas
v. Wildlife
vi. Aesthetic values
vii. Drinking water supply

f. CDOT Maintenance Program
    i. Current CDOT maintenance practices
    ii. Winter maintenance material use and data trends
    iii. Summary of problem areas/areas for improvement as outlined by CDOT Maintenance
g. Aquatic Ecology
h. Recreation
i. Control Measure Design analysis for Sediment Control in Zone 1, about 30' +/- from traveled way
    i. Source vs. Depositional Areas
    ii. Sediment Source Estimates
    iii. Sediment Control Strategy
    iv. Hydraulic and Hydrologic Drainage Analysis
        1. Culverts
        2. Ditches/swales
        3. Storm drain system
    v. Existing structural Control Measures
        1. Inventory of completed projects and how they relate to 3rd lane
j. Proposed structural Control Measures
    i. Provide proposed locations that work in conjunction with the installation of a 3rd lane including any re-alignments of the roadway.
    ii. Coordinate locations that integrate into CDOT maintenance practices and the roadway construction. Coordinate locations with other proposed features to be installed as part of the West Vail Pass Auxiliary Lanes project, such as wildlife crossings, pullouts, truck appurtenances, barriers, bridges, access, recreation, recreation path
    iii. Provide plan for riparian/wetland creation, restoration, and/or enhancement in areas under and around bridges, and in other floodplain areas that experienced historic wetland and riparian habitat loss or degradation.
    iv. Ensure access to all control measures and additional access to areas that currently cannot be easily reached and cleaned.
    v. Address washouts of sand onto recreation path
    vi. Review and correction of existing erosion issues on OLD US 6
k. This is a new roadway in some areas. What construction techniques should be used for fill and cut slopes to prevent erosion?
l. Proposed Non-Structural Control Measures
m. Proposed Implementation Plan and cost estimate
n. Summary of existing status of Black Gore Creek, Gore Creek, and connected tributaries and projected future status
o. SCAP Implementation Plan
p. Potential opportunities for partnerships
    i. Identify projects that are both inside and outside of the scope of the SCAP as implemented as part of the auxiliary lane installation. Which projects are Zone

1 and included in the mitigation for the Project and which are Zone 2 and 3 partnerships?
    ii. Future monitoring recommendations
    iii. SWEEP MOU requirements
5. Deliverables:
    a. Draft SCAP Outline
    b. Final SCAP Outline
    c. Preliminary Draft SCAP
    d. Draft Final SCAP
    e. Final SCAP
6. Maintenance Manual:
   Prepare a manual of maintenance practices on Vail Pass. The manual shall include past procedures and practices for making the roadway safe through snow removal operations, equipment, material placement, material removal. Provide recommendations for improvements to keep the roadway safe while efficiently placing de-icing chemicals or traction sand on the roadway to reduce impacts to nearby rivers and the landscape. Provide recommendations for maintaining the control measures proposed in the SCAP.
    a. Provide interviews with TM II, TM III and LTC Ops both current and others who have previously worked on the Pass to evaluate different philosophies and SOP
    b. Provide a literature review of CDOT manuals and studies as related to operations and water quality
    c. Coordinate with manufactures and other high mountain areas for additional background information on the maintenance practices from around the Country in similar settings
    d. Provide recommendations for the removal of sediment or any other mitigation measures required by the EA including removal of deposited sediment below existing bridges where possible.
    e. Evaluate typical application rates of typical deicing and traction materials placed and provide recommendations for future SOP and best practices
    f. Provide recommendations for an optimum balance between safety and environmental impacts and mitigation when it comes to the traveling public and the environment
    g. Submit to CDOT PM a preliminary outline for review and approval:
7. Introduction and background
    a. Purpose of maintenance plan
    b. Mapbook of Control Measure Locations
    c. Maintenance Procedures for Control Measures
        i. Snow storage zones
        ii. Sediment basins
        iii. Schedule
        iv. Documentation and reporting
        v. Recommendation
    d. Maintenance Procedures for Roadway Safety
        i. Application rates and techniques
        ii. Products
        iii. Interviews
        iv. Maintenance Decision Support System (MDSS)
        v. Friction sensors
8. Engineering Design Roadway Work

a. As part of the SCAP effort, some concepts may need to be evaluated that require evaluations of the roadway alignment or roadway template, such as the impacts of an extra wide shoulder or adjustment of a median width at a bridge to include a sediment collection structure.

9. H&H Analysis
    a. The Consultant will perform a detailed Hydrology and Hydraulics analysis including detailed hydrological analysis on tributary basins followed by a detailed hydraulic analysis on culverts and other infrastructure to adequately size the culverts, control measures, storm drain system and other structures proposed for implementation. A HEC-RAS model for Gore Creek and Black Gore Creek along I-70 will be developed to be used for river hydraulics and sediment transport analyses.
    b. A 2D sediment transport analysis will be performed as applicable in various areas of the basin to determine locations of deposition and erosion. HEC-6T will be used to evaluate sediment loads and changes in stream sections.
10. Geomorphological Assessment (Need to refine this scope)
    a. Stream classifications will be verified/developed for Black Gore Creek and Gore Creek within the study area in order to come up with sediment/erosion control and applicable control measures for each stream Class. The Rosgen stream classification or Montgomery Buffington stream classification methodology will be used as applicable. Concept plans for potential sediment retention areas will be developed as part of this process.
    b. As part of the walk the corridor meeting, areas with high degree of erosion / scouring will be identified and conceptual restoration measures in order to reduce sediment erosion and improve WQ / habitat in selected reach will be developed.
    c. Areas for future stream geometry monitoring locations will be suggested as part of the SCAP report in conjunction with the recommended sediment control measures. These locations will be selected to better understand the stream processes and to verify the performance of the recommended sediment control measures should they be installed.
    d. (This work may be eliminated and would only be to identify potential projects for a partnership and not to be implemented as part of the SCAP.)
11. Water Quality Sampling
    a. Coordinate with Region 3 Environmental Manager and Water Quality Specialist to perform additional water quality sampling on Black Gore Creek and Gore Creek to acquire the latest information on stream conditions. Assume up to 8 sample sites and two trips to complete sampling on all streams for turbidity and chloride only. (This SOW is only to create a benchmark measuring point for the latest water quality measuring. This work could be used to create a more comprehensive plan, and not necessarily implementing one.)
12. Site Reconnaissance Inventory

    The Consultant shall visit the site to review the existing features as related to the SCAP and any Engineering Design Roadway Work required for this SOW. An inventory of existing sedimentation features shall be reviewed and cataloged along with location, description and photos. Existing storm drain shall be evaluated, and condition verified for inclusion into the SCAP
    a. Verify existing sedimentation ponds
    b. Perform rudimentary inspection of existing CMP, starting with a literature review of existing storm sewer (as-builts and asset manager information)

c. Identification of existing erosion issues related to steep grades on the Pass along I-70 and existing US 6 recreation path as it parallels I-70 in its entirety from about MP 182-190
d. Submit memo with summary of findings

Aesthetic Guidance ITF

1. Section 106 Aesthetic Guidelines:
    a. In order to complete the Guidelines, the following areas of expertise are assumed to be required at a minimum:
    (1) Project Management
    (2) Landscape Architect and maybe an Architect
    (3) Civil Engineering with roadway design and sight grading
    (4) CSS Involvement
    (5) Environmental expertise to tie all Guideline improvements back to the ROD and EA and the context of the overall project
    (6) Wildlife expertise for coordination of wildlife improvements needs
    (7) Structural Engineer for recommendations and review of practicality of proposed improvements
    (8) Geotechnical Engineer for recommendations and review of practicality of proposed improvements
    (9) Historical Resources with Section 106 expertise
    (10) Environmental expert with Section 106 expertise
    (11) Provide an individual with proven Visualization experience and expertise, such as a Landscape Architect, Planner or other.
    (12) Renderings of concepts and provide renderings of final

2. List of anticipated Stakeholder Meetings:
    a. Coordinate and host all required ITF and Public meetings.
3. GOAL: CDOT has committed to creating an Aesthetics Issue Task Force (ITF) during final design of the project. This ITF will be responsible for developing project-specific aesthetic guidance that builds on the MOU and Crest of the Rockies Aesthetic Guidance and incorporates the historic context of West Vail Pass.
4. Aesthetic Guideline Notes
    a. The purpose of the Section 106 Aesthetic Guidelines is not necessarily to create new guidelines, but is to incorporate the Historical Aspects from the EA into them and enhance what has already been completed.
    b. The Guidelines need to drill down to an additional level of detail; doesn't create new aesthetic guidelines, but just explain how it honors the historical approach and design.
    c. Explain how, from a Section 106 perspective, Vail Pass was originally designed as a part of the original EA from 1971 and the EIS from 1973 and how the actual West Vail Pass Project will honor that approach.
    d. The Guidelines will commit CDOT to design criteria, and provide in depth context about the Historical Resource (Vail Pass) and how that will be conveyed to the West Vail Pass Project Improvements.
    e. Identify, through the EA effort the important contributing features from the district, and how the new design will maintain the feeling and setting of the original highway as it runs through the environment.
    f. These Guidelines will serve as both the mitigation and a way to develop the mitigation as outlined in the Historical Tech Report and the Visualization Tech Report that are part of the EA.
    g. Baseline Aesthetic Guidance is the Crest of the Rockies design segment and the Top of

Vail Pass – Area of Special Attention Report. Also taking into consideration the "I-70 Mountain Corridor Design Criteria."

h. The limits shall include primarily MP 180-190 on I-70. There are some signs that fall a little outside of those limits that require consideration as well. Also included is the proposed recreation path realignment as well as existing US 6 and the existing recreation path as found within the similar limits of the project from I-70 MP 180-190.
i. The Guidelines will assess the practical implementation and application of recommendations as related to constructability, civil, structural and geotechnical engineering. The Guidelines are not intended to be a structure selection report, but at a minimum will take these factors into account for the measures recommended.
j. The Guidelines will include expertly and professionally prepared sketching, renderings and paintings to enhance the reader's visualization of recommended measures.
k. Follow the Programmatic 106 MOU as directed by CDOT PM.

5. Provide for detailed landscaped Aesthetic Guidelines taking into the account the ecological balance of existing and proposed features that connect the roadway to the landscape evaluating the visual aspects such as:
    a. Roadway alignment
    b. Existing walls that remain in place
    c. Proposed walls
    d. Obliteration of the roadway alignment that is retired
    e. Existing bridges that remain in place, which will probably all be replaced
    f. Proposed bridges
    g. Sediment control features
    h. Wildlife underpasses
    i. Drainage features
    j. Signage
    k. Rock outcrops
    l. Runaway truck ramps
    m. Chain station
    n. Truck Parking Area
    o. Widened pull outs
    p. Grading
    q. Geotechnical Engineering
6. Tie the historical context of Vail Pass to the Crest of the Rockies design segment following the visualization mitigation measures, including but not limited to:
    a. Transportation and Land Relationships
    b. Transportation Facilities Alignment
    c. Structures that Support Transportation Facilities
    d. Interchanges
    e. Roadside Elements (Guardrails, Barrier, and Edge Delineation)
    f. Color Selection and Consistency
    g. Earthwork, Embankment, and Restoration of Existing Disturbance
    h. Hydrologic Features
    i. Landscape Planting, Revegetation, and Topsoil Management
    j. Wildlife Corridors and Crossings
    k. Community Interface
    l. Sound Attenuation
    m. Recreational and Cultural resources Access

n. Road Services and Adjunct Facilities
o. Advanced Guideway System (AGS) (as related to Vail Pass)
p. Transportation Lighting and Illumination
q. Signage
r. Utilities in the Corridor
s. Construction Material Management (Probably not applicable?)
t. CSS Process

7. Follow the CSS process in the creation of the Guidelines
    a. Outline the process for collaboration
    b. Create a system for management and mitigation over the life of the project and after completion
    c. Identify realistic opportunities for specific issues and sustainability
8. Guide Outline: the consultant shall propose an outline to ensure that all areas of expertise are accounted for. Submit the final outline to CDOT PM for review and approval. The Guidelines shall cover all of the mitigation as noted in the Historical Tech Report and the Visualization Tech Report included as part of the EA.
9. Site Reconnaissance
    a. The Consultant shall visit the site to review the existing features as related to and required for the completion of the Guidelines. An inventory of existing features shall be reviewed and cataloged along with location, description and photos. Submit memo with summary of findings.

CSS Design Criteria Exception ITF

1. The goal of the CSS Design Criteria Exception ITF effort is to host ITF meetings to engage the stakeholders and gather feedback for the CSS design variances where the Project plans do not adhere to the Crest of the Rockies Top of Vail Pass Area of Special Attention. Work collaboratively with the stakeholders for the outcome, respecting the CSS process.
    a. Design Speed
    b. Alignment
    c. Slope cut and fill
    d. Disturbance
    e. Rock Cut
    f. Bridge Structures
    g. Sound attenuation
2. Develop and coordinate the effort and present to the PLT for endorsement of the process.
3. Develop options evaluating multiple scenarios for each area previously identified as an area in need of a variance. As an example, what is the best balance between the combination of a cut wall and cut slope? Why widen into the median instead of only towards the River or towards the mountain, what balance can be struck in that instance?
4. Evaluation of variance areas shall take into account the Core Values established in the EA phase of the project.
5. Document the design exceptions and explain how they all individually meet the following criteria as outlined in the supplemental PEIS documentation.
    a. Complementing surrounding physical characteristics
    b. Enhancing safety
    c. Increasing capacity
    d. Reducing costs
    e. Protecting the environment
    f. Preserving historic and scenic elements
    g. Interfacing with multiple modes of transportation
    h. Utilizing new technology or innovative approach
    i. Doing the right thing
6. This process must be integrated into the overall design effort, landscaping, aesthetics, SCAP, ALIVE, CSS, etc. This is not a standalone effort and must take into account ALL project variables.
7. Present the final variances to the PLT.
8. Per the EA, only areas that are currently under consideration for design work need to undergo the CSS variance process. However, the overall implications must be considered, for example if the lower truck ramp reconstruction at MP 182.5 is in the scope and a variance is considered in the median the impacts the location of the truck ramp, several miles of roadway may need to be evaluated to accommodate the truck ramp, including the implications to the chain station improvements that are on the EB side of the highway.

ALIVE ITF Effort

1. The goal of the ALIVE ITF effort is to follow the mitigation noted in the EA and implement it in a collaborative effort by presenting the implementation plan to the PLT and hosting and engaging stakeholders in the CSS process.
2. The design and implementation of the wildlife underpasses is a complicated undertaking requiring the input and coordination with several disciplines to layout a seamless integrating into the overall proposed improvements. The following expertise will be required at a minimum to property implement this effort:
    - **(1)** Project Management
    - **(2)** Landscape Architect
    - **(3)** Wildlife expert with experience in Road Ecology
    - **(4)** Civil Engineering Site Grading and design
    - **(5)** Structural Engineering
    - **(6)** Hydraulics and Hydrology
    - **(7)** Visualization
    - **(8)** Landscape Architecture
    - **(9)** Production of renderings and sketches
    - **(10)** CSS Involvement
    - **(11)** Environmental
    - **(12)** Wetlands
    - **(13)** SCAP expertise

3. ALIVE measures, such as the six wildlife underpasses and wildlife fence noted in the EA mitigation, must be coordinated will ALL disciplines as well as the proposed improvements as part of the overall project.
4. Provide science based practical recommendations for the layout and dimensions of the wildlife underpasses for the targeted species. Provide memo detailing selected sizes and layout of underpasses/wildlife permeability decision making and logic behind permeability recommendations. Draft memo is due at FIR and shall be a part of and run concurrent with the Structure Selection Report.
5. Provide custom wildlife fence details to handle additional snow load on Vail Pass. Establish a cost effective design while balancing the longevity of the fence.

Recreation Path ITF Effort

1. The goal of the ITF effort is to present the new recreation path alignment from MP 185.2-186.9 and two bridges to the stakeholders and gather feedback.
2. The roadway alignment may impact other adjacent locations of the recreation path that will also require re-alignment.
3. The recreation path alignment shall be refined to contour the existing topography as best as possible to minimize disturbances and integrate aesthetic and landscaping requirements that are defined as part of this project. Incorporate the Core Values as established during the EA phase of the project.
4. Provide plans/profile details as part of the design effort for the early construction package and incorporate the path into the construction package.
5. Provide expertise in:
    - **(1)** Landscape Architecture
    - **(2)** Experienced Visualization Expertise
    - **(3)** Graphical or painted/sketched renderings
    - **(4)** Mountainous roadway alignment Civil Engineering Design
    - **(5)** Structural Engineering
    - **(6)** Wetlands
    - **(7)** Recreation Path Expertise
    - **(8)** Detailed sight grading Civil Engineering
    - **(9)** Landscape Architecture
    - **(10)** Roadway Design
    - **(11)** Wildlife Biology and Road Ecology
    - **(12)** Coordination with other disciplines, such as structural and geotechnical
6. Work on phasing plan for the recreation path and all other associated construction to minimize closures to the path during construction. The plan shall also work to minimize closures to other recreation facilities as well.
7. Incorporate design features into the recreation path to make it safer and a better user experience than the existing. Consider the implementation of; path etiquette signage, passing lanes, pullouts, width, innovations to make the path a safer and better user experience
8. Design the alignment of the path to best balance the Core Values as established during the EA phase of the project and incorporate it into the existing landscape.

Public Meetings and Flyers

1. The goal of the Public Meetings and Flyers is to continue to keep the public and CSS Stakeholders informed about the progress of the project.
2. Provide expertise in public involvement management
3. The consultant shall prepare post cards and advertisements for local newspapers and media for public meetings for review by CDOT PM and CDOT Public Liaison. After drafts are accepted the consultant shall distribute the mailing and advertisements whose coast shall be include in the consultant's budget.
4. Host and coordinate the public meeting preparing all required presentations, meeting boards and personnel to staff the meeting.
5. Project update flyers shall be issued periodically during the course of the project. The consultant shall prepare professional quality flyers with graphics and appropriate contact and issue to the CSS Stakeholders and others that have expressed interest in the project.

Survey

1. The goal of the survey effort is to tie the existing aerial mapping to CDOT control and verify accuracy and supplement areas of missing information. Additional detail may be needed or desired around wall or other improvement locations. Provide complete ROW Plan development services for any private property acquisition or U.S. Forest Service Highway Easement Deed (HED) needs. Prepare legal descriptions for any private property acquisitions.
2. 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. The State has aerial mapping of the project limits and does not anticipate that a survey of the entire project limits is required. The Surveyor shall review the existing information and determine areas that need additional detail.
4. Verify existing CDOT Control. Additional control may be needed.
5. 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.
6. Obtain utility locates, per the SUE SOW, and field survey markings. Field survey the top of utilities at locations that are potholed. Coordinate with pothole company for timing of survey.
7. The consultant shall complete CDOT PM form 1217 to determine the precise survey limits.
8. Attend Pre-Survey Conference.
9. Prepare and obtain “Permission to Enter Property” forms for the purpose of surveying within private ownership parcels. If surveying on USFS property, obtain the necessary approvals from the USFS.
10. Momumentation of COT ROW is not anticipated to be part of the SOW. Most of the proposed improvements are on USFS property. The existing HED may need to be modified or amended as part of the SOW to accommodate all of the proposed improvements. Some proposed improvements are adjacent to private property near MP 180.
11. Acquire a special use permit from CDOT in order 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.
12. Establish Survey Control using nearby Reference Stations.
13. 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.
14. 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 Black Gore Creek and Polk Creek
c. 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. (See also UTILITIES SUE SOW)
d. Provide potholing for establishment of utility profiles and survey locations and depths to utilities.
e. Survey all inverts of 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 storm sewer system.
f. Coordinate with hydraulic engineer if cross sections or flow line of river are required for both Black Gore Creek and Polk Creek.
g. Determine Existing Right of Way and HED limits. Provide a dgn file of the existing Right of Way Model.
h. Locate Geotechnical Borings.

15. Obtain Title Commitments for any private properties from which ROW or easements may be required.
16. Provide Survey Report
17. Prepare right-of-way plans in CDOT format for impacted private properties and USFS property 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.
18. Stake the proposed parcels and easements for appraisal purposes. A one-time staking effort may be assumed.
19. 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 Eagle County Clerk and Recorder's office and Summit County Clerk and Recorder’s office as appropriate.

Wetlands/404

1. Provide expertise in identifying jurisdictional waters of the US (WOTUS), including wetlands, and non-jurisdictional connectors per current laws, regulations, and guidance pertaining to Section 404 of the Clean Water Act, and per current US Army Corps of Engineers regional wetland delineation standards and special requirements of the Sacramento District and provide the appropriate level of 404 permitting. Guide CDOT through the permitting process and establish the time line to keep the project on schedule for the desired construction start date.
2. Wetland Determination, Field Delineation, and FACWet Functional Assessment.
    a. Delineate all wetlands and waters of US within the project area.
        i. Preliminary work has been completed for the EA.
    b. Identify and quantify areas subject to the Army Corps of Engineers (Corps) jurisdiction under Section 404 of the Clean Water Act.
    c. Determine location of Ordinary High Water Mark (OHWM) as located by the Surveyor.
    d. Provide digital map of wetland polygons, other waters of the US and OHWM areas to design team for placement on appropriate FIR, DOR, FOR and AD plan sheets. Coordinate with Project Surveyor to have wetland flags surveyed. All wetland mapping and reporting should be in accordance with the Corps Sacramento District's Minimum Standards.
3. Obtain Preliminary Jurisdictional Determination of wetlands and waters of the US from the US Army Corps of Engineers (USACE) Sacramento District (Western Colorado Regulatory Branch) after coordination with CDOT R3 Wetland Biologist with the 404 permit application or pre-construction notification (PCN).
4. Provide: Final Wetland Delineation Report in accordance with the Corps Sacramento District's Minimum Standards with maps, forms, clearly annotated and dated photo points of jurisdictional and non-jurisdictional features. Provide shapefiles and their metadata of project wetland polygons to CDOT for incorporation into CDOT's GIS database.
5. Wetland Finding
    a. Prepare a Wetland Finding according to the 2019 Memorandum of Agreement (MOA) between CDOT and FHWA. Prior to preparation of this report, first coordinate with the CDOT R3 Wetland Biologist after determination of all temporary and permanent impacts to jurisdictional and non-jurisdictional wetlands as outlined in the MOA and in conjunction with 404 permitting to include compensatory mitigation. The Wetland Finding will follow a standard outline provided by the CDOT R3 Wetland Biologist to document existing conditions, describe any proposed unavoidable impacts to wetlands and describe mitigation proposed for wetland impacts.
6. Provide: Draft and Final Wetland Finding to CDOT.
7. Assist the State in obtaining a permit from the Army Corp for construction impacts and mitigation of wetlands. The actual impacts are unknown for this SOW at this time and the Consultant shall be prepared for either a Nationwide permit or an Individual permit process:
    a. Provide services required to obtain an Individual Permit through the Army Corp, or
    b. Request for Nationwide Permit Authorization
        i. Prepare a complete Pre-Construction Notification (PCN) for Section 404 Permitting. The PCN will include the wetlands delineation, a compensatory wetland mitigation plan with monitoring requirements, Section 7 and Section 106 reports, and all relevant plan and profile sheets showing wetland mapping and impacts, including information related to fills below OHWM in all waters of

the US. Include appropriate volumes of riprap, and appropriate grading and structure plans. Coordinate the appropriate information with the CDOT R3 Wetland Biologist prior to submit to the Corps.

ii. Review plans for compliance with 404 permit.

c. Provide: Plan sheets with revegetation recommendations; seed mixes, plant lists and revegetation notes; Draft Permit to CDOT, Final Permit submitted to Corps including final conceptual wetland mitigation and monitoring plans; comments on drawings and specifications.

8. Integrate this process and expertise into the SCAP and ALIVE effort for potential on-site mitigation requirements or enhancements around bridge(s). The State may choose to provide additional riparian enhancements above and beyond the 404 requirements to meet stakeholder needs.

Geotechnical Investigation

1. The goal of the Geotechnical investigation shall be to provide geotechnical recommendations for the structural design of wall, bridge and other proposed structures. Provide CDOT standard Engineering Geology and Geotechnical Plan sheets as required.
2. Incorporate any geotechnical mitigation requirements from the EA into project design and recommendations.
3. The elements of the work shall include recommendations for Pavement Design (Coordinate with Regional Materials Program for final needs), foundations, retaining walls, culverts, landslide evaluation, cut slopes and embankments.
4. The Geotechnical Engineer shall work with the Aesthetic Effort and Landscaping to provide recommendations for aesthetic rock sculpting and blasting techniques. Identify areas where rock sculpting may be required instead of wall construction, such as exposed roadside cut areas.
5. The consultant shall follow the guidelines set forth in the latest CDOT Geotechnical Design Manual, with the latest being April 24, 2017 at the time of this SOW, for the preparation of the Geotechnical Investigation Report. Including, but not limited to:
    a. Standards for CDOT Geotechnical Work Table 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
    f. Follow the prescribed methods for subsurface exploration.
6. Refer to the latest CDOT Bridge Design Manual for other requirements and requirements for geology sheets.
7. Provide information on site conditions, subsurface conditions, groundwater, and geochemical properties with recommendations for spread footings foundations, drilled shafts, driven piles, and different walls types such as mechanically stabilized earth, typical cantilevered, soils nail/shotcrete, and other types as required by the Structural Engineer.
8. 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 designer for any potential other needs prior to starting work. The report will include Engineering Geology sheets indicating location of borings.
9. Borings are anticipated to be advanced into competent bedrock though 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.
10. Review geotechnical hazard maps provided as part of the EA and provide appropriate recommendations as needed in collaboration with the CDOT Geohazards Program.

11. The report shall identify geologic hazards, such as landslides and mine workings, in the vicinity of the project, and shall determine if these features will be impacted by construction. In the event disturbance of geologic hazards is anticipated due to construction, mitigation to reduce the risks of disturbance to the sensitive area shall be recommended.
12. Identification of geotechnical issues and concerns associated with locations.
13. Vail Pass has shallow groundwater in some places. Provide recommendations for frost heave mitigation measures where applicable. Provide at least 6 months of groundwater monitoring in borings capturing low (winter) and high (spring) water levels for verification of groundwater presence and depth along with gathering and analyzing recent historic precipitation and groundwater monitoring data from the US Geological Survey, NOAA, or other available sources.
14. Two individual reports may be required, one for the Early Construction Package and one for the Overall Construction Package. Provide drafts for CDOT specialty unit and PM review prior to issuing the final stamped version. Final engineer stamped versions are required.
15. Provide for the minimum FHWA and CDOT required number of borings/test holes per wall, bridge, pole or other features as required. Alternate field collection methods such as geophysics and cone penetration testing can be use in place of borings at CDOT's approval.
16. The Consultant shall use the Appendix B: Geotechnical Report Checklist and submit to CDOT PM for QC.
17. Take on-site soil samples and determine their use for roadbase or other cost saving measures, including mixing with other offsite soils.
18. This project will need a Life Cycle Cost Analysis for the pavement section. Most likely, CDOT materials will perform the calculation.

FHWA Value Engineering Requirements

1. The goal of the FHWA Value Engineering Requirements is to follow the CDOT Project Development manual and FHWA guidance on VE and incorporate those into this project at the right time to maximum the effects. The follow is a guide for an assumed level of effort. The consultant shall submit a plan that follows the latest requirements for review and approval by the CDOT PM.
2. Host a five-day value engineer workshop that follows FHWA Value Engineering guidelines and requirements. Adhere to those guidelines. Elements to be studied include, but are not limited to, roadway, structures, traffic management, phasing, safety, and constructability. The objective of the VE study is to make tangible recommendations to CDOT to make informed decisions.
3. The services will conclude with a final report describing the process, findings and conclusions of the study. The BE analysis should be conducted before the completion of preliminary (30-35%) design.
4. The consultant shall prepare a cost estimate, separate from the ICE and CM/GC estimates, to be used at the VE workshop.
5. Host pre-study meeting conference call to determine other areas of potential VE. Host the call at least 4 weeks prior to the VE Study workshop.
    i. The consultant performing the VE analysis shall not have an interest in the Project outcome. The consultant shall be a qualified VE practitioner, experienced in performing and leading VE studies, and have sufficient VE training, education and experience to be recognized by SAVE International as meeting the requirements for certification.

Structural Engineering

1. 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 and coordinate with the CDOT PM and Construction Manager for alternative selection. Collaborate with the aesthetic and landscaping effort as outlined in this overall SOW.
2. The entire limits of the project contain 16 existing bridges.
3. The Consultant shall follow the latest CDOT Bridge Design Manual Policies and Procedures. At the time of this SOW there is a January 2020 version.
4. Project scoping shall also include a determination that a new structure is require or rehabilitated of an existing structure is feasible. This determination shall be confirmed through preliminary design. As an example, should existing walls remain in place and the new alignment be constructed around them? Should the walls be rehabilitated or replaced?
5. Provide structure inspection services of existing walls. This may require excavation to determine if the existing metal straps on the Mechanically Stabilized Earth walls are in good shape. Determine the condition of the existing concrete walls and if they can remain or not, or if they should remain or not.
6. Although many bridges are planned to be replaced, the consultant shall maintain the ability to provide for inspection services on existing bridge structures.
7. Do to the size of this project meetings with Staff Bridge prior to each milestone will be required for all Scoping, DOR and FOR meetings.
8. The preliminary design for major and minor structures, pedestrian 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.
9. The Structure Selection Report is due by FIR.
10. Coordinate required recommendations with geotechnical engineer.
11. The general scope of work includes, but is not limited to:
    a. Bridge Replacement
    b. Bridge Rehabilitation
    c. Wall Design
    d. Wall Rehabilitation
    e. New bridges
    f. Cantilever Monotube overhead signs
    g. Poles
    h. Fence
    i. Gates
    j. Major structures, such as Concrete box culverts
    k. Wildlife Underpasses, such as a CBC, pre-cast arch, CMP arch, etc
12. The design effort on this project may require the retro fit of existing walls to accommodate the desired roadway alignment and improvements.
13. Participate in the survey SOW needs.
14. This project will require a CSS aesthetic component.

Highway Design and Traffic/Safety Engineering

1. Provide geometrical highway design and traffic engineering expertise for the new I-70 lane addition and associated improvements.
2. The consultant shall follow the latest version of the CDOT Roadway Design Guide. The latest at the time of this SOW is 2018. The consultant shall be responsible for incorporating AASHTO A Policy on Geometric Design of Highway and Streets 2011, the MUTCD, and the CDOT Roadway Design Guide into plans, A Policy on Design Standards – Interstate System May 2016, MUTCD, into specifications and recommendations.
3. Provide design of roadside elements, such as guardrail barrier. Provide for Traffic and Safety Engineering recommendations.
4. A preliminary alignment has been designed for the proposed improvements as part of the EA. The consultant shall evaluate the alignment and improvement features to fine-tune the geometry using an iterative collaborative effort to achieve the safest, most cost effective roadway alignment. As an example, if a crash modification factor could be improved upon with a change in geometry that takes into context the impacts and core values as established in the EA, then it should be considered. The consultant shall take the EA alignment and improve it to provide the most cost effective and safest layout that still follows the core values defined in the CSS process. The safety revision and optimization effort shall be documented in a final memo. Provide traffic engineering expertise for crash reduction evaluation.
5. Provide detailed site grading expertise for the identifications of walls and conforming the roadway to the adjacent landscape. Coordinate efforts with the geotechnical, structural, aesthetics and other areas of expertise as required to complete the Project.
6. Many highway improvements will require Traffic Engineering expertise for evaluation. Provide traffic engineering review and recommendations of improvements, such as the lane drop configuration at the 190 Exit and signage and striping.
7. Provide a Traffic Engineering plan for management of traffic during construction for phasing purposes. Evaluate the current Region 3 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 components.

Hydraulics and Hydrology

1. Adhere to guidelines in CDOT's Drainage Design Manual and applicable Procedural Directives for drainage design work. Much of this SOW refers to that manual and will be used as guidance. Also adhere to Procedural Directives concerning drainage and storm sewer pipe selection.
2. The Consultant shall devise and implement a plan to inspect and/or televise each culvert to assess its condition. Determine if the culverts can be used as is, need to be rehabilitated, replaced, abandoned or rerouted. Provide an inventory and memorandum, based on the field reconnaissance, to the CDOT PM. Review asbuilt information as part of research effort. Review region wide priorities and inspection reports for culverts.
3. Prepare detailed design work of rundowns to convey water from the roadway to the creek.
4. Bridge Work: Prepare Hydrology and Hydraulic Drainage Reports. Follow the CDOT Drainage Design Manual and also refer to chapter 10, Bridges.
    a. Hydrology:
        i. Determine the watershed hydrology
        ii. Visit the site and obtain and review flood history and data
        iii. Check for current floodplain studies and determine level of FEMA/CWCB level of coordination for a LOMR or LOMC if required
    b. Hydraulics Design Activities:
        i. Complete a water-surface profile
        ii. Analyze bridge opening sizes
        iii. Locate and place the bridge crossings. Coordinate with CDOT Region 3 for input on the alternative evaluation to come to a consensus on the recommended plan.
        iv. Provide analysis and mapping of Base Flood Flows for 100 year and 500 year based on survey cross sections and assess impacts to surrounding property.
        v. Conduct a scour analysis
        vi. Design revetment
        vii. Provide required water elevations in the plan sheets
        viii. Provide additional information as required by Region 3 Hydraulics Engineer (CDOT)
        ix. Provide preliminary information, as noted above, for the FIR meeting
        x. Complete all documents for plans and reports as noted in the drainage design manual.
    c. Provide required plans per the CDOT Drainage Manual as well appropriate project specifications
    d. Follow the CDOT Coordination flowchart between Hydraulics, Geotechnical and Bridge Engineer for FIR/FOR submittal timing
5. There is a distinction between the SCAP effort and the hydraulics and hydrology required for Civil Engineering design work and the drainage reports. The level of detail for the SCAP is not necessarily that required to size inlets and culverts and layout specific drainage improvements. SCAP features should be sized and designed as part of the Civil Engineering design package and not the SCAP report.
6. This project contains several wildlife underpasses. The underpasses might not be able to be used as the primary conveyance for runoff and may require a separate drainage feature to allow for the unimpeded movement of wildlife through the structure. Participate and coordinate in

the ALIVE ITF for inclusion of the drainage system and integration with the wildlife needs on the pass. It is not desirable to have the wildlife passages be the primary conveyance of runoff and an effort may need to be made to supply separate drainage.

7. Provide plans, specs, details, hydrology/hydraulic analysis and drainage report of proposed storm sewer system per CDOT Drainage Manual.
    a. Integrate a new storm sewer system in to the existing system taking into account recommendations and commitments from the EA and the SCAP. Take advantage of existing culverts that have been rehabilitated in recent years.
8. Notes: Many of the culverts are listed as inactive, so they are not being regularly inspected. Culverts could have been repaired or replaced. New minimum size culvert under roadway is 36". Plan on replacing culverts on pass, but they can be evaluated and perform repairs or maintenance to extend the life of the culvert. Consider lining or repairs to existing. After initial survey, consider replacing or repair, not necessarily to televise each one. Rundowns are needed to convey the drainage from above the interstate to the creek. Review the priorities for getting water/runoff to the creek. Assessments could be minimized, maybe just consider what needs to be replaced first.

Environmental Compliance and EA Reevaluation

1. The goal of the Environmental Compliance is to monitor and ensure that the Project adheres to all of the mitigations noted in the EA.
2. Provide Environmental expertise as required to review project materials and ensure compliance to the EA.
3. It is assumed that the design effort will realize an efficiency in the detailed effort that will require a reevaluation of the original EA.
4. Provide guidance, expertise and coordination with FHWA and expertise for an environmental reevaluation of the original EA as required. Refer to the Work Assignments Section and Submittal Section.
5. The Template EA, currently underway, will evaluate the following items for mitigation at a minimum. The consultant shall maintain the ability to reassess the following areas if impacted by changes implemented by this design effort following the appropriate NEPA guidelines and direction. Following is the outline of the EA and the required areas of expertise:
    a. Template EA: Will include the P&N, PEIS summary, Alts summary, No Action safety and ops info, and environmental impact and mitigation tables based on current status of tech memos. The tech memos are as follows:
    b. Air Quality: Qualitative Assessment of AQ
    c. Biological Assessment: Summary of T&E species and impacts for the USFWS
    d. Biological Evaluation: Summary of USFS listed species and impacts, including moonwort
    e. Cumulative: Analysis of past, present and future projects on certain environmental resources within the corridor
    f. Floodplains: Assessment of floodplains/drainage impacts in the study area
    g. Geotech: Assessment of geologic conditions and impacts in the study area
    h. Hazmat: Potential hazmat in study area, impacts and mitigation
    i. Historic: Eligibility and effects recommendations for SHPO review and concurrence
    j. Social Resources: Analysis of existing land use, population and households, household income, employment status and industry types. Analysis of potential economic impacts. A list of all parks and rec resources in the study area. Impact analysis only for the non-4(f) resources. Rec 4(f) covered in separate document and will be referenced in this memo. EJ- assessment of low-income and minority population impacts and mitigation.
    k. Noise: Analysis of potential noise impacts and mitigation
    l. Section 4(f) Historic and Non-Historic: impacts, avoidance etc., analysis of all historic and 4(f) rec facilities in the corridor
    m. Transportation Resources (safety, traffic, etc.): Safety and operations analysis. All the purposed and need backup data and analysis of the proposed action.
    n. Utilities: existing utilities and potential impacts and mitigation
    o. Water Quality: Existing water quality features, SCAP info, proposed BMPs and other mitigation
    p. Wetlands: Existing wetlands, potential impacts, potential restoration areas
    q. Visual: Assessment of critical views, viewer groups, etc. Assessment of potential impacts to viewer groups and mitigation.
    r. Alternatives Evaluated: summary of alternatives considered for the proposed action including the screening process.
    s. CSS: Summary of CSS process, including PLT, TT, ITF meetings and commitments

t. Design and Bridge information: (A supplemental memo(s) to the EA containing background info on the design that went into the EA.)

ITS Components

1. The goal of the ITS effort is to design all ITS components of the project.
2. ITS components shall be designed such that they are fully integrated into the CDOT fiber line located on Vail Pass.
3. Provide plans and expertise for the automated remote closures system, variable message signs, variable speed limit signs, flashing median chevrons, lights, and other components.
4. There is a completed Systems Engineering Analysis for the "Vail Pass Westbound I-70 Road Closure System." It includes a preliminary layout for Variable Message Signs, Lane Use Signals, Blank Out Signs, CCTV Camera, Fiber Optic Communications and Ethernet Network Gear.

Utilities

1. The goal of the utility effort is to provide design plans for all required utility installation for all ITS components of the project.
2. Follow CDOT SUE guidelines for existing conditions survey.
3. Provide SUE compliant plans following Senate Bill 18-167.
4. Provide all required expertise for areas requiring lighting and electronic components, such as truck parking lighting, chain up station lighting and electronic signs, VMS, Variable Speed Limit signs, chevrons, and integration of these systems into CDOTs fiber line and systems at Eisenhower Tunnel.
5. As part of the scoping process, prepare an assessment of all the utility needs and all Intelligent Transportations Systems (ITS) and Network Services and submit to CDOT PM as a memo.

FHWA Controlling Criteria Variances

1. Prepare materials following the FHWA variance request guidelines for variances from the 10 controlling criteria.
2. Lead CDOT through the preparation of form 464 and the FHWA variance request process.
3. Identify mitigations for variance from the ten controlling criteria.
4. Identify potential crash reduction factors for mitigations.

Work Activity Assignments

This list establishes the consultant's individual task responsibility. The consultant shall maintain the ability to perform all work tasks which are indicated below by an 'X' mark in the consultant column in accordance with the applicable CDOT standards. Selected work tasks shall be assigned only after coordination and consultation with CDOT. The Project Team is responsible for coordinating the required work schedule for those tasks accomplished by CDOT and other agencies**. Many of the included Consultant Responsibilities revolve around maintaining and providing the appropriate expertise for the re-evaluation of the EA if required. Some are marked with an * asterisk.**

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
A. Project Initiation and Continuing Requirements:			
1. Initial Project Meeting		X	
2. Review Environmental Mitigation Requirements		X	
3. Independent Design Review		X	
4. Project Schedule		X	
5. Develop Design Criteria		X	
6. Initiate Survey (Map Preparation)		X	
7. Right-of-Entry and Permits		X	
8. Traffic Control		X	
9. Initial Submittals		X	
10. Progress Meetings		X	
11. Structure Review Meetings		X	
12. Project Management		X	
B. Project Development:			
1. Communication and Consensus Building			
a. Contact List		X	
b. Public Notices/Advertisements		X	
c. General Meetings			
(1) Small Group		X	
(2) General Public		X	
(3) Project Review		X	
d. Communication Aids			
(1) Graphics Support		X	
(2) Newsletter		X	
(3) Wall Displays		X	
(4) Study Model		X	
2. Project Review Team		X	
3. Survey			
a. Presurvey Conference		X	
b. Survey Data Research		X	
c. Secure Rights of Entry		X	
d. Project Control Survey			
(1) Locate or establish HARN Stations		X	
(2) Monumentation		X	
(3) Project Control		X	

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
e. Photogrammetry			
(1) Camera Calibration Report			
(2) Flight Plan			
(3) Flight			
(4) Contact Prints			
(5) Negatives			
(6) Enlargements			
(7) Photo Index			
(8) Supplemental Survey (wing points)			
f. Supplemental Surveying		X	
g. Accuracy Tests		X	Confirmation of existing information
h. Review (by Registered Professional Land Surveyor)		X	
4. Conceptual Design			
a. Aesthetics		X	
b. System Feasibility		X	
c. Alternatives Analysis		X	Provide optimization of improvements
d. Final Alternatives Reports			
e. Interchange Approval Process		X	
5. Data Gathering Analysis, and Mitigation Development			
a. Traffic Related			
(1) Traffic Study		X	
(2) Accident Study		X	
(3) Noise Study		X	*
(4) Air Quality			
(a) Air Quality Monitoring			
(b) Air Quality Analysis		X	*
(5) Alternate Transportation Sys.			
b. Archaeology			
(1) Gather Data & Analysis			
(2) Mitigation Implementation		X	*
c. Paleontology			
(1) Gather Data & Analysis			
(2) Mitigation Implementation		X	*
d. Initial Geology Investigation		X	
e. Water Quality			
(1) Quality Analysis		X	
(2) Quality Monitoring		X	
f. Ecological Assessment		X	*
g. Historical			
(1) Historical Bridge Clearance		X	

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
(2) Historical Study & Clearance		X	*
h. Floodplain and Drainage Assessment		X	
i. Right-of-Way			
(1) Early ROW		X	
(2) ROW Review		X	
j. 4(f)/6(f) Activity			
(1) Evaluation		X	*
(2) Clearance/Concurrence		X	*
k. Threatened and/or Endangered Species			
(1) Determination of Presence		X	
(2) Implement Mitigation		X	
l. Wetlands			
(1) Wetlands Determination		X	
(2) Wetlands Findings Report		X	
m. Hazardous Materials			
(1) Field Search		X	
(2) Research		X	
(3) Conduct in-situ tests		X	
(4) Analyze and Assess Impacts		X	
n. Existing Roadway/Major Structure		X	
o. Construction Requirements		X	
p. Aesthetic Considerations		X	
q. Utilities		X	
r. Economics		X	
s. Farmland			
t. Energy Usage		X	
6. Environmental Assessment (EA) Process		X	* Reevaluation
7. Environmental Impact Study (EIS) Process			
8. Design Report Process		X	
9. Obtain Permits		X	
C. Preliminary Design:			
1. Design Field Surveys			
a. Presurvey Conference		X	
b. Survey Data Research		X	
c. Secure Rights of Entry		X	
d. Project Control Survey			
(1) Locate or Establish HARN Stations		X	
(2) Monumentation		X	
(3) Local Project Control		X	
e. InRoads TMOSS Survey Openroads Designer		X	
f. Terrain Survey		X	
g. Utility Survey		X	
h. Hydraulic Survey		X	
i. Material Survey		X	
j. Supplemental Surveying		X	

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
k. Survey Report		X	
l. Accuracy Tests		X	
m. Review (by Registered PLS)		X	
n. Wetland Boundary		X	
2. Traffic Engineering		X	
3. Materials Engineering			
a. Preliminary Soil Investigation		X	
b. Pavement Rehabilitation		X	
c. New Pavement Structure		X	
d. Pavement Justification		X	
e. Pavement Design Report		X	
f. Existing Bridge Investigation		X	
g. Foundation Investigation		X	
h. Geotechnical		X	
4. Hydrology/Hydraulics Engineering		X	
a. Hydrology		X	
b. Hydraulics		X	
c. Preliminary Hydraulics Report		X	
5. Utility Coordination		X	
a. Location Maps		X	
b. Reviews and investigations		X	
(1) "Potholing"-Excavation		X	
(2) "Potholing"-Surveying Utility Locations		X	
c. Relocation recommendations		X	
d. Ditch Company coordination			
6. Roadway Design and Roadside Development		X	
a. Roadway Design		X	
b. Roadside Development		X	
(1) Guardrail and delineator		X	
(2) Curb Ramps and Sidewalk		X	
(3) Landscaping		X	
(4) Sound Barriers		X	
(5) Bike paths		X	
(6) Truck Escape Ramps		X	
(7) Rest Areas		X	
(8) Safety analysis		X	
c. Lighting Plan		X	
7. Right-of-Way		X	
a. Research		X	
b. Ownership Map		X	
c. Appraisal		X	
d. Acquisition		X	
8. Major Structural Design			
a. Structural Data Collection		X	
b. Structure concept study		X	

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
c. Value Engineering		X	
d. Structure Selection Report		X	
e. Foundation Investigation Request		X	
9. Construction Phasing Plan		X	
10. Preparation for the FIR		X	
11. Field Inspection Review		X	
12. Post FIR Revisions		X	
D. Final Design:			
1. Project Review		X	
2. Design Coordination		X	
3. Utility Coordination		X	
4. Hydraulic Design			
a. Data Review		X	
b. Storm Water Pollution Prevention Plan		X	
c. Major Structure Channel Design		X	
d. Final Hydraulics Report		X	
5. Interim Plans			
a. Initiate ROW Authorization Process		X	
b. Final Utility Plans		X	
c. Final Railroad Plans			
6. Right-of-Way			
a. ROW Plans Content		X	
b. Title Insurance and Closing Services		X	
c. Authorization Plan		X	
d. Appraisal Staking		X	
e. ROW Plan Revisions (During Negotiations)		X	
f. ROW Acquisition		X	
7. Materials Engineering			
a. Materials Data		X	
b. Stabilization validity		X	
c. Stabilization Plan		X	
8. Traffic Engineering			
a. Permanent Signing/Pavement Marking Plans		X	
b. Signalized Intersections		X	
c. Traffic Control Plan		X	
9. Roadside Planning			
a. Landscaping		X	
b. Other		X	
(1) Sprinkler systems/Liquid Anti-Icing		X	
(2) Bike paths		X	
(3) Sound barriers		X	
(4) Truck escape ramps		X	
(5) Rest Areas			
(6) Guardrail and delineator		X	
(7) Safety analysis		X	

PRECONSTRUCTION	CDOT/Other	Consultant	Notes
c. Lighting Plans		X	
10. Roadway Design		X	
11. Final Major Structural Design			
a. Structure Final Design		X	
b. Preparation of Structure Plans and Specifications		X	
c. Independent Design, Detail, and Quantity Check		X	
d. Bridge Rating and Field Packages		X	
e. Structure Final Review Plans and Specifications		X	
12. Construction Phasing Plan		X	
13. Plan Preparation for FOR		X	
14. Final Office Review		X	
15. Construction Plan Package		X	
16. Respond to Job Showing Questions		X	
17. Revise Plans during Advertisement – if necessary		X	
E. Corridor Management Support:			
1. Design Control		X	
2. Information Services		X	
3. Budget Planning Support		X	
F. Value Engineering		X	

SERVICES AFTER DESIGN	CDOT/Other	Consultant	Notes
A. Review of Shop Drawings		X	
B. Construction Services			
1. Coordinate Schedule		X	
2. Provide field observation			
a. Pile driving/caisson drilling		X	
b. Major concrete pours		X	
c. Placement of girders		X	
d. Splicing of girders		X	
e. Post-tensioning duct and anchorage placement		X	
f. Post-tensioning operations		X	
3. Technical assistance			
a. Design Support during Construction		X	Provide services after submittal of construction package, not full CM services
4. Submittals			
a. Diary		X	
b. Documentation/justification		X	
c. Progress reports		X	
d. Calculations, drawings, and specifications		X	

SERVICES AFTER DESIGN	CDOT/Other	Consultant	Notes
e. Daily time sheets		X	
C. Post Design Plan Modifications		X	
D. Post Construction Services:			
1. Final earthwork determination			
2. As-built plans			
3. Revisions to Right-of-Way Plans (Excess Land)		X	
4. Monument ROW		X	
5. Set Property Corners (Remainders)		X	
6. Deposit ROW Plans		X	
E. Construction Engineering			

Submittals

SUBMITTALS	CDOT/Other	Consultant	Notes
A. Project Initiation and Continuing Requirements:			
1. Periodic Reports & Billings		X	
2. Meeting Minutes		X	
3. Project Schedule		X	
4. Completed Specific Design		X	
5. Survey Plan		X	
6. Permissions to Enter (Form 730)		X	
7. Traffic Control Plan		X	
8. Initial Submittal of InRoads TMOSS and/or MOSS Compatible Data – Openroads Designer		X	
9. Initial Submittal of an Original Plan Sheet			
B. Project Development:			
1. Public Communication Contact List		X	
2. Route Location Survey:			
a. Electronic Survey Files		X	
b. Survey InRoads TMOSS Data Openroads Designer		X	
c. Monument Records		X	
d. Control & Monumentation Plan Sheets		X	
e. Aerial Photography Index Map Sheets			
f. Aerial Photography Contact Prints			
g. Aerial Photography Negatives			
h. Photogrammetry			
(1) Electronic Data			
(2) Base Map Sheets			
(3) Base Map Index Sheet(s)			
i. Rectified Photos with Mylar Originals			
3. System Feasibility Study			
4. Final Alternatives Report			
5. Noise Assessment Report		X	*
6. Air Quality Report		X	*
7. Archaeology Survey Report & Mitigation Plan		X	*
8. Paleontology Preliminary Report & Mitigation Plan		X	*
9. Water Quality Report (SCMP)		X	
10. Ecology Report		X	*
11. Historical Bridge Clearance or Mitigation Plan		X	*
12. Historical Cultural Resources Report		X	*
13. Floodplain and Drainage Assessment Report & Mitigation Plan		X	*
14. ROW Report		X	*
15. 4(f)/6(f) Mitigation Plan		X	*
16. Threatened and/or Endangered Species		X	*

SUBMITTALS	CDOT/Other	Consultant	Notes
Assessment			
17. Wetlands Findings Report		X	
18. Hazardous Materials Findings		X	
19. Environmental Assessment (EA)			
a. Preliminary EA			
b. Certified Verbatim Transcript			
c. Finding of No Significant Impact (FONSI)			* This project needs to cover the mitigation requirements from the EA AND the Consultant needs to provide the expertise for a re-evaluation if necessary
20. Environmental Impact Statement			
a. Draft EIS			
b. Certified Transcript of Meeting			
c. Final EIS			
21. Design Report Process			
a. Preliminary Design Report		X	
b. Final Design Report		X	
22. Permits			
a. 401 Permit		X	
b. 402 Permit		X	
c. 404 Permit		X	
d. Wildlife Certification		X	
e. NPDES Storm Water Permit		X	
23. Preliminary Design		X	
a. Electronic Survey			
b. Traffic Data & Recommendations		X	
c. Soils Investigation Report		X	
d. Pavement Design Report		X	
e. Existing Bridge Condition Report		X	
f. Foundation Investigation Report		X	
g. Engineering Geology Plan Sheet(s)		X	
h. Preliminary Hydraulics Report		X	
i. Utility Relocation Recommendations		X	
j. Ditch Structure Plans		X	
k. Stabilization Plan		X	
l. FIR Plan Set		X	
24. Final Design			
a. Corrected FIR Plan Set		X	
b. Preliminary Cost Estimate		X	
c. List of Deviations from Standard Design		X	

SUBMITTALS	CDOT/Other	Consultant	Notes
Criteria			
d. Final Hydraulics Report		X	
e. Signing/Pavement Marking Plans		X	
f. Signal Warrants			
g. Signalized Intersection Plans and specifications			
h. Traffic Control Plan		X	
i. Structural Selection Report		X	
j. Foundation Investigation Request		X	
k. Structure Final Review Plans and Special Provisions		X	
l. Construction Phasing Plan		X	
m. FOR Plan Sheets and Special Provisions		X	
n. FOR Cost Estimate		X	
o. FOR Revised Plans and Special Provisions		X	
p. Final Review Revisions		X	
q. Final Utility Plan Set		X	
25. Roadside Planning			
a. SWMP Plans & Specs.		X	
b. Certification of plant Availability		X	
c. Sprinkler System Plans & Specs.		X	
d. Bike path Plans & Specs.		X	
e. Sound Barrier Plans & Specs.		X	* Provide expertise for EA re-evaluation if necessary
f. Truck Escape Ramp Plans & Specs.		X	
g. Rest Area Plans & Specs.			
h. Lighting Plans		X	
C. Right-of-Way			
1. Title Commitments		X	
2. Preliminary Ownership Map (include in the FIR plan set)		X	
3. Area Calculations		X	
4. Authorization Plans		X	
5. Legal Descriptions		X	
6. ROW Authorization Plans		X	
D. Construction Plan Package			
1. Roadway Design Data Submittal (Form 463)		X	
2. Major Structure Design Final Submittal		X	
3. Record Plan Sets		X	

Invoice Formatting and Information

Consultant Invoicing Guidelines. Please provide the following seven sections and information in each invoice in the following order:

1. **Form 1313**
2. **Invoice**
    a. Provide invoice in a 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
    b. Provide columns next to employees ensuring Consultant has reviewed for:
        i. Employee on original TO
        ii. Employee on MPA and date
        iii. Employee added to TO by letter and date
        iv. Employee added to MPA Date and documentation
    c. Provide a header for the invoice noting:
        i. SAP OL#, SAP PO#, Invoice Date, Invoice #, Project # and subaccount #, current billing period, TO# and any other pertinent information
3. **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.
    a. 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.
    b. 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.
    c. A description of the cause for delays beyond the planned completion of time of work activities or millstones contained in the project.
    d. 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. In other words, verify the burn rate of prime, subs, and vendors to ensure they are on track and on task.
    e. 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.
    f. Documentation of meetings that were held during the subject time period.
    g. A report on the participation of DBE sub-consultants.
4. **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)
5. **Labor backup** – timesheets

a. The Prime, Sub-consultants and Vendors shall submit detailed hourly back up of effort noting time/date of activities and number of hours or costs. Lodging backup shall be submitted through ODC backup.

6. **ODC backup** – Only Submit documentation pertaining to the project and the invoice
    a. Provide a summary of ODC Cover sheet
        i. Purpose of trip, Date of Trip, Who went
    b. 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.
7. **Sub-consultant billings and Vendors** - should have the same documentation as prime, except Form 1313, which is optional.