

GENERIC SCOPE OF WORK BASIC CONTRACT

CONTRACT TYPE [CHECK ONE]

- Cost Plus Fixed Fee
- Lump Sum

CONTRACT DATE: **Anticipated February 2010**

PROJECT NUMBER: NH 0361-093

PROJECT LOCATION: US-36: Federal to Wadsworth Parkway.

PROJECT CODE: 17516.

THE COMPLETE SCOPE OF WORK INCLUDES THIS DOCUMENT (ATTACHED TO THE CONTRACT FOR CONSULTANT SERVICES) AND, IF REFERENCED,

- SECTION 1 PROJECT SPECIFIC INFORMATION
 - SECTION 2 PROJECT MANAGEMENT AND COORDINATION
 - SECTION 3 EXISTING FEATURES
 - SECTION 4 REFERENCE ITEMS NEEDED BY THE CONSULTANT
 - SECTION 5 GENERAL INFORMATION
 - SECTION 6 ENVIRONMENTAL WORK TASK DESCRIPTIONS
 - SECTION 7 PRECONSTRUCTION WORK TASK DESCRIPTIONS
 - SECTION 8 SERVICES AFTER DESIGN
 - SECTION 9 CONTRACT CONCLUSION (CHECKLIST)
- APPENDICES

SECTIONS 3 AND 4 AND SECTION 6 ARE AVAILABLE AS SEPARATE DOCUMENTS AND APPLY TO THE CONTRACT ONLY BY REFERENCE

Comments regarding this scope may be directed to:

David Wells

CDOT Agreements Office,

(303)757-9480

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SECTION 1 - PROJECT SPECIFIC INFORMATION

1 PROJECT BACKGROUND

The Colorado Department of Transportation and the Regional Transportation district are currently completing the US-36 Environmental Impact Statement. A Record of Decision is anticipated to be finalized in December of 2009.

CDOT recently applied for a TIGER Grant to construct a portion of the US-36 corridor, with construction to be completed by February 2012.

In the application, CDOT requested \$160 million dollars to reconstruct US-36 from Federal to Wadsworth Blvd or \$260 million dollars to reconstruct US-36 from Federal to Interlocken Pkwy. While this scope of work assumes the \$160 million dollar grant request will be successful, the project scope may be adjusted based on the results of the grant application. The announcement as to which projects have been selected to receive Grant Funds, and the extent of Funding granted, is expected by mid January 2010.

As part of this effort, CDOT requires consulting services to bring the level of project design from the present 5% to 10% to approximately 30% and to perform all work activities required for the procurement of a design build contractor for the project. CDOT will then proceed with a Design/Build contract to complete design and construction.

This project includes the construction of one managed lane with a 12' inside shoulder and a 4 foot buffer in each direction, reconstruction and rehabilitation of pavement in various locations, construction of sound and retaining walls, bikeway, replacement of the Lowell Blvd Bridge, ITS, lighting, minor ramp work and some BRT related improvements.

Due to the complexity, extremely aggressive schedule and importance of this project to transportation in the US-36 Corridor, CDOT is strongly encouraging a team approach, with several consultant firms participating, in an effort to maximize efficiency, complete the project by February 2012 as required in the TIGER application, and ensure the highest quality in the both the preliminary design and Design/Build procurement activities.

A single consultant team is encouraged in order to:

- ◆ Meet an extremely aggressive project schedule (4 months for preliminary design and Design/Build Procurement).
- ◆ Consolidate multiple/redundant RFPs, selections, invoicing, etc., into one single RFP, selection, invoicing, etc.
- ◆ Maximize efficiency by consolidating multiple points of contact into one project manager in responsible charge of the deliverables called for in this scope of work on schedule.
- ◆ Provide sufficient staff resources demanded by the scope and scale of a major corridor reconstruction project.
- ◆ Ensure consistent, high quality work to move the project forward toward completion on time and within or under budget.

2 PROJECT GOALS

This project is intended to produce the following improvements:

- A. Increase capacity
- B. Provide Congestion relief
- C. Expand mode of travel options
- D. Increase efficiency of transit service
- E. Update outdated highway facilities
- F. Improve Safety

- G. Higher level-of-service
- H. Improve riding surface (smoother or stronger pavement)
- I. Bridge Replacement
- J. Rehabilitation
- K. Reconstruction
- L. Improve ITS
- M. Bikeway

3 PLANNED IMPROVEMENTS

This project is located on US-36, from milepost 48.0 to milepost 54.9, in Adams and Broomfield Counties.

4 PROJECT COSTS

The construction cost of this project is estimated at \$ 160,000,000, but could change based on the results of the TIGER grant application.

5 WORK DURATION

The time period for the work described in this scope is approximately 120 calendar days.

6 CONSULTANT RESPONSIBILITY AND DUTIES

The Consultant is responsible for:

- Preliminary Engineering to prepare project for Design-Build process.
- Professional services and deliverables required for design-build procurement process. Developing, refining, implementing and supporting the US-36 Corridor Reconstruction Project, hereby called the "Project," utilizing a design-build procurement process.

Descriptions of the consultant responsibilities and duties are further described in this document.

7 WORK PRODUCT

The Consultant work products are:

- A. Reports
- B. Field Inspection Review (FIR) Plans and Estimates
- C. Project Coordination
- D. Schedules
- E. Meeting Minutes

Detailed work product requirements are described in the following sections. All work required to complete this Scope of Work requires the use of English Units.

8 WORK PRODUCT COMPLETION

All submittals must be accepted by the CDOT Contract Administrator or designee.

9 ADDITIONAL PROJECT INFORMATION

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

- A. US-36 FEIS
- B. US-36 Record of Decision
- C. US-36 TIGER Grant Application

Copies of these documents may be obtained from CDOT Printing and Visual communications Center, Phone no. 303-757-9214, Room 117, 4201 East Arkansas Avenue, Denver, Colorado 80222. A moderate fee, determined by document size, will be charged. An additional charge will be added for requests by mail or for billing. Please provide a notice of two working days prior to obtaining the document(s) in person.

10 SCOPE OF WORK ORGANIZATION

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

SECTION 3 - EXISTING FEATURES

1 STRUCTURES



Colorado Department of Transportation Field Log of Structures

Data of Data: May 16, 2005

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Route	Mile Point	Structure	Span #	Type	Feature Intersected	Feature carried	Str Len	Road Width	Inv Rate	Posted	Vertical Clearances					Year Built	Rehab	District
											Max	N/E	Min	Max	S/W			
0036B	48.035	E-16-FK	4	CIC	SH 121 ML SBND	US 36 ML	231	30.0	22			20' 7"	19' 7"	17' 7"	16' 4"	1951		6
0036B	48.036	E-16-HV	4	CIC	SH 121 ML NBND	US 36 ML	232	28.0	27			16' 7"	17' 11"	16' 5"	15' 7"	1971		6
0036B	48.037				JCT SH 121-LEAVE BROOMFIELD													6
0036B	48.248				BOULDER-JEFFERSON CL													6
0036B	49.300	E-16-OK	2	SIGNB	MEDIAN		22					NO MAX	17' 7"	NO MAX	17' 10"	1991		6
0036B	49.477	E-16-FL	4	CIC	CNTY RD OLD WADS	US 36 ML	182	30.0	23			15' 5"	15' 5"	15' 5"	15' 5"	1951		6
0036B	49.985	E-15-LY	3	CBGC	BNSF RR	US 36 ML	244	86.0	35							1985		6
0036B	50.250	E-15-NV	1	SIGNC	EBND RAMP R		30					NO MAX	17' 2"			1991		6
0036B	50.360	E-16-NM	2	CPGC	104TH AVE	US 36 ML	212	76.0	45			16' 5"	16' 5"	16' 5"	16' 5"	1991		6
0036B	50.895	E-15-FS	2	CBGC	PED ACCESS/BIG DRY CREEK	US 36 ML	29		36							1951		6
0036B	50.750	E-16-NU	1	SIGNC	WBND RAMP R		30							NO MAX	18' 0"	1991		6
0036B	51.360	E-16-KY	2	CPGC	HARLANWEST.BLVD.	US 36 ML	314	60.0	44			19' 7"	19' 7"	19' 7"	19' 7"	2001		6
0036B	51.530	E-16-OL	2	SIGNB	MEDIAN		29					NO MAX	17' 9"	NO MAX	18' 1"	1991		6
0036B	51.791				ENTER WESTMINSTER													6
0036B	52.000	E-16-OJ	1	SIGN	WBND ML R		70							UNKN	OWN	2001		6
0036B	52.200	E-16-DU	1	SIGNC	EBND ML		28					UNKN	OWN			2000		6
0036B	52.201	E-16-LA	2	CPG	92ND AVENUE	US 36 ML	256	105.0	52			16' 5"	16' 5"	16' 4"	16' 4"	1983		6
0036B	52.479	E-16-FO	4	CICK	SH 95 ML	US 36 ML	191	76.0	32			15' 1"	14' 9"	17' 3"	16' 11"	1951 1973		6
0036B	52.480				JCT SH 95-SHERIDAN BLVD													6
0036B	52.500	E-16-PW	2	STT	PED OVERPASS(RTD)	US 36 ML	210	10.0	N/A			17' 9"	17' 9"	17' 9"	17' 9"	1996		6
0036B	52.703				JEFFERSON-ADAMS CL													6
0036B	52.705	E-16-OT	1	SIGNC	HOV LANES		16					NO MAX	18' 0"	NO MAX	18' 0"	1992		6
0036B	52.706	E-16-OU	1	SIGNC	WBND RAMP R		23					NO MAX	17' 4"	NO MAX	17' 4"	1992		6
0036B	53.000	E-16-QP	1	SIGN	EBND ML R		70					UNKN	OWN			2001		6
0036B	53.000	E-16-QV	1	SIGN	WBND ML R		70							UNKN	OWN	2001		6
0036B	53.030	E-16-OV	1	SIGNC	WBND ML		26					NO MAX	17' 10"	NO MAX	17' 10"	1992		6
0036B	53.832	E-16-PP	4	CICK	80TH AVE	US 36 ML	180	52.0	22			15' 8"	14' 4"	17' 4"	16' 4"	1951 1971		6
0036B	54.322	E-16-FR	3	CICK	LOWELL BLVD	US 36 ML	130	86.5	22							1951 1989		6
0036B	54.324				LEAVE WESTMINSTER													6
0036B	54.510	E-16-ML	1	SIGNC	HOV LANES		13					NO MAX	18' 7"	NO MAX	18' 7"	1990		6
0036B	54.544	E-16-RV	1	SIGN	EBND ML		77					UNKN	OWN			2002		6
0036B	54.730	E-16-P2	1	SIGN	EBND ML + RAMP R							UNKN	OWN			2002		6
0036B	54.780	E-16-RW	1	SIGN	EBND ML		47					UNKN	OWN			2002		6
0036B	54.830	E-16-KA	1	SIGN	EBND ML - VMS		114					UNKN	OWN			2002		6
0036B	54.858	E-16-PK	2	CPGC	US 287 ML	US 36 ML	345		36			17' 5"	17' 2"	18' 0"	17' 4"	2002 2002		6

Mile Sp

2 UTILITIES

- ◆ Xcel
- ◆ QWEST
- ◆ Westminster

Contact Utility Notification Center of Colorado (U.N.C.C.) at 1-800-922-1987

3 IRRIGATION DITCHES

- ◆ Farmers Highline canal
- ◆ Allen Ditch

4 RAILROADS

- ◆ BNSF

Note: The above is a list of the known features in the area. It should not be considered as complete. The Consultant should be aware of any other features that may exist in the area.

SECTION 4

- REFERENCE ITEMS NEEDED BY THE CONSULTANT

Note: cross out non-applicable items

1 CURRENT CDOT MANUALS, SPECIFICATIONS, STANDARDS, ETC.

Electronic files of applicable standards. All CDOT forms specified in this document.
The consultant shall obtain and utilize the most recent CDOT adopted references including standards and specifications, manuals and software or as directed by the CDOT/PM.

SECTION 5 - GENERAL INFORMATION

1 NOTICE TO PROCEED

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

- A. Reviews and Approvals.
- B. Response and Direction

2 PROJECT COORDINATION

- A. Routine Working Contact

The routine working contact will be between the CDOT Project Manager (CDOT/PM) and the Consultant Project Manager (C/PM) as defined in Appendix C.

- B. Project Manager Requirements

Each Project Manager will provide the others with the following:

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

3 ROUTINE REPORTING AND BILLING

The Consultant will provide the following on a routine basis:

- A. Coordination

Coordination of all contract activities by the C/PM

- B. Periodic Reports and Billings

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

- C. Minutes of all Meetings:

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

- D. General Reports and Submittals

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

4 PERSONNEL QUALIFICATIONS

The Consultant Project Manager (C/PM) must be approved by the CDOT Contract Administrator. Certain tasks must be done by Licensed Professional Engineers (PE) or Professional Land Surveyors (PLS) who are registered with the Colorado State Board of Registration for Professional Engineers and Land Surveyors. National Institute for Certification in Engineering Technology (NICET) or other certifications may be required for project inspectors and testers.

5 CDOT COMPUTER/SOFTWARE INFORMATION

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

- A. Earthwork InRoads
- B. Drafting/CADD InRoads and Microstation with CDOT's formatting configurations and standards.
- C. Survey CDOT Inroads TMOSS
- D. Geometry CDOT COGO (Coordinate Geometry)
- E. Bridge Staff Bridge software shall be used in either design or design check
- F. Estimating Transport (an ASHTO sponsored software)
- G. Specifications Microsoft Word

6 COMPUTER DATA COMPATIBILITY

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

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

7 PROJECT DESIGN DATA AND STANDARDS

A. General:

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

B. Specific Design Criteria:

Appendix B is a list of specific project criteria. The list is comprehensive and may include items that are not required for a tasks defined in this scope. The Consultant shall submit proposed any changes to the pertinent criteria to the CDOT/PM at one of the periodic progress meetings prior to initiating design.

C. Construction Materials/Methods:

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

SECTION 6

- ENVIRONMENTAL WORK TASK DESCRIPTIONS

The purpose of section is to support the post-US 36 FEIS/ROD environmental work needed to get the described/funded project phase out for a Design/Build bid. This effort will support following:

- ◆ Verification of ecological data as represented in the FEIS including exact prairie dog/burrowing owl locations and the development of a mitigation plan
- ◆ Verification of noxious weed areas and development of mitigation plan sheets for the project
- ◆ Support wetland delineation effort from 104th to Wadsworth and/or for the west end portions of this project as required
- ◆ Support possible reassessment of historic resources required by the Programmatic Agreement prepared for the ROD between CDOT, FHWA, and the State Historic Preservation Officer.

SECTION 7 -.PRECONSTRUCTION WORK TASK DESCRIPTIONS

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’ in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Selected work tasks shall be assigned only after coordination and consultation with CDOT. The Consultant is also responsible for coordinating the required work schedule for those tasks accomplished by CDOT and other agencies. The Consultant should review this entire section to identify applicable material. Contact the Colorado Department of Transportation/Project Manager (CDOT/PM) if clarification is required (see Section 2.01).

The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice should be planned by the Consultant and coordinated with the CDOT/PM. The time of their accomplishment will overlap and parallel paths of activity should be planned to finish the development phase in accordance with the shortest possible schedule. The type and number of meetings, documents, etc., will depend on the category and characteristics of the project work. A project plan shall be developed by the Consultant which satisfies the requirements of the project development. This plan must be approved by the Contract Administrator (see Section 2.01) before starting the work.

	<u>CDOT/ Other</u>	<u>Consultant</u>
1 <u>PROJECT INITIATION AND CONTINUING REQUIREMENTS</u>		
A. Initial Project Scoping Meeting	X	X
Identify scope elements, responsibilities and coordination necessary to complete the work.		
B. Review applicable environmental documents and requirements	_____	X
Ensure that any mitigation or commitments are addressed.		
C. Independent design review	_____	X
An independent design review shall be performed on any design accomplished by others that will be used in this project. A report identifying the results of these reviews shall be submitted to the CDOT/PM within one week of the review.		
D. Develop a Project Schedule and assign tasks	_____	X
E. Identify design criteria.	_____	X
Submit a copy of Appendix B -Specific Design Criteria.		
F. Initiate survey	X	_____
Arrange Preliminary Field Survey and/or Aerial Survey. CDOT Form 1217a is an outline of a complete survey request and may be used as a guide for completing the survey plan.		
G. Obtain necessary Right-of-Entry and permits	X	_____
a Some activities may require work on land not controlled by CDOT. In such cases the Consultant shall obtain the necessary written permission to enter the premises.		

- b Included in this written permission will be the names and telephone numbers of persons to contact should notification prior to entry be necessary. These written
- c Permissions apply to CDOT personnel as well as Consultant personnel. CDOT Form 730 may be used for this purpose. Signed copies of written permission will be submitted to the CDOT/PM prior to entering private property for survey work.
- d Some activities such as materials testing on existing pavement and structures may require a permit. Permits will be obtained and copies submitted to the CDOT/PM.

H. Traffic Control

X

X

Consultant field activities that interfere with traffic operations within existing roadways will require control of traffic. The Consultant will plan and provide any required traffic control for the survey, testing, or the design process. Traffic control operations will be in accordance with the MUTCD. The proposed Method for Handling Traffic (MHT) must be submitted to the CDOT/PM. Also, certification of the Traffic Control Supervisor as a Worksite Traffic Supervisor by the American Traffic Safety Services Association (ATSSA) or as a TCS (Traffic Control Supervisor) by the Colorado Contractors Association (CCA) shall be required.

I. Initial Submittals

X

Submit the following samples to the CDOT/PM for approval:

- a An original plan sheet that complies with this scope of work
- b Photogrammetric and/or survey data and a drawing or photograph in accordance with the requirements specified in this scope of work.

Note: No original plan sheets or photogrammetric survey work will be accomplished until satisfactory samples have been received.

J. Progress Meetings

a CDOT and Consultant Project Managers

X

X

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

- i Activities required to be complete since the last meeting
- ii Problems encountered/anticipated and potential solutions
- iii Project Schedule Update
- iv Action Items
- v Coordination required with other agencies

The consultant will provide meeting minutes.

b Structure Review Meeting

X

X

While the major structural design work is progressing, the Consultant shall meet periodically with the CDOT Structure Reviewer to review the work. These meetings

may be in addition to, or in conjunction with, the Project Progress Meetings. The complexity of the structure shall be considered by the CDOT Structure Reviewer to determine the frequency of review meetings. Other required meetings are described in subsequent sections.

K. Project Management

X

The Consultant will coordinate all the work tasks being accomplished by all parties to ensure project work completion stages are on schedule.

L. Project Meeting Minutes

X

Project Meeting Minutes shall be completed and provided to the CDOT Project Manager within one week of the actual meeting

2 **PROJECT DEVELOPMENT**

A. Communication and Consensus Building

a Contact List

X

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

i The information on the list shall include as a minimum:

A Name

B firm (if any)

C Mailing/E-mail address

D Phone/Fax number

ii The contacts will be compiled from the list below and as supplemented by the Project Team, and the attendees at public meetings.

A Public Agencies

B Elected/Appointed Officials

C Neighborhood Groups

D Property Owners/Tenants

E Business Interests

F Special Interests

G Railroads

H Media Contacts

B. Public Notices/Advertisement

_____ X

Publicize the proposed project in accordance with the CDOT policies and procedures. Copies of the publication shall also be mailed to the individuals on the "contact list".

Information obtained from small group and general public meetings shall be used in the project development process.

a Meetings

The types and number of meetings shall be flexible and determined by an interactive process as approved by the CDOT/PM. Minutes of these meetings shall be provided to the CDOT/PM and all participants.

- | | | | |
|---|-----------------------------------|---|---|
| i | Small Group Meetings (one-on-one) | X | X |
|---|-----------------------------------|---|---|

Meet with property and business owners or others directly affected by the project work to identify likely impacts and discuss possible mitigation or resolutions.

- | | | | |
|----|--|---|---|
| ii | General Public Meetings (informal and workshops) | X | X |
|----|--|---|---|

The format of these meetings will be dictated by the project and goals for the meetings. These meetings may be used to establish communications with the public, add to the “contact list”, and gather information regarding local concerns. The meetings may also take the form of a work session or workshop with the affected parties.

- | | | | |
|-----|--------------------------|---|---|
| iii | Progress Review Meetings | X | X |
|-----|--------------------------|---|---|

These meetings are intended to disseminate project progress information to the public and representatives of local entities. Notices will be mailed at least 14 days in advance of these meetings to those on the “contact list”. The Consultant will provide the presentation aids, and help conduct the meeting.

b Communication Aids

- | | | | |
|---|------------------|-------|---|
| i | Graphics Support | _____ | X |
|---|------------------|-------|---|

Provide the graphics for presentations and project documents. This may include slides, overhead projector slides, maps and plan views of conceptual design, computerized presentations and other displays for visual presentations at meetings.

- | | | | |
|----|------------|---|---|
| ii | Newsletter | X | X |
|----|------------|---|---|

A newsletter which will contain project progress information and announcements will be published at the specified interval and will be distributed to those on the “contact list” specified by the CDOT/PM.

- | | | | |
|-----|--------------|-------|-------|
| iii | Local Office | _____ | _____ |
|-----|--------------|-------|-------|

Obtain and maintain an office within the project area to conduct small group meetings and provide displays/information to the public.

C. Survey

Surveys will be conducted in accordance with the CDOT Survey Manual, the latest addendum thereof, and applicable state statutes.

- | | | | |
|---|----------------------|---|-------|
| a | Presurvey Conference | X | _____ |
|---|----------------------|---|-------|

A presurvey conference shall be held as per CDOT Survey Manual. The consultant shall attend the Presurvey conference prior to any right of way or survey work

b	Survey Data Research.	X	_____
	Research shall be done as per CDOT Survey Manual and the CDOT Right-of-Way Manual.		
c	Secure Rights of Entry	X	_____
	Follow procedures in the CDOT Survey Manual.		
d	Project Control Survey:		
i	Locate or Establish HARN Stations	X	_____
	Project control shall be tied to the nearest Colorado High Accuracy Reference Network Station (HARN). In the event there are no HARN stations within 3 miles of the project (Order B, 1:1,000,000 accuracy), or HARN Densification (Order B-2, 1:500,000 accuracy), additional HARN Densification stations shall be set. NGS Blue Book procedures shall be followed for all HARN Densification stations. This will include proper spacing using proper monumentation, equipment, observation procedures, coordination through the Colorado State Geodetic Advisor and submission to NGS for inclusion in the National Database.	X	_____
ii	Monumentation	X	_____
	Materials will be supplied by CDOT care is to be taken to install said monumentation in locations that are readily usable for the project and in a safe location so that they can be utilized throughout construction (no monumentation shall be set on or near the centerline of the proposed roadway).		
iii	Local Project Control	X	_____
	Survey the required project control (centerline/baselines and elevation reference) as required. Prepare a control survey diagram showing graphical representation of all monuments used for control. Tabulate coordinates and physical descriptions of all found monuments and other physical evidence.		
e	Land Survey/Boundary Survey	X	_____
	Tie aliquot, property and other land monuments to the control survey. Prepare a Land Survey Control Diagram showing graphical representation of all found aliquot, property and land monuments and their relationship to the project control. Tabulate the coordinates and physical description of all found monuments and other physical evidence.		
f	TMOSS (Topographic) Survey	X	_____
	Collect the data required to produce a planimetric map and submit in TMOSS format. Features located will include, but not be limited to signs, mailboxes, fences, driveways, curb cuts, curbs, sidewalks, and edges of pavements. Horizontal accuracy shall be as specified in the CDOT Survey Manual for a CDOT class C or D TMOSS survey.		

	<u>CDOT/ Other</u>	<u>Consultant</u>
g Terrain (Relief or Elevation) Survey	<u>X</u>	_____
Collect elevation data and submit in TMOSS format. Natural ground elevations shall be as specified in the CDOT Survey Manual.		
h Utility Survey	<u>X</u>	_____
Locate utility poles, manholes, valves, pedestals, guy wires, and other visible utility features. Survey underground utilities as marked by the utility companies. Determine invert elevations of manholes and vaults and survey the locations of utilities exposed by "potholing".		
i Hydraulic Survey	<u>X</u>	_____
Locate culverts, storm sewer pipes, inlets, vaults, manholes and determine invert elevations. Locate inlets and determine invert elevation of pipes. Accomplish drainage situation surveys for designated culverts and bridges.		
j Material Sources	<u>X</u>	_____
Survey designated material sources as specified.		
k Supplemental Surveying:	<u>X</u>	_____
As required and specifically requested.		
l Survey Report:	<u>X</u>	_____
Prepare a Survey Report as required in the Survey Manual.		
m Photogrammetry:	<u>X</u>	_____
i Camera Calibration Report	<u>X</u>	_____
ii Flight Plan	<u>X</u>	_____
iii Flight	<u>X</u>	_____
iv Contact Prints	<u>X</u>	_____
v Negatives	<u>X</u>	_____
vi Enlargements	<u>X</u>	_____
vii Photo Index	<u>X</u>	_____
viii Supplemental Survey (wing points)	<u>X</u>	_____
ix Data Reduction	<u>X</u>	_____
A Topographic Contours		
B Planimetric (Topography)		
x Map Compilation	<u>X</u>	_____
A Index Maps		

	<u>CDOT/ Other</u>	<u>Consultant</u>
<i>B Finished Maps</i>		
n Accuracy Tests:	<u>X</u>	_____
Tests are to be performed on a regular basis throughout the project by the consultant.		
o Review by Professional Land Surveyor	<u>X</u>	_____
The accuracy tests are to be reviewed by the PLS in responsible charge for the project, and submitted to the project engineer and made part of the project records. Further review of all aspects of the field and office work shall also be the responsibility of the PLS in responsible charge.		

Note: The completed survey shall be reviewed by the Region survey unit. Two weeks should be provided in the schedule to complete.

Note: This section of the scope of work applies after the environmental clearance document and clearances have been completed and is not limited to the following:

Noise, Air Quality, Alternate Modes, Archaeology, Paleontology, Hydraulics, Hydrology, Water Quality, Ecological Assessment, Historical, Floodplains, Wetlands, ROW, 4f/6f, As well as the following: Threatened and Endangered Species, Hazardous Materials, Traffic and Safety, Environmental Justice and cumulative and indirect impacts.

Note: The following requirements for the listed categories “a” through “s” may have been completed in the environmental phase.

D. Gathering Data, Analysis, and Mitigation Development	_____	<u>X</u>
a Traffic Related:	_____	<u>X</u>
i Traffic Study.	_____	<u>X</u>
A Obtain the necessary data and perform the necessary traffic counts (including percentage of trucks, directional split and turning movements) and produce traffic projections for the design year in accordance with generally accepted procedures.		
B The consultant is required to request the appropriate safety document through the CDOT/PM and incorporate the recommendations into the project design.		
b Noise Study:	<u>X</u>	_____

	<u>CDOT/ Other</u>	<u>Consultant</u>
Prepare a noise assessment analysis in accordance with FHWA noise impact regulations. As a minimum, this activity will consist of the following:		
i	<u>X</u>	_____
ii	<u>X</u>	_____
iii	<u>X</u>	_____
iv	<u>X</u>	_____
c	_____	<u>X</u>
i	_____	<u>X</u>
Monitor the air quality including but not limited to particulates, carbon monoxide (during the months of December and January) and ozone (during July and August), to obtain the required data.		
ii	_____	<u>X</u>
Prepare an air quality report and submit it to CDOT for approval.		
iii	_____	<u>X</u>
Evaluate the effect of other transportation systems on the proposed concepts when required, including but not limited to alternative modes, TDM (Traffic Demand Modeling) and TSM (Traffic Systems Management).		
d	<u>X</u>	_____
i	_____	_____
<i>A Conduct a field survey and test excavations as specified.</i>		
<i>B Complete a laboratory analysis of the diagnostic specimens.</i>		
<i>C Write the archaeology survey report to recount the analysis of artifacts and describe the culture and importance.</i>		
<i>D Develop and write the archaeology mitigation plan.</i>		
<i>E Coordinate the plan with the State Historic Preservation Office (SHPO) and other agencies as required (via the Region Environmental Manager).</i>		
ii	_____	_____
<i>A Coordinate activities with the designated agencies</i>		
<i>B Excavate the site</i>		
<i>C Analyze artifacts</i>		
<i>D Finalize and submit an archaeology survey report which describes the culture and importance of the artifacts.</i>		

	<u>CDOT/ Other</u>	<u>Consultant</u>
e Paleontology	_____	<u>X</u>
i Gather Data and Analyze	_____	<u>X</u>
A Determine if paleontologic resources are present within the project site.		
B Conduct a field survey.		
C Conduct a literature survey.		
D If any resources are found, conduct an analysis to determine their significance. Determine the potential for additional resources.		
E Write a preliminary paleontology report.		
F Develop the paleontology mitigation report and coordinate with FHWA.		
ii Mitigation Implementation	_____	<u>X</u>
A Coordinate activities as required.		
B Excavate the site.		
C Analyze the resources.		
D Prepare and submit the final paleontology report.		
f Initial Geology Investigation	<u>X</u>	_____
A visual inspection of the project area shall be performed to determine possible geologic impacts on the design concepts under consideration. Impacts such as major rock cuts, unsatisfactory subgrade materials, etc., shall be evaluated.		
g Water Quality	_____	<u>X</u>
i Quality Analysis	_____	<u>X</u>
A Determine the impact of the project during and following construction by considering the project location and design concept in relation to existing water resources such as: including streams, rivers, lakes, ponds and aquifers.		
B Develop a mitigation plan which includes construction and permanent best management practices for erosion control measures.		
C Identify necessary permits		
ii Write the water quality report	_____	<u>X</u>
iii Quality Monitoring	<u>NA</u>	NA
Collect and analyze samples as required.		
iv Obtain the water quality baseline data prior to construction	<u>NA</u>	NA
h Ecological Assessment		
This effort will support the verification of ecological data represented in the FEIS that include exact prairie dog/burrowing owl locations and the development of a		

	<u>CDOT/ Other</u>	<u>Consultant</u>
mitigation plan, verification of noxious weed areas and development of mitigation plan sheets for the project		
i To support final design efforts.	_____	<u>X</u>
ii Conduct a ground verification of the presence of these resources and map them onto plan sheets. Quantify the impacts of the preliminary design footprint on these resources.		
iii Prepare mitigation plan sheets and specifications to mitigate for these resource impacts.	_____	<u>X</u>
iv Coordinate with other state and federal agencies as required	_____	<u>X</u>
v Research available data	_____	<u>X</u>
vi Conduct a field study (work shall be performed between April 15 th and November 15 th)	_____	<u>X</u>
vii Investigate the concerns raised by coordinated agencies.	_____	<u>X</u>
viii Write the ecological report.	_____	<u>X</u>
i Historical	<u>X</u>	_____

This effort will support the possible reassessment of historic resources required by the Programmatic Agreement prepared for the US 36 ROD between CDOT, FHWA, and the State Historic Preservation Officer.

This task will only be required if certain thresholds are met as described in the US 36 Corridor Programmatic Agreement.

A person or persons who meet or exceed the Secretary of the Interior’s Professional Qualifications Standards for History or Historic Architecture should complete or supervise the following tasks:

- a) Review design plans as they are finalized for the Preferred Alternative (either Design/Build or Design/Bid/Build), to determine the following: _____ X _____
- ◆ Changes in the Area of Potential Effects (APE) and providing summaries of these changes to CDOT. Apply the guidance provided by CDOT (found in manuals and the Section 106 Programmatic Agreement), the Advisory Council on Historic Preservation, and AASHTO, when summarizing changes to the APE.
 - ◆ The presence of any additional historic properties need to be surveyed either because they recently met the 45-year-old age criteria or because of APE revisions. Use FEIS data, Assessor, building permits and other data to determine the age of properties.
 - ◆ Additional or different impacts to previously-surveyed properties that were determined to be eligible for or listed on the NRHP or those resources that were treated as eligible for the purposes of the FEIS. For a list of these properties, please refer to Chapter 4.7 of the FEIS.
 - ◆ Assess the current condition of resources previously determined to be eligible to the NRHP to determine if the resources still meet the criteria or no longer meet the criteria (due to deterioration, demolition, or other major changes to the resource).
- b) Prepare site forms with determinations of eligibility If effort is less that assumed, some of this effort could go towards reevaluating certain historic properties that were treated as eligible for the purposes of the FEIS. These properties would be surveyed and determinations of NRHP eligibility or supporting/non supporting status for segments of linear features would be prepared. Site forms (including OAHF re-evaluation forms) for these resources will be prepared according to the specifications described above. For a list of these properties, please refer to Chapter 4.7 of the FEIS. _____ X _____

- ◆ Site forms will follow the OAHHP Cultural Resource Survey manual guidelines and instructions, especially in completing all information required on the forms, and follow the format of photographs, the sketch map, and USGS map that must be attached to all draft and final forms.
 - ◆ The contractor will submit draft sets of forms to the CDOT Region 6 historian for review, attached to draft Historic Architectural Resource Report or Report(s). Final forms will be submitted as follows: one unbound copy for SHPO, one bound copy for CDOT and additional copies for identified consulting parties.
 - ◆ For scoping purposes, assume the preparation of no more than 20 site forms and/or re-evaluation forms total.
- c) Coordinate with existing or newly identified Section 106 consulting parties (including SHPO) as directed by FHWA or CDOT on behalf of FHWA. Complete this process by 1 August 2010. _____ X
- i Historical Bridge Clearance X _____
 - A Conduct a literature and records search
 - B Consult with the State Historic Preservation Office via the Region Environmental Manager, FHWA and Staff Historian
 - C Obtain clearance for non-eligible bridges
 - ii Historical Study and Clearance X _____
 - A Conduct a literature and records search
 - B Consult with the State Historic Preservation Office via the Region Environmental Manager, FHWA, and advisory council.
 - C Determine effects
 - D Develop a mitigation plan
 - E Develop memorandum of understanding.
 - F Write the cultural resources report.
 - j Floodplain and Drainage Assessment _____ X
 - i Determine the probable impacts of the project with respect to flood plain and drainage. _____ X
 - ii Develop possible mitigating actions for the adverse impacts _____ X.

Analyze the impacts and mitigations. Included in the analysis shall be a determination of significant impacts due to:

 - A Single community access routes
 - B Significant risk for social or economic losses due to flooding
 - C Alteration of beneficial floodplain values.
 - iii Complete a written “Floodplain and Drainage Assessment Report” _____ X

The report includes:

 - A A detailed discussion of the pertinent aspects of the analysis
 - B Identification of the significant floodplain/drainage impacts
 - C Possible practical mitigating actions.

	<u>CDOT/ Other</u>	<u>Consultant</u>
k Right-of-Way	<u>X</u>	_____
i Perform a field inspection of each project alignment	<u>X</u>	_____
Ascertain number of parcels, affected improvements, and possible problem areas (i.e., mobile homes, functional replacements, historical sites, etc.) Try to estimate family sizes on residential relocations.		
ii Compile a ROW cost estimate.	<u>X</u>	_____
iii Prepare a relocation plan.	<u>X</u>	_____
iv Prepare a property ownership map based on tax records which identifies ownerships	<u>X</u>	_____
v Prepare a land use map which identifies land usage.	<u>X</u>	_____
The parcel use categories shall utilize appropriate categories including:		
<i>A Land in public ownership: specific use and responsible agency/jurisdiction</i>		
<i>B Commercial: retail, wholesale, industrial, other commercial</i>		
<i>C Residential: single or multi-family</i>		
<i>D Vacant</i>		
<i>E Mixed Uses</i>		
<i>F Other (specific)</i>		
vi Review the impacts on existing and future land use.	<u>X</u>	_____
l 4(f)/6(f) Activity	<u>X</u>	<u>X</u>
Determine and evaluate project impacts on 4(f)/6(f) properties. Include a cost analysis with minimization and avoidance alternatives	<u>X</u>	_____
i Prepare the applications for 4(f) clearance and 6(f) concurrence.	<u>X</u>	_____
Coordinate with affected agencies (e.g. HUD, US Forest Service, Dept. of Interior, Local Governments. Etc).		
ii Prepare and coordinate determination with FHWA	<u>X</u>	_____
iii Write 4(f)/6(f) mitigation report.	<u>X</u>	_____
m Threatened and/or Endangered Species(T/E)	<u>X</u>	_____
i Determine the presence of Threatened and/or Endangered Species on the site.	<u>X</u>	_____
<i>A Write findings letter to Division of Wildlife.</i>		
<i>B Coordinate with FHWA and USFWS</i>		
<i>C Prepare the Threatened and/or Endangered Species assessment.</i>		

	<u>CDOT/ Other</u>	<u>Consultant</u>
ii Prepare and provide the T/E mitigation plan.	<u>X</u>	_____
n Wetlands		
Support the wetland delineation effort for project location.		
Note: A delineation has already been done for Federal to 104 th but this delineation will need to have the Colorado Functions and Values (FACWet Method) applied to them in addition to picking up the rest of the wetland delineations with the FACWet method for the remainder of the areas for this project		
i Wetlands Determination	<u>X</u>	_____
◆ To support a construction project-specific amendment to the section 404 Individual Permit that CDOT should receive no later than June 2010, provide an estimate to perform a wetland delineation on the specific project areas		
Note: Wetland Tech Report prepared for the FEIS can be used as a guide and as a way to identify the level of effort required for this scope.		
◆ Perform a functional assessment of wetlands delineated using FACWet for the entire length of the project.		
◆ No Jurisdictional Determination will be needed because the USACE has already issued a preliminary JD for all wetlands in the corridor (all jurisdictional).		
◆ Meetings with USACE will be necessary.		
◆ Graphics, figures and plans will be needed. A draft and final wetland delineation document will be required. This should be completed by 1 June 2010.		
A Conduct a field evaluation for the presence of wetlands.		
B Prepare a wetlands map which identifies the wetland boundaries within the project corridor of each alignment.		
C Coordinate the findings with other agencies as directed by CDOT.		
ii Wetlands Findings Report	<u>X</u>	_____
o Hazardous Materials	<u>X</u>	_____
i Conduct a field survey of project area.	<u>X</u>	_____
ii Research	<u>X</u>	_____
Conduct a records search for possible hazardous waste using but any or all of the following:	<u>X</u>	_____
A Lists compiled by EPA or Colorado Department of Public Health and Environment (CDPHE) which identify:		
a Hazardous waste generators		
b Hazardous water treatment/storage/disposal facilities (current and closed)		
c Hazardous waste transporters		
d Locations of underground storage tanks		

- e Known suspected or abandoned hazardous waste sites

- B Records kept by EPA or CDPHE on violations or citations.
- C Lists kept by the appropriate FIRE department on:
 - a Underground storage tank locations
 - b HAZMAT incidents/accidents
 - c Local emergency planning/hazardous materials use reporting

- D Available historic tax records which indicate past land use (coordinate with property ownership and land use data research)
- E Available historic aerial photos of the corridor (e.g., USGS, Public Library, etc.)
- F Any pertinent records maintained by CDOT

- iii Conduct in-situ tests: X _____
 - A Select locations for soil boring/monitoring wells based on information obtained above, geologic review and alignment considerations.
 - B Install monitoring wells and obtain soil and water samples for chemical analysis as well as geotechnical and geologic data.
- iv Analyze results of chemical analyses and records review and identify potential impacts to the construction from hazardous waste. Assess potential hazards to the public and construction workers and develop potential mitigation options.

- p Existing Roadway and Major Structures. _____ X

Evaluate existing conditions to assess the proposed design relative to the following:

 - i Roadway and structure condition _____ X
 - ii Geometry _____ X
 - iii Lighting _____ X
 - iv Traffic signal devices _____ X

- q Construction Requirements: _____ X

Analyze/investigate the following:

 - i General construction impact (of temporary nature) _____ X
 - ii Noise impacts and mitigation _____ X
 - iii Material pits _____ X
 - iv Haul roads _____ X

		<u>CDOT/ Other</u>	<u>Consultant</u>
r	Aesthetic Considerations:	_____	<u>X</u>
When specified, the following will be investigated:			
i	Wild and scenic rivers	_____	<u>na</u>
ii	Natural areas and trails	_____	<u>X</u>
iii	Scenic roads and parkways	_____	<u>X</u>
iv	Overall visual qualities of this project area	_____	<u>X</u>
s	Utilities	_____	<u>X</u>

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

Note: The scope user should include the following wording in consultant contracts for all Federal-aid highway projects on the M other projects when there is a high potential for significant ratio of savings to study cost, or substantial improvements in project or program effectiveness. User should remove this “usage” text before incorporation into the final scope of work.

E. Value Engineering (VE) STUDY

X X

A team of transportation design and construction experts will perform a Value Engineering (VE) study. The VE study will be conducted early enough in the project development process to allow evaluation and incorporation of VE recommendations in the NEPA document or design process, as appropriate.

X X

The VE study shall be performed in accordance with Federal Highway Administration’s (FHWA) guidelines and recognized techniques, and will identify possible alternatives that may save the project cost, time or other resources. An individual with prior experience and certification in facilitating VE studies (the VE facilitator) shall conduct each VE session. It is strongly recommended that VE facilitators be qualified VE practitioners, experienced in performing and leading VE studies (have participated in several VE studies as a team member and several as a team leader), and have sufficient VE training, education, and experience to be recognized by the Society of American Value Engineers (SAVE) International as meeting the requirements for certification.

X X

The VE team will consist of individuals with no prior exposure to the project in order to ensure that their comments are fair and unbiased. Individuals that have some familiarity and history with the project may provide briefings to the team. Consultants or firms should not conduct studies of their own designs unless they maintain distinct organizational separation of their VE and design sections. At the direction of the CDOT/PM, the VE team will be assembled to review the Conceptual,. Background information and plans shall be provided to the team at least three weeks in advance of VE sessions. The VE facilitator will coordinate the study with CDOT, appropriate entities, and FHWA.

X X

The VE review team will formally evaluate each VE recommendation, and sufficient justification will be made for the acceptance or rejection of each. The VE facilitator will produce a document that summarizes the results, as well as the project elements investigated

X X

The Consultant/PM shall prepare a written response detailing which recommendations were not included, the reasons for exclusion, and how all approved VE results will be incorporated into subsequent engineering efforts. These responses shall be forwarded to the CDOT/PM for distribution to the CDOT Region Transportation Director, FHWA, and other appropriate entities. All approved VE proposals shall be incorporated into the final design plans

X X

3 **PRELIMINARY DESIGN**

A. Traffic Engineering

- | | | | |
|---|--|-------|----------|
| a | Review locations with “potential for accident reduction map” and or traffic operations analysis and or the safety assessment report. As provided by CDOT to determine which safety improvements will be incorporated into the project. | _____ | <u>X</u> |
| b | Analyze the proposed project design with the traffic projection data | _____ | <u>X</u> |
| c | Recommend the appropriate geometry (i.e., number of lanes, auxiliary lanes, storage lengths, weaving distances, etc.) In accordance with the current or most recent version of Highway Capacity Manual. | _____ | <u>X</u> |
| d | The proposed design shall be reviewed to ensure compatibility with existing signing procedures throughout the preliminary roadway design process | _____ | <u>X</u> |
| e | Use traffic data appropriate to the anticipated construction timing in developing detour alternatives. | _____ | <u>X</u> |
| f | Develop the total ESAL for the design life and submit to the CDOT/PM for the pavement design. | _____ | <u>X</u> |
| g | Submit the traffic data and recommendations to the CDOT/PM for review. | _____ | <u>X</u> |

B. Materials Engineering

- | | | | |
|-----|--|----------|-------|
| a | Preliminary Soil Investigation | <u>X</u> | _____ |
| i | Determine test hole locations (horizontal and vertical) and coordinate with the CDOT/PM. | <u>X</u> | _____ |
| ii | Collect soil samples and test for: | <u>X</u> | _____ |
| A | <i>Classification</i> | | |
| B | <i>Moisture – Density Relationship</i> | | |
| C | <i>Resistance Value</i> | | |
| D | <i>Corrosiveness</i> | | |
| a | <i>Note locations of high corrosiveness with recommendations</i> | | |
| E | <i>Bearing Capacity</i> | | |
| iii | Prepare and submit a soils investigation report. | <u>X</u> | _____ |

C. Pavement

- | | | | |
|---|-------------------------|----------|-------|
| a | Pavement Rehabilitation | <u>X</u> | _____ |
|---|-------------------------|----------|-------|

This section applies if the project includes existing pavement that is incorporated in the design for continued utilization.

	<u>CDOT/ Other</u>	<u>Consultant</u>
i Determine the equivalent Design Traffic (18k ESAL) that the existing pavement can carry	<u>X</u>	_____
ii Estimate the 18k ESAL's experienced by the existing pavement.	<u>X</u>	_____
iii Obtain the projected 18k ESAL for rehabilitated pavement design period.	<u>X</u>	_____
iv Perform a distress survey	<u>X</u>	_____
<i>A Determine the types of distress present in the pavement</i>		
<i>B Determine the extent of each distress type</i>		
<i>C Develop a distress map for the existing pavement</i>		
<i>D Determine the causes of the existing distress utilizing tests and required and analyses.</i>		
<i>E Determine the drainage conditions of the existing surface and subsurface</i>		
v Investigate the existing pavement structure	<u>X</u>	_____
<i>A Subgrade: soil classifications, moisture/density relationship, resistance value and corrosiveness</i>		
<i>B Base: thickness, gradation, plasticity index, liquid limit, resistance value, strength coefficient</i>		
<i>C Pavement: thickness, strength coefficient</i>		
vi Perform deflection testing to obtain the following:	<u>X</u>	_____
<i>A Deflection profile</i>		
<i>B Maximum deflection</i>		
<i>C Deflection basin</i>		
<i>D Differential deflections at transverse joints for portland cement concrete pavement (pccp)</i>		
<i>E In place determination of the appropriate modulus for each layer and subgrade</i>		
vii Determine the remaining load carrying capacity from the above data.	<u>X</u>	_____
viii Design the feasible alternatives for the required rehabilitation (and widening if appropriate) utilizing the above investigations and test results.	<u>X</u>	_____
The design of the feasible alternatives shall be checked against the following:	<u>X</u>	_____
<i>A The basic cause of distress which shall be corrected</i>		
<i>B Effect on the rate of future deterioration</i>		
<i>C Effect on surface characteristics</i>		
Where appropriate, any new pavement widening shall be included in the analysis		
b New Pavement Structure	<u>X</u>	_____

	<u>CDOT/ Other</u>	<u>Consultant</u>
<p>The feasible alternatives of new pavement structure shall be designed utilizing procedures accepted by the CDOT/PM. New pavement designs for widening shall be compatible with adjacent rehabilitated existing pavement.</p>		
c Pavement Justification	<u>X</u>	_____
i Basic factors:	<u>X</u>	_____
A <i>Desired life expectancy (obtain design life from CDOT).</i>		
B <i>Required maintenance activities intervals.</i>		
C <i>Basis for performance life.</i>		
ii Analyze life cycle cost of the selected alternatives	<u>X</u>	_____
A <i>Perform analysis with unit and maintenance costs from CDOT. Determine present worth and annual costs in accordance with the procedures in the CDOT Pavement Design Guide.</i>		
B <i>Compare alternatives over the same life span.</i>		
C <i>Recommend the pavement structure and provide the basis for the recommendations.</i>		
d Pavement Design Report	<u>X</u>	_____
<p>Include all the above tests, investigations, analyses, and calculations performed as a result of this section. Submit to the CDOT/PM for acceptance.</p>		
D. Structures		
a Existing bridge condition investigation	_____	<u>X</u>
<p>Determine condition of existing bridge deck, superstructure and substructure material as required.</p>		
b Foundation Investigation Report	_____	<u>X</u>
i Prepare a Foundation Investigation Request showing requested test hole locations.	_____	<u>X</u>
ii Formulate drilling pattern, perform the necessary subsurface investigation and collect samples as required.	_____	<u>X</u>
iii Perform the appropriate laboratory tests and analyze the data. Determine strength, allowable bearing capacity and corrosiveness of foundation material.	_____	<u>X</u>
iv Perform lateral analyses (deformation, moment, and shear) for the caissons and/or piles which are subjected to lateral loadings. This may be a computer analysis which will consider the group effect and selection of the soil parameters.	_____	<u>X</u>
v If appropriate, a pile driving analysis using a wave equation will be accomplished.	_____	<u>X</u>
vi Submit the Foundation Investigation Report to the CDOT/PM for approval.	_____	<u>X</u>
vii Prepare engineering geology plan sheet and copies of the Foundation Investigation Report foundation report with recommendations for type, size, and		

	<u>CDOT/ Other</u>	<u>Consultant</u>
tip (bottom) elevation of the required foundation. Specify if pre-drilling, pile tip, casing, dewatering, etc., are needed for foundation construction.	_____	<u>X</u>
E. Hydrology/Hydraulic Engineering	_____	<u>X</u>
a Hydrology	_____	<u>X</u>
i Establish drainage basin data: delineate, determine size, waterway geometrics, vegetation cover, land use.	_____	<u>X</u>
ii Collect historical data; research flood history and previous designs in the project proximity; and obtain data from other sources (e.g., Urban Drainage & Flood Control District, Colorado Water Conservation, CDOT Maintenance, and local residents).	_____	<u>X</u>
iii Select a storm frequency based on the CDOT Hydraulic (Drainage) Design Guide criteria.	_____	<u>X</u>
iv Do a hydrological analysis using existing studies or approved methods (see CDOT Drainage Design Manual)?	_____	<u>X</u>
v Perform a risk analysis.	_____	<u>X</u>
b Hydraulics	_____	<u>X</u>
i Accomplish the preliminary design of minor drainage structures:	_____	<u>X</u>
A <i>Determine location and crossing alignment. Identify channel centerline by highway station or coordinates, as appropriate</i>		
B <i>Determine the allowable headwater.</i>		
C <i>Assess the degree of sediment and debris problems to be encountered, including abrasion and corrosion.</i>		
D <i>Type, size, shape and material of the structures.</i>		
E <i>Prepare preliminary structure cross-sections to determine the elevations, flow lines, slopes and lengths of the structures. Show the flow quantity on the sections</i>		
F <i>Complete the design computations and documentation in accordance with the CDOT Drainage Design Manual.</i>		
G <i>Determine high water level.</i>		
ii A water surface profile and complete hydraulic analysis is required for major structures. Determine the following:	_____	<u>X</u>
A <i>Water surface profile and hydraulic analysis</i>		
B <i>Required hydraulic size and skew of the bridge</i>		
C <i>Minimum low girder elevation using CDOT Drainage Design Manual criteria</i>		
D <i>The design year frequency</i>		

	<u>CDOT/ Other</u>	<u>Consultant</u>
<i>E The design year and 500 year high water elevations</i>		
<i>F Predicted total scour profile for design year and 500 year scour</i>		
<i>G The channel erosion protection for structures</i>		
iii If required, identify and assist CDOT in coordinating any required potential funding participation of local municipalities or agencies.	_____	<u>X</u>
iv Recommend culvert pipe sizes, type, shape and material for proposed detours.	_____	<u>X</u>
c Storm Water Management Plan	_____	<u>na</u>
i Initiate a Storm Water Management Plan in accordance with:		
<i>A Municipal Separate Storm Sewer Systems (MS4)</i>		
<i>B CDOT's Erosion Control and Storm Water Quality Guide</i>		
<i>C CDOT's Standard Specifications</i>		
<i>D CDOT Standard Plans</i>		
<i>E Other appropriate documents</i>		
d Preliminary Hydraulics and Hydrology Report. Include the following:	_____	<u>X</u>
<i>A Hydrology analysis</i>		
<i>B Minor structure hydraulic designs</i>		
<i>C Major structure hydraulic designs</i>		
<i>D Detour hydraulic designs</i>		
<i>E Structure cross-sections</i>		
<i>F Storm Water Management Plan</i>		
<i>G Appendix:</i>		
<i>a Drainage basin maps</i>		
<i>b Hydrology/hydraulic worksheets</i>		
F. Utility Coordination		
a Location Maps	X	X
Obtain utility location maps from the Utility Companies which identify utility features in the project area. Requests and receipt of maps will be coordinated with the Region Utility Engineer via copies of request and transmittal letters.		
b Reviews and Investigations	X	X
Conduct field reviews and utility investigations with the Region Utility Engineer and Utility companies, as required, to ensure correct horizontal and vertical utility data. When possible this will be done utilizing non-destructive investigative techniques. The horizontal and vertical locations will be shown in the FIR plans and cross sections.		
When "potholing" is required, the Consultant shall be responsible for the		

	<u>CDOT/ Other</u>	<u>Consultant</u>
excavation	X	X
c Surveying Utility Locations	X	_____
d Relocation Recommendations	_____	<u>X</u>
Submit necessary information for the relocation or adjustments of affected utilities to the Region Utility Engineer. The Region Utility Engineer will process the required agreements.		
e Ditch Company Coordination	_____	<u>X</u>
Contact ditch companies through the Region Utility Engineer to coordinate ditch requirements and restrictions. Develop the plans for the necessary irrigation structures and submit to the Region Utility Engineer for Ditch Company review.		
G. Roadway Design and Roadside Development		
Coordinate all design activities with required CDOT specialty units and other outside entities.		
a Roadway Design	_____	<u>X</u>
i Check and plot survey data	_____	<u>X</u>
ii Verify that a project specific coordinate system approved by CDOT is used to identify the horizontal locations of key points. The coordinate systems used for roadway design and ROW shall be compatible.	_____	<u>X</u>
iii Check horizontal and vertical alignments against all design criteria. Necessary variances and/or design decisions will be identified with justification and concurrence by CDOT & FHWA.	_____	<u>X</u>
iv Provide alignments, toes of slope and pertinent design features, including permanent and temporary impacts, to the ROW, Utility and Environmental Managers.	_____	<u>X</u>
v Plot/develop all required information on the plans in accordance with all applicable CDOT policies and procedures	_____	<u>X</u>
vi Using current approved CDOT software, generate a 3 dimensional design model and produce preliminary quantities	_____	<u>X</u>
b Roadside Development:	_____	<u>X</u>
For roadside items including but not limited to, guardrails, delineators, landscaping, sprinkler systems, sound barriers, bike paths, sidewalks, lighting, curb ramps, truck escape ramps, and rest areas provide the following:		
i Layouts in the plans	_____	<u>X</u>
ii Critical locations in the plans for irrigation sleeves and other utility conduits underneath the proposed roadways.		
iii Coordinate the roadside items with the Storm Water Management Plan (SWMP).		

	<u>CDOT/ Other</u>	<u>Consultant</u>
H. Right-of-Way.	<u>X</u>	_____
<p>The following work shall be done by, or under the immediate supervision of, a Professional Land Surveyor (PLS). The following work may be included as part of a Surveying contract or part of a Right-of-Way plans preparation contract.</p>		
a Research	<u>X</u>	_____
i Identify affected ownership from preliminary design plans	<u>X</u>	_____
ii Obtain assessor’s maps for the project	<u>X</u>	_____
iii Locate documents which transfer title.	<u>X</u>	_____
iv Prepare chain of title as directed by the CDOT ROW Manual or as directed by the CDOT Project Manager.	<u>X</u>	_____
v Look for encumbrances, liens, releases, etc.	<u>X</u>	_____
vi Make physical inspection of property. Note any physical evidence of apparent easements, wells, ditches, ingress, and egress.	<u>X</u>	_____
vii Check with local entities such as the County Road Department or County Engineer for location of existing roads or easements.	<u>X</u>	_____
viii Check for and obtain latest subdivision plats and vacations of streets.		
b Ownership Map	<u>X</u>	_____
<p>For additional detail on required drafting software, see Section 8 Submittals. Project coordinate system ownership map shall be submitted along with a “Project Narrative”.</p>		
i Review preliminary design and survey report	<u>X</u>	_____
ii Review project coordinate system and basis of bearing from Control Survey prior to calculations.	<u>X</u>	_____
iii Compute alignment of ROW centerline and store coordinates of all found monuments within the FIRst tier of properties left and right of Centerline.		
iv Review ownership documents (Memoranda of Ownership and/or title commitments, deeds and supporting plats).	<u>X</u>	_____
v Calculate coordinates of lost or obliterated aliquot corners using guidelines established by the Bureau of Land Management. (To be used in resetting corners according to Colorado Revised Statutes).	<u>X</u>	_____
vi Establish subdivisions of sections using Bureau of Land Management Guidelines. Show all section lines and ¼ section lines on the ownership map and ROW plans.	<u>X</u>	_____
vii Determine existing Right-of-Way limits from deeds of record, CDOT plans and found ROW markers. Previous Right-of-Way plans, if available, will be provided by CDOT as an aid.	<u>X</u>	_____

	<u>CDOT/ Other</u>	<u>Consultant</u>
viii Determine ownerships and their property boundary locations. Locate the intersection of these property boundary lines with the existing CDOT Right-of-Way. Determine location and ownership of existing easements of record.	<u>X</u>	_____
ix Secure additional property ties and additional topography where the highway improvement may affect improvements adjacent to the Right-of-Way. This additional topography should include:	<u>X</u>	_____
<i>A Proximate buildings, sheds, etc.</i>		
<i>B Underground cables and conduits</i>		
<i>C Wells</i>		
<i>D Irrigation ditches and systems</i>		
<i>E Septic tanks, cesspools, and leaching fields</i>		
x Reconcile overlaps and gaps in ownerships as required by CDOT, documenting method used (may require additional field work). Include reasons for decisions in the "Project Narrative".	<u>X</u>	_____
xi Plot OWNERSHIP MAP on 22 inch x 34 inch Mylar sheets in accordance with specifications. DOT Form 126-R will be provided by CDOT for this purpose. Normal scale, 1"=400' in rural areas, 1"=200' in urban areas. If entire ownership will not fit on the sheet at this scale, an additional abbreviated OWNERSHIP MAP may be used at a scale of 1"=1 mile, or other suitable scale, to show the configuration of large ownerships. Metric equivalents may be required.	<u>X</u>	_____
xii Label all monuments found with description of monument and project coordinates (from Control Survey Diagram).	<u>X</u>	_____
xiii Show improvements and topography within the ownerships and existing access to the street/county road system	<u>X</u>	_____
xiv Number ownerships alternately as they occur along the centerline from south to north or west to east in the same direction as the stationing. Show current names of owners and lessees.	<u>X</u>	_____
xv Calculate the total area of all ownerships affected, including coordinates of all property corners. Deduct areas for existing road Rights-of-Way. Bearings and distances do not need to be shown on 1" = 1 mile abbreviated OWNERSHIP MAPS.	<u>X</u>	_____
xvi Different land uses within a property should be cross-hatched or shaded	<u>X</u>	_____
xvii In the lower right corner of the OWNERSHIP MAP, show seal, number and name of Professional Land Surveyor supervising the work.	<u>X</u>	_____
xviii Transmit finished reproducible OWNERSHIP MAP, electronic drawing files, and Memoranda of Ownership to CDOT along with all calculations, field notes, and supporting data. The OWNERSHIP MAP will include a copy of the control and monumentation sheet	<u>X</u>	_____

Note that only the project control data needs to be completed at this time.

I. Major Structural Design:

Major structures are bridges and culverts with a total length greater than twenty feet or retaining walls with a total length greater than one hundred feet and a maximum exposed height at any section of over five feet. This length is measured along centerline of roadway for bridges and culverts, and along the top of wall for retaining walls. Overhead sign structures (sign bridges, cantilevers, and butterflies extending over traffic) are also major structures, but are exempt from the structure preliminary design activity defined here.

_____ X

Major structures shall be designed in accordance with the AASHTO Load Resistance Factor Design (LRFD) Specifications and the CDOT Bridge Design Manual. The CDOT Structure Reviewer will participate in coordinating this activity.

a Structural Data Collection

_____ X

- i Obtain the structure site data. The following data, as applicable, shall be collected: (Typical roadway section, roadway plan and profile sheets showing all alignment data, topography, utilities, preliminary design plan) Right-of-Way restrictions, preliminary hydraulics and geology information, environmental constraints, lighting requirements, guardrail types, recommendations for structure type, and architectural recommendations.
- ii Obtain data on existing structures. When applicable, collect items such as existing plans, inspection reports, structure ratings, foundation information, and shop drawings. A field investigation of existing structures will be made with notification to the Resident Engineer.

b Structure Selection and Layout

_____ X

- i Review the structure site data to determine the requirements that will control the structure size, layout, type, and rehabilitation alternatives. On a continuing basis, provide support data and recommendations as necessary to finalize the structure site data.
- ii Determine the structure layout alternatives. For bridges, determine the structure length, width, and span configurations that satisfy all horizontal and vertical clearance criteria. For walls, determine the necessary top and bottom of wall profiles.
- iii Determine the structure type alternatives. For bridges, consider precast and cast-in-place concrete and steel superstructures and determine the spans and depths for each. For walls, determine the feasible wall types in accordance with the CDOT Bridge Design Manual.
- iv Determine the foundation alternatives. Consider piles, drilled caissons, spread footings, and mechanically stabilized earth foundations based on geology information from existing structures and early estimates from the project geologist. To obtain supporting information, initiate the foundation investigation as early as possible during the preliminary design phase.
- v Determine the rehabilitation alternatives. Continued use of all or parts of existing structures shall be considered as applicable. The condition of existing structures shall be investigated and reported. Determine the modifications and

rehabilitation necessary to use all or parts of existing structures and the associated costs.

- vi Develop the staged construction phasing plan, as necessary for traffic control and detours, in conjunction with the parties performing the roadway design and traffic control plan. The impact of staged construction on the structure alternatives shall be considered and reported on.
- vii Compute preliminary quantities and preliminary cost estimates as necessary to evaluate and compare the structure layout, type, and rehabilitation alternatives.
- viii Evaluate the structure alternatives. Establish the criteria for evaluating and comparing the structure alternatives that, in addition to cost, encompass all aspects of the project's objectives. Based on these criteria, select the optimum structure layout, type, and rehabilitation alternative, as applicable, for recommendation to CDOT.
- ix Prepare preliminary general layout for the recommended structure. Prepare structure layouts in accordance with the CDOT Bridge Detailing Manual. Special detail drawings and a detailed preliminary cost estimate shall accompany the general layout. The special detail drawings shall include the architectural treatment. Perform an independent design and detail check of the general layout.

c Structure Selection Report

_____ NA

Prepare a structure selection report to document, and obtain approval for, the structure preliminary design. By means of the structure general layout, with supporting drawings, tables, and discussion, provide for the following:

- i Summarize the structure site data used to select and layout the structures. Include the following:
 - A Existing structure data, including sufficiency rating and whether or not the structure is on the "select list".
 - B Project site plan
 - C Roadway vertical and horizontal alignments and cross sections at the structure
 - D Construction phasing
 - E Utilities on, below, and adjacent to the structure
 - F Hydraulics:
 - Channel size and skew, design year frequency, minimum low girder elevation, design year and 500 year high water elevations, estimated design year and 500 year scour profiles, and channel erosion protection
 - G Preliminary geology information for structure foundation
 - H Architectural requirements
- ii Report on the structure selection and layout process. Include the following:

- A *Discuss the structure layout, type, and rehabilitation alternatives considered*
- B *Define the criteria used to evaluate the structure alternatives and how the recommended structure was selected*
- C *Provide a detailed preliminary cost estimate and general layout of the recommended structure*

iii Obtain acceptance by CDOT on the recommended structure and its layout.

Allow approximately two weeks for review of the structure selection report. The associated general layout, with the revisions required by the CDOT review, will be included in the FIR plans. The work schedule shall be planned accordingly. The structure selection report, with the associated general layout, must be accepted in writing by CDOT prior to the commencement of further design activities.

d Foundation Investigation Request _____ X

Initiate the foundation investigation as early in the preliminary design phase as is practical. On plan sheets showing the project control line, its stations and coordinates, utilities, identify the test holes needed and submit them to the project geologist. The available general layout information for the new structure shall be included in the investigation request.

J. Construction Phasing Plan _____ X

A construction phasing plan shall be developed for all projects which integrates the construction of all the project work elements into a practical and feasible sequence. This plan shall accommodate the existing traffic movements during construction (detours). A preliminary traffic control plan will also be developed which will be compatible with the phasing plan.

K. Preparation for the FIR/Design/Build Procurement _____ X

- a Coordinate, complete, and compile the plan inputs from other branches: materials, hydraulics, traffic, right-of-way, and Staff Bridge.
- b If a major structure is included in the project, a general layout (which has been accepted by CDOT) will be included in the FIR plans.
- c Prepare the preliminary cost estimate for the work described in the FIR plans base on estimated quantities.
- d The FIR plans shall comply with CDOT requirements and shall include: title sheet, typical sections, general notes, plan/profile sheets, and preliminary layouts of interchanges/intersections.

The plan/profile sheets will include the following: all existing topography, survey alignments, projected alignments, profile grades, ground line, existing ROW, rough structure notes (preliminary drainage design notes, including pipes, inlets, ditches and channels), and existing utility locations.

i The following items will be mandatory for the FIR plans:

4 **FINAL DESIGN**

A. Right-of-Way Plans and activities - reference the CDOT ROW and surveying manual' requirements for the following:

- | | | | |
|-------|---|----------|-------|
| a. | Initiate ROW authorization process | <u>X</u> | _____ |
| | Coordinate with the CDOT/PM to initiate the ROW authorization process. Typically, the corrected FIR plans (with final hydraulic design inputs) will be used as the design basis for the ROW authorization plans. | | |
| b. | Ownership Maps | <u>X</u> | _____ |
| c. | Authorization Plan: | <u>X</u> | _____ |
| i. | Integrate toes of slopes and other design details such as lane lines, culverts, road approaches, etc. into ownership map (base map for ROW plans). | | |
| ii. | Determine new Right-of-Way requirements, access control, and easements from design plans following the FIR and plot on ownership/base maps. Normal scale, 1"=50' in urban areas, 1"=100' in rural areas. Metric units may be required as per PM. Metric scales will be as shown in the CDOT "Metric Conversion Manual". Revise numbering of ownerships to correspond to ROW acquisitions. | | |
| iii. | Calculate areas of parcels, easements, and remainders in accordance with CDOT Right-of-Way Manual. | | |
| iv. | Prepare ROW plan sheets | | |
| v. | Prepare legal descriptions of parcels, easements and access control as directed by the CDOT ROW Manual | | |
| vi. | Prepare tabulation of properties sheet | | |
| vii. | Prepare Right-of-Way Title Sheet | | |
| viii. | Incorporate the Control Survey and Monumentation Sheets into the plans. | | |
| ix. | On the Monumentation Sheet, list the Right-of-Way, Easement, Control, etc., points to be set and the aliquot corners to be reset. | | |
| x. | Prepare right-of-way tabulation of road approaches, if applicable. Show owner milepost/station, right or left of centerline, width of approach, skew angle, and any remarks. | | |
| xi. | Hold ROW Plan Review, with Design, ROW, and Construction to determine if ROW plans are sufficient to proceed with appraisal of property to be acquired for the project. | | |
| xii. | Transmit originals of the plan sheets, title sheet, tabulation of properties sheet, and revised ownership (memoranda of ownership and title commitments as directed by the ROW manager), calculations and supporting data (i.e., parcel diaries), and final electronic data for all work products. | | |

	<u>CDOT/ Other</u>	<u>Consultant</u>
d. Right-of-Way Plan Revisions	<u>X</u>	_____
<p>Revise the Right-of Way plans as needed through out the appraisal and negotiation process for those changes approved by the Region Right-of-Way Supervisor. All plan revisions shall be submitted to the Region Right-of-Way Supervisor within 5 working days after receiving notice from CDOT to proceed with a Plan Revision.</p>		
e. Final ROW plans and monumentation	<u>X</u>	_____
i. ROW Plan Review	<u>X</u>	_____
ii. ROW Plan Revisions, as needed throughout the negotiation and appraisal process.	<u>X</u>	_____
f. Appraisals	<u>X</u>	_____
g. Appraisal staking	<u>X</u>	_____
<p>Stake the proposed ROW line, easements and existing ROW line, if required by the region supervisor. Set lath or wooden stakes at all angle points and on line as necessary to have at least three stakes visible from any point on line. Mark COGO point numbers on all stakes and color code per CDOT Survey Manual. The appraisal stakes only need to be set at an accuracy of +/- 1.0 foot, unless the point fall near improvements, then +/- 0.25 foot is necessary.</p>		
h. Title Insurance and Closing Services	<u>X</u>	_____
<p>Provide title insurance and closing services as described in the CDOT ROW Manual and coordinate with the CDOT Region ROW Manager.</p>		
i. Acquire needed parcels including title insurance and closing services coordinated with the Region ROW Manager	<u>X</u>	_____

5 **ITS/HOT Lanes/BRT**

The consultant will coordinate with the High Performance Transportation Enterprise in the planning and design of HOT lane and ITS infrastructure as well as the Colorado Department of Transportation's Region 6 ITS Implementation Plan.

A. HOT Lanes Geometric Configurations	_____	<u>X</u>
a. Review proposed geometric configurations as proposed in the US-36 FEIS		
b. Delineate locations and design characteristics of HOT lane ingress and egress, including relationship with ramp lane configurations.		
c. Pinpoint locations at which exceptions to Typical HOT lane configuration is required, and design and document most appropriate solution		
d. Develop preliminary signing and striping plan for Managed lane in project area		
e. Coordinate with law enforcement and make preliminary recommendations as to the following		
1. <i>Enforcement areas</i>		
2. <i>Pull-over points</i>		
3. <i>Visibility</i>		
4. <i>Enforcement Technology</i>		
f. Coordinate with CDOT maintenance and make preliminary recommendations as to the following		

1. *Infrastructure location*
2. *Maintenance Planning*
3. *Street Maintenance*
4. *Equipment Maintenance*

B. Infrastructure

X

Here, infrastructure refers to the tolling equipment, communications components, and other ITS devices comprising the field system. Included in the task is assuring interoperability between the US-36 system and other state systems

a Tolling Equipment

◆ Make preliminary recommendations as to the following

1. *Lane Controllers*
2. *Toll Tag antennas/Readers*
3. *Transponders*
4. *License plate technology cameras*
5. *Toll Rate signs*
6. *Structures for mounting roadside and overhead equipment*
7. *Enforcement Beacon*
8. *Communications Components*

b Other ITS devices

◆ Make preliminary recommendations as to the following

1. *Variable Message Signs*
2. *Closed Circuit Television Cameras*
3. *Highway Advisory Radios*
4. *Road and Weather Information Stations*
5. *Traffic Monitoring Stations*
6. *Ramp Meter Signals*

SECTION 8

- PROCUREMENT PRECONSTRUCTION WORK TASK DESCRIPTIONS

This section establishes the consultant's individual task responsibility. The consultant shall maintain the ability to perform all work tasks listed below, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Selected work tasks shall be assigned only after coordination and consultation with CDOT. The Consultant is also responsible for coordinating the required work schedule for those tasks accomplished by CDOT and other agencies. The Consultant should review this entire section to identify applicable material. Contact the Colorado Department of Transportation/Project Manager (CDOT/PM) if clarification is required (see Section 2.01).

The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice should be planned by the Consultant and coordinated with the CDOT/PM. The time of their accomplishment will overlap and parallel paths of activity should be planned to finish the development phase in accordance with the shortest possible schedule. The type and number of meetings, documents, etc., will depend on the category and characteristics of the project work. A project plan shall be developed by the Consultant which satisfies the requirements of the project development. This plan must be approved by the Contract Administrator (see Section 2.01) before starting the work.

Generally this scope entails the following actions: Managing and preparing design-build procurement processes for the Project including;

- Determining the project risks and developing a risk management strategy;
- Determining the project goals;
- Determining "best value" elements;
- Determining Industry interest in the preparation and issuance of the Letters of Interests (LOI);
- Scheduling, attending and participating in Industry informational meetings;
- Preparation and issuance of a Request for Qualifications (RFQ);
- Determining and preparing the evaluation criteria, methods and processes to be used to evaluate received Statements of Qualifications (SOQ);
- Evaluation of SOQ's and recommending a Short List of three to five qualified teams;
- Preparation and issuance only to short listed teams a Draft Request for Proposal (DRFP);
- Scheduling, attending and participating in the Industry Review process;
- Refining the draft request for proposal resulting from Industry Reviews;
- Reviewing Technical Approaches and Technical Concepts;
- Preparing and issuing a Final Request for Proposals (FRFP);
- Preparing of Contract
- Preparing Books One, Two, Three and Five of the Final Request for Proposals;
- Assisting and reviewing prepared by CDOT Book Four – ROW plans
- Determining and preparing the evaluation criteria, methods and processes to be used to evaluate responses to the Final RFP;
- Preparing an independent quantity and cost estimate based on the Final RFP;
- Evaluating responses received to the Final RFP;
- Providing guidance in the recommendation of the selection of the most highly qualified design-build team;
- Providing CDOT Contract support after Award.

This work scope is separated into two components:

PHASE 1

General support activities and work activities leading to selection of a design-build contractor.

PHASE 2

Work activities performed to support CDOT after Award of, a design-build contractor.

This scope includes a description of the work tasks, estimates of resource staffing hours, and costs of the work based on the man hour estimate.

SCOPE OF WORK- PHASE 1

1.0- PROJECT MANAGEMENT AND ADMINISTRATION SUPPORT

The Consultant will perform and assist in the necessary Project Management tasks to ensure timely completion of the Project in compliance with all applicable standards. These tasks are specific for preparation, review and approval of activity cost invoices.

2.0 -GENERAL SUPPORT

This task includes providing support by attending regularly scheduled meetings, reporting on activities, and preparing and providing meeting minutes and agendas; preparing presentation material as requested; supporting the development of a public involvement program; identifying project policy elements and solutions; preparing project process schedules; preparing independent cost estimates; and completing quality control assurance reviews

2.1 Meeting Attendance and Preparation

- 2.1.1 CDOT/RTD Management meetings -assume 3 meetings
- 2.1.2 Coordination/Progress meetings -assume bi-weekly for 26 weeks
- 2.1.3 Contract Development meetings -assume weekly for 26 weeks
- 2.1.4 Policy elements, schedules, estimates, and quality control

2.2 Document Management and Control System

The consultant will identify a Document Management and Document Control System (DM DC) fully compatible with CDOT's computer system. The DMDC system will maintain and control all project related information including: project drawings, specifications, correspondence, and reports. The DM DC will also contain all incoming and outgoing data, allowing the Project Manager and Project Team to easily track all project related documents through a searchable database as well as a routing and notification process. The DMDC system will be web-based and accessible via the internet with an assigned username and password. User permissions can be assigned to allow control of users and their access to information.

The DMDC system is not the same system utilized for Public Information.

2.3 Public Involvement Services

The Consultant with CDOT will develop communication efforts to effectively and proactively provide government leaders, community leaders and stakeholder materials to communicate the Project's purpose, impacts, scheduled activities and progress. Public Involvement efforts shall utilize the projects' web site, which shall be updated weekly to reflect public information releases. The Public Information Web systems shall be located and be a part of CDOT mainframe system.

2.4 Unforeseen Services As Requested

As the Consultant's role is fairly broad, there will be additional services requested by CDOT that are not specifically defined within this scope of services. A specific line item will be included in the work-hour estimate to cover such services which will be performed upon written direction and approval from CDOT Project Manager.

3.0 DESIGN-BUILD PROCUREMENT MANAGEMENT SERVICES

3.1 Policy Decisions.

It will be necessary, as the design-build contract is being developed, for CDOT to make decisions on Project policy issues. The Consultant will recommend processes that allow for this to be completed timely and effectively. Issues that will be considered include:

- Identifying the Project Executive Oversight Committee (EOC), and its Roles and Responsibilities
- Identifying the Project Management Team (PMT), and its Roles and Responsibilities
- Assigning and Managing Project Risks
- Establishing Evaluation and Selection Process Integrity and Confidentiality
- Developing Qualification Evaluation Criteria
- Developing Qualification Evaluation Methodology
- Identifying the Qualification Evaluation Team
- Identifying the Qualification Selection Board
- Developing Proposal Evaluation Criteria
- Developing Proposal Evaluation Methodology
- Identifying the Proposal Evaluation Team
- Identifying the Proposal Evaluation Board
- Conflict of Interest

3.2 Assist/Support Project Goals Development.

The Consultant will assist in the effort to develop the project goals with CDOT Region 6, RTD and other CDOT identified stakeholders. The Consultant will support development by attending the project goals workshop and provide input as appropriate (It is assumed 2 meetings will be required to develop project goals).

3.2.1 Best Value.

The Consultant will assist in the identification and definition of Best Value elements based on project goals, priorities, budget and schedule. The identification of Best Value will assist in development of the project approach, and overall contract document.

3.3 Risk Assessment and Design-Build Deliverables determination.

A risk assessment workshop involving CDOT Region 6, RTD, and Stakeholders identified by CDOT will be facilitated by the Consultant. The risk assessment will identify areas of project risk that, by action of CDOT prior to the Design-Build Team selection, will manage, reduced or eliminate risks. The goals of the Risk Assessment are to ensure a higher probability of project success and reduced project costs. The risk assessment analyzes the degree of impact to the project goals, the probability of the risk occurring, and the effort needed to mitigate or eliminate the risk. The result is a detailed matrix that identifies the level of effort needed to manage risk in areas such as:

- vii Percent design required for each discipline
- viii Determining the need for design studies/investigations
- ix Determining the need for pre-selection ROW acquisition
- x Determining the need for utility agreements
- xi Determining the need for hazardous materials identification
- xii Determining the need for additional geotechnical investigations, and the completion of additional geotechnical investigations
- xiii Determining the need for third party agreements
- xiv Determine and Define "Quality"

3.4 Risk Allocation and Design Build Contract Development.

After the risk assessment effort is complete, a systematic approach to risk allocation will be facilitated by the Consultant while involving CDOT Region 6, RTD and other Stakeholders identified by CDOT. This effort will identify the party best able to manage the project risks, while considering if risk sharing is more advantageous to the project goals. A risk allocation/decision matrix will be developed as part of this process. The matrix will assist in the development of the entire Design-Build Contract document.

3.4.1 Conduct Risk Allocation Workshops

Conduct Risk Allocation Workshops (Assume 2) with CDOT, RTD, legal counsel, financial advisors, and others to develop a policy and methodology to divide and assign the risks associated with the design and construction

elements of the Project. A Risk Allocation matrix will be developed which will divide and assign all potential risks associated with the development and implementation of the project, including:

Design Process: design defect (damages, third party injury); design defect (Nonconforming Work); other cost increases and delays; accuracy of schematics and reference documents; alignment change creating need for additional right-of-way.

Right of Way: right-of-way acquisition costs; acquisition delays.

Utility Relocation: delay due to Utility Adjustments, including unidentified utilities; cost of unidentified utilities; failure of Utility Owners to comply with Adjustment Agreements.

Governmental Approvals: governmental approvals; new environmental approvals and changes due to changes in Final Design; governmental approvals required due to Force Majeure or Owner-directed Change After NTP.

Force Majeure Events: actions of the elements; acts of war; strikes and labor disputes; archaeological, paleontological or cultural resource; threatened or endangered species; changes in law; injunctions against the Project; temporary no-work restrictions resulting from the discovery within the Site of any hazardous materials (third party spills after proposal date); hazardous materials (existing).

Construction, Supply and Installation: cost increase due to Owner Directed Change or Caused Delay; differing site conditions; delay in completion (other than Owner caused Delay, Force Majeure and certain uncooperative utility delays); delay in completion due to Owner caused delay, Force Majeure and certain uncooperative utility delays; construction defect (damages, third party injury); construction defect (Nonconforming Work).

Quality: The risk assessment activity of the project must consider and address project quality, expectations, measures and approaches. The Consultant will assist CDOT in the actions required to identify and define requirements for a Quality Management Plan to be undertaken by, and at the cost of, the design-builder. The QMP shall address the elements of Quality Control, Quality Assurance and Project Management.

3.4.2 Independent Cost Estimate

In order for the Contract Structure (Guaranteed Maximum Price, Additional Requested Elements, or other) options to be determined the Consultant will utilize existing electronic copies of design files, hard copies of as-built drawings and other pertinent data necessary to develop an independent construction cost estimate. The cost estimate will include allowances for contingencies as established by the CDOT. This effort will include a cost analysis of major bid items. An escalation factor will be applied to account for the design-build contractor's risk. The deliverable to the CDOT will be a cost range based on assessments of the design-build contractor's risk, and supporting degree of detail provided in plan sheets.

3.5 REQUESTS FOR QUALIFICATIONS (RFQ) SERVICES

This work will be performed consistent with CDOT's Design-Build Policy and Procedures Manual, and current Federal Highways Administration rules for Design-Build.

3.5.1 Letter of Interest

Working jointly with the CDOT, and RTD, the Consultant will develop the "Letter of Interest" to "Advertise" the project, and determine Industry interest. The Consultant will assist in the scheduling and participation of Industry informational meetings as determined by Industry response. (One mandatory meeting assumed).

3.5.2 Development of the RFQ

Working jointly with the CDOT and RTD, the Consultant will develop RFQ. The Consultant will post the RFQ as required by CDOT Policy, and provide responses to questions/modifications as may be required during the process. RFQ provisions shall include at a minimum:

- General Understanding of the Project
- Scope of Services to be requested
- Design-build Team and Personnel requirements
- Financial statements and requirements
- Bonding and Insurance information
- General Disclosures

3.5.3 Qualification Evaluation Criteria and Methodology

Working jointly with the CDOT, and RTD, the Consultant will identify and develop the Qualification Evaluation Criteria and Qualification Evaluation Methodology to be used in the Short Listing process. To ensure integrity and minimize challenge to the process it is vital that these actions be completed and presented to the Executive Oversight Committee (EOC) for authorization in advance of the RFQ release.

3.5.4 Responses to the RFQ

Working with the CDOT the Consultant will:

- compile responses to the RFQ for the Project into qualifying, measurable components as presented in the RFQ;
- evaluate the measurable qualifications of each component utilizing the evaluation procedures and formulas authorized by the EOC;
- provide summaries of strengths and weaknesses of all respondents for each component;
- Participate in evaluation meetings to discuss evaluations of SOQ applicable to each component.

3.5.5 Presentations/briefings/discussions - EOC

Working with the CDOT the Consultant will;

- prepare and distribute agenda for oral presentations/briefings/discussions (the "orals") by and with the respondents if requested by the EOC;
- assist with the preparation of questions to be asked by the EOC at the orals;
- assist and advise the EOC in planning and managing the orals;
- assist the EOC in answering questions at the orals;
- Prepare written answers to respondent questions posed at the orals for consideration by the EOC.

3.5.6 Participation with the EOC - discussions and reviews

The Consultant will:

- participate with the EOC in discussions and reviews of the respondents' comments and answers to EOC questions post orals;
- assist in the preparation of final written synopses of those responses in a style and format suitable for review and evaluation by the Qualification Evaluation Team (the Team may be composed of CDOT and RTD staff members and non-voting representatives of Stakeholders identified by CDOT);
- Prepare the documentation for the record the review and short list selection procedure followed.

3.5.7 Preparing for and presenting the recommendations

The Consultant will:

- assist the CDOT in preparing for and presenting the recommendations of the Qualification Evaluation Team to the Qualification Selection Board;
- Prepare and organize of all documents, exhibits, and visual aids helpful to the comprehension and supportive of the presentation to the Board.

3.5.8 Document classification and identification system

The Consultant will assist the CDOT in the preparation and implement of the CDOT document classification and identification system, a document distribution policy with recorded verification of receipt, and a permanent document filing system, both hard copy and computerized.

3.5.9 Preparation of correspondence

The Consultant will assist in the preparation of correspondence for consideration, authorization and execution by the CDOT.

3.6 DRAFT REQUEST FOR PROPOSALS (DRFP)

3.6.1 Development of a management plan for the procurement

Develop a management plan for the procurement of a design-build contractor for the Project. This will entail working closely with the CDOT in the preparation of a procurement process/protocol and reasonable time schedule

to define progress achievement milestones between the issuance of the DRFP and the issuance of Notice(s) to Proceed to the selected design-build team for the Project. This schedule will allow time for all elements of the procurement process, including: development of the DRFP by the CDOT; preparation of Detailed Proposals by the short listed proposers; assessment of the Detailed Proposals by the CDOT; selection of the "Best Value" proposal; negotiations if necessary; and Award and Execution of the Contract.

3.6.2 Development of the draft versions of the main sections of the DRFP.

These main sections will include:

- Instructions to Proposers (ITP) -This document will contain relevant information to the short listed proposers regarding the project and their associated submittals, including: an introduction and summary of the project; a procurement schedule defining the major milestone dates to be adhered to during the procurement process; detailed description of the procurement process which the CDOT will utilize during the review and evaluation of the responses to the DRFP;
- Detailed information pertaining to the Proposal delivery, content and format;
- Proposal evaluation criteria and weighting;
- Contract award and approval process; and
- Stipend information and amounts (if applicable).
- Prepare Book one through Book five
- Draft Design-Build Agreement -This document will contain the actual Agreement to be executed between the CDOT and the successful proposer. This section of the DRFP will be prepared cooperatively by the Consultant's legal consultant, and the CDOT.
- Draft Scope of Work -This document will contain detailed information, specifications and associated guidance intended to apply specifically to the development and implementation of the Project.
- Draft Technical Provisions -This document will contain detailed information, specifications, and associated guidance intended to apply to the development and implementation of the Project.
- Prepare a Revised Draft RFP by incorporating the Risk Allocation assignments agreed to by the CDOT under section 3.4 into the Draft RFP prepared under section.
- Consultant internal review of Draft RFP must be completed by senior level staff having experience in design-build processes to ensure completeness.

3.6.3 Organize Reference Documents, prepared by the Consultant, or provided by the CDOT or RTD for inclusion into the Draft RFP as attachments. These documents may include:

- A. Reference Drawings
- B. Utility Memorandums of Agreement
- C. Cooperative Agreements
- D. Environmental Permits
- E. Right-of-way Acquisition Documentation

3.6.4 Develop an Industry Review

Develop an Industry Review utilizing documents and information prepared under section 3.6.2 and 3.6.3 for transmittal to the short listed proposers for their review and comment;

- Written review comments and responses will be formally requested from the short listed proposers.
- Individual meeting with each short listed proposer will be conducted to discuss the DRFP and solicit feedback; documentation of these meetings. A memo summarizing the comments and responses will be prepared for submittal to the CDOT. Comments identified during this Industry Review process will be discussed with the CDOT staff, legal, and project advisers to obtain approval prior to modifying the DRFP.

3.6.5 Assist the CDOT in obtaining Federal Highway Administration (FHWA) approval of the Draft RFP (updated per the Industry Review process described in section 3.6.4).

3.6.6 Verify a construction cost estimate.

3.7 FINAL REQUEST FOR PROPOSALS (FRFP)

3.7.1 Compiling the Final RFP

Based upon the completion of sections 3.6.1 through 3.6.6:

- compile the Final RFP
- Prepare of correspondence for execution by the CDOT distributing the Final RFP to short listed proposers.

3.7.2 Final RFP - , handling, distributing, tracking, storing

Develop a secure system for receiving, handling, distributing, tracking, storing, and dating all documents, correspondence, facsimile transmissions, and other telecommunications after the date of acceptance of the Final RFP.

- Store all documents and correspondence received and created on and after the date of receipt of the Final RFP.
- Create and maintain a list of parties who have been authorized access to the secured data.
- Create and maintain a controlled system in which the evaluators must check out, check in, and be recorded as possessing the secured data.

3.7.3 Industry Review

Planning, organizing, and administering workshops for Industry Review to be attended by CDOT Region 6 staff, the Consultant legal consultant, project advisers, Consultant staff, and short listed respondents. These workshops will be held to allow short listed proposers the opportunity to ask questions / request clarifications on the Final RFP; it will also provide the short listed proposers the opportunity to solicit preliminary feedback regarding potential Alternative Technical Concepts they intend to include in their Technical Proposals.

- The Consultant will assist in soliciting information from the short listed proposers such that agendas and related documents or exhibits can be prepared and distributed prior to the workshops;
- Minutes of all workshops will be prepared by the Consultant.
- The Consultant will assist with evaluations questions (oral and written) posed at the workshops (and submitted later in writing) and draft answers for consideration by the CDOT.
- Upon receipt of CDOT approval, the Consultant will assemble and distribute CDOT answers to questions.

3.7.4 Assess status of Reference Documents prepared by the Consultant, CDOT or RTD. These documents may include:

- A. Reference Drawings
- B. Utility Memorandums of Agreement
- C. Cooperative Agreements
- D. Environmental Permits I Agreements
- E. Right-of-way Acquisition Documentation

- Documentation describing the status of the Reference Documents will be prepared for submission to the short listed proposers by way of ADDENDA to the Final RFP such that the short listed proposers can include additional efforts in their Proposals for the completion of these items, if required.
- It is critical that all the technical elements of the design-build contract (Books Two through Five) are consistent with the design-build contract (Book One). The most efficient way to accomplish this task is through continuous coordination and communication with the teams developing the technical elements. In addition, a "Legal Review" of the entire Contract (Books One through Book Five) will be undertaken to ensure consistent terminology and intent.

3.7.5 Assist with the preparation and issuance of all addenda to the Final RFP, if required, suggested by meetings, discussions, workshops, questions posed by potential respondents, and clarifications suggested and or approved by the CDOT; addenda will also include status updates on Reference Documents originally included in the RFP, if required.

3.7.6 Working with the staff of CDOT Region 6 consultant will develop a detailed two part procedure and methodology for evaluating the Proposals to be submitted by the short listed proposers, as follows:

- Initial Proposals, which include conceptual information pertaining to Alternate Technical Concepts (ATCs), will be evaluated. The evaluation procedure and methodology for the Initial Proposals will include a detailed review by a committee approved by the EOC; this review will be completed such that recommendations of "Accepted", "Conditionally Approved" or "Rejected" will be made for each component of the Initial Proposal.
- Technical Proposals, which include detailed information pertaining to the development of the Project as defined in the Final RFP, opening schedule, and overall approach to the project will be evaluated. The

evaluation procedure and methodology for the Technical Proposals will utilize the "Best Value Concept" process and will include detailed reviews by committees approved by the EOC. The findings of each committee review will be documented for presentation such that a five level adjectival evaluation process can be completed. Upon completion of the individual Committee member evaluation and scoring, an average of all scores will be prepared for each Proposal. Upon receipt of EOC approval on the evaluation procedures and methodologies, a workshop will be held to convey this information to the Proposal Evaluation Team.

3.7.7 Receive and commence review of the Initial Proposals

Receive and commence review of the Initial Proposals submitted by the short listed proposers, which include information pertaining to Alternate Technical Concepts (ATCs).

- The Consultant will assist in establishing a series of specialized committees approved by the EOC to evaluate the thoroughness and quality of the Initial Proposal responses to each inquiry item contained in the Final RFP utilizing the evaluation procedures and formulae adopted by the EOC.
- The Consultant will prepare documentation of the findings resulting from the committee evaluations.

3.7.8 Perform detailed reviews of Alternative Technical Concepts (ATCs)

Perform detailed reviews of Alternative Technical Concepts (ATCs) submitted by the short listed proposers. These ATCs will include proposed changes to the minimum project requirements set forth in the Final RFP.

- The Consultant will assist in establishing an ATC Review Team composed of senior level staff to lead the review of these Concepts.
- Upon completion of the reviews, recommendations will be made to the EOC regarding which ATCs should be accepted, conditionally approved, or rejected.
- Upon acceptance of the recommendations by the EOC, the Consultant will assist in obtaining necessary agency approvals, including CDOT and FHWA, if required.
- The Consultant will attend meetings with the CDOT to present and discuss the selected ATCs with CDOT and FHWA; written comments will be formally requested from both agencies.

3.7.9 Prepare correspondence for execution by the CDOT transmitting the findings of the evaluation of the Initial Proposals (as defined in sections 3.7.7 and 3.7.8). This correspondence will be utilized by the short listed proposers during their preparation of their Technical Proposals.

3.7.10 Detailed reviews of the Technical Proposals

Receive and commence detailed reviews of the Technical Proposals submitted by the short listed proposers, which include detailed information pertaining to the development of the minimum build scenario of the Project as defined in the Final RFP, opening schedule, and overall approach to the project; review of the associated price proposals submitted by the short listed proposers defining their maximum price for the aforementioned minimum build scenario of the Project will also be reviewed.

- The Consultant will establish specialized committees approved by the EOC to evaluate the thoroughness and quality of the Technical Proposal responses to each inquiry item contained in the Final RFP utilizing the evaluation procedures and formulae adopted by the EOC.
- There may be other unsolicited technical, contractual or financial proposals in addition to the base guidelines provided by the CDOT in the Final RFP; such alternate responses also shall be evaluated and reported by the Consultant.
- The Consultant will prepare documentation of the findings resulting from the Technical Subcommittee evaluations.

3.7.11 Final deliberations pertaining to the Proposals.

Prepare and distribute agenda for meetings called at the option of the CDOT for final deliberations pertaining to the Proposals. These meetings will allow the CDOT the opportunity to discuss any remaining questions or issues related to the Proposals prior to the identification of the "Best Value" Proposal. The Consultant will assist and or prepare documentation of these meetings.

3.7.12 Identification and selection of the "Best Value" Proposal

Assist the CDOT in the identification and selection of the "Best Value" Proposal.

- An evaluation outline will be prepared which documents the procedure followed during the evaluation of the Proposals, indicating what measurable developer performance categories were identified and individually analyzed.
- Using the outline, a detailed summary report of the review and analysis process followed by the Consultant will be prepared, describing how the evaluators used the analytical work performed by the Consultant to rank the responses in a best value order.

3.7.13 Serve as a resource participant

Serve as a resource participant with the evaluators and CDOT staff in delivering final reports and recommendations for best value selections and designations to the Proposal Evaluation Team and to the Proposal Selection Board.

- The Consultant will prepare final reports summarizing the deliberations, actions, and recommendations of the Team and the Board relative to the review and consideration of the Proposals, and their final selection and designation of the project's "Best Value" evaluations.

3.8 POST FINAL RFP

3.8.1 Conduct debriefing (assume 3) on behalf of CDOT, under the guidance of legal consultant of CDOT, for respondents to the Final RFP that were not selected to enter a design-build agreement with CDOT.

3.8.2 Evaluation report

Assist and or prepare:

- a benchmarking evaluation report to capture lessons learned through out the process and
- identify alternative or refined strategies that CDOT should consider for future procurements.
- The report shall be based upon a series of interviews to be held with CDOT, proposers, CDOT legal consultant, and other appropriate parties. Issues to be addressed include; risk shifting, potential for contract change orders, quality, time savings, life cycle cost, design and construction management changes, total project cost, etc

DELIVERABLES FOR PHASE 1

- Assist and recommend hardware/software configurations for development and implementation of a DMDC system compatible with CDOT's computer system
- Forecast encompassing staffing for the Consultant and CDOT floor space, office equipment, and computer hardware and software to support post award project implementation.
- Workshop documentation
- Management plan and schedule for the procurement process of the Project.
- Independent Cost Estimate at strategic process points
- Draft Request for Proposals (DRFP) document
- Final Request for Proposals (FRFP) document
- Book One through Book Five
- Transmittal correspondence
- Question & answer documentation
- Addenda documents, if required
- Detailed Proposal Evaluation Criteria & Methodology
- Self-reporting matrix documenting outcome of Detailed Proposal evaluations
- Log of telephone conversations relevant to the procurement process
- Detailed summary report of the review and analysis process followed by the Consultant in reviewing the responses to the FRP.
- Final reports summarizing the deliberations, actions, and recommendations of the Committee and the Board.
- Unforeseen Services as directed and approved by the Project Manager

SCOPE OF WORK ASSUMPTIONS -PHASE 1

The following lists assumptions, clarifications, and exclusions for the accompanying work hour estimate:

1. The duration of PHASE 1 is 28 weeks after a Notice to Proceed has been issued to the Consultant.

2. Section 1.0 -Project Management, Section 2.0 -General Support and Section 3.0 -Design- Build Procurement Management Services shall be performed under PHASE 1.

3. The extent of additional services that may be requested by CDOT for Unforeseen Services exclusive of services and estimated hours identified for work in PHASE 1 is estimated to be 300 work hours and shall be at the direction and approval of the CDOT Project Manager.

4. PHASE 2 - services, work and costs are not included in PHASE 1.

5. This scope assumes CDOT will lead the effort and provide all Agency Coordination efforts, Permits and Approvals. Extensive coordination with public agencies is required to obtain necessary permits and approvals to proceed with the design-build process. The Consultant will assist in these efforts as directed by the CDOT Project Manager.

6. This scope assumes CDOT will lead the development and execution of all Intergovernmental Agreements and Third party agreements. The Consultant will assist in these efforts as directed by the CDOT Project Manager.

4.0 POST AWARD PROJECT SUPPORT SERVICES - PHASE 2

The tasks performed under this phase of work shall include to perform technical reviews, assessments, and evaluations of the Design-Builder's work. Including, but not limited to; design development; recommendations to modify plans as appropriate; review of right-of-way (ROW) requirements; review of utility investigations; assistance with agency coordination, permits, and approvals; reviewing and monitoring the status of IGAs; design, construction and materials quality assessments; attendance and participation in weekly design/build meetings; support of negotiations provided for in design-build Contract.

4.1 PROVIDE PROJECT MANAGEMENT CONTROLS

4.1.1 Update and Maintain Work Breakdown Structure as identified in Contract Documents prepared in Phase 1.

4.1.2 Update and Maintain the Master Schedule of the Project

4.1.3 Update and maintain project Cost Controls

4.1.4 Update project budget projections

4.1.5 Attend and Participate in weekly project Management Meetings

4.2 CONTRACT MANAGEMENT

4.2.1 Change Management

4.2.2 Change Control Board

4.2.3 Documentation

4.2.4 Cost and Price analysis

4.2.5 Claims Management

4.2.6 Close-out

4.3 POST AWARD PROJECT OVERSIGHT

4.3.1 Right-of-way Oversight

4.3.1.1 Schedule

4.3.1.2 Regulation Compliance and Documentation

4.3.2 Design

4.3.2.1 Standards

4.3.2.2 Constructability

4.3.2.3 Field Changes

4.3.3 Quality Oversight (Design /Materials / Construction). In design-build, the Owner relies on the design-builder for quality control, quality assurance, and complete contract compliance, Construction, Design and Materials Oversight are performed through the Assessment Process of the design-builders Quality Management Plan. The process may utilize ISO standards established to verify the QMP, QC and QA procedures.

4.3.3.1 Quality Management Plan. The Consultant and CDOT, in conjunction with the design-build contractor, shall jointly and cooperatively develop a Project Quality Management Plan. It shall include Quality Assurance and Quality Control for design, materials and construction.

4.3.3.2 Verification. The Consultant and CDOT shall identify and develop a procedure to verify and insure the validity of the results from the design-builder's Quality Management Plan (QMP), QC, QA and overall quality of the project. Results shall identify and assign a level of non conformance to all non-compliances. The levels shall identify the

severity of the non-compliance. All areas of nonconformance shall be tracked in the database for easy retrieval and use.

4.3.3.3 Quality Assessment Training. The Consultant shall train CDOT in the actions and processes required to verify quality.

4.3.3.4 Assessments. The Consultant shall assist CDOT in performing assessments to verify quality assurance processes and procedures for design, materials, and construction. Assessments will be conducted on a routine or random basis and may include all documentation. Assessments shall use a checklist of contract requirements, and shall be used to identify compliance and noncompliance. Assessments may be "reactive" for known, recurring non-conformance. Assessment data will be documented in a data base, and provided to the design-builder for corrective action; where non-compliance is determined. CDOT shall also use the j data base to prepare quality reports. The database shall provide CDOT a basis for withholding payment, a method for documenting correction of non-conformances, and a basis for final acceptance.

4.3.3.5 Reports. The Consultant shall assist CDOT in preparing, compiling and tracking assessment reports. The Reports shall be used to identify reoccurring non-compliances, systematic problems, trends, and to promote continuous improvement

4.3.3.6 Independent Assurance (IA). The Consultant shall assist CDOT in Independent Assurance compliance tasks using CDOT established IA processes, procedures and programs.

4.4 DBE Compliance

4.5 Unforeseen Services as Directed by the Project Manager

SCOPE OF WORK ASSUMPTIONS -PHASE 2

The following lists assumptions, clarifications, and exclusions for the accompanying work-hour estimate.

1. CDOT shall issue the Consultant a Notice to Proceed to authorize PHASE 2 work upon Award and Execution of the selected Design-Build Contractor's Contract.
2. The Consultant shall perform PHASE 2 work (assisting CDOT to perform technical reviews, assessments, and evaluations of the Design-Builder's work) beginning with the NTP through Acceptance of the Project.
3. The duration of PHASE 2 is 70 weeks and shall be adjusted to coincide with the Design-Build Contractor's actual progress.

DELIVERABLES FOR PHASE 2

- Staffing, assistance and support and supplement CDOT contract administrative needs.
- Meeting documentation
- Review of Design-Build Contractor Submittals.
- Design Quality Assessments and supporting documentation
- Construction Quality Assessments and supporting documentation
- Materials Quality Assessments and supporting documentation
- Contract Change Documentation
- Claims resolution and negotiation support
- Project Closeout documentation and support
- Unforeseen Services as directed and approved by the Project Manager

<i>TABLE 1...SUBMITTALS</i>					
Hard Copy	Electronic Copy		Project Initiation and Continuing Requirements	CDOT/OTHER	CONSULTANT
	PDF	Orig.			
X	X	X	Periodic Reports		X
X	X	X	Billings		X
X		X	Meeting Minutes		X

X	X	X	Project Schedule		X	

**SECTION 9
- SERVICES AFTER DESIGN**

The Consultant shall appoint a responsible member of the firm to be the contact person for all construction services. That person should be available until the end of construction to coordinate the following serves:

	<u>CDOT/ Others</u>	<u>Consultants</u>
A. Technical Assistance	_____	<u>X</u>
Provide technical assistance to CDOT project personnel on an as-needed basis. This service shall include, but not be limited to, the following:		
a. Respond to questions in the field that arise relative to the plans, details or special provisions.	_____	<u>X</u>
b. Provide engineering and drafting services for design revisions required due to changes in construction or field conditions.	_____	<u>X</u>

TABLE 2...SUBMITTALS

Hard Copy	Electronic Copy		Project Initiation and Continuing Requirements	CDOT/OTHER	CONSULTANT
	PDF	Orig.			
X		X	Periodic Reports		X
X	X	X	Billings		X
X		X	Meeting Minutes		X
X	X	X	Project Schedule		X
X		X	Completed Specific Design Criteria		X
X	X		Survey Plan	X	
X	X		Approved MHT's	X	X
X	X		Traffic Control Supervisor Certification		X
X	X		Permissions to Enter	X	
		X	Initial Submittal of TMOSS and or Compatible Data	X	
X	X	X	Initial Submittal of an Original Plan Sheet		X
			Project Development		
X		X	Public Communication Contact List		X
			Route Location Survey		
X	X		Traffic Control Supervisor Certification		X
X	X		Approved MHT's		X
		X	Survey data in raw, unedited formats	X	
X		X	Pothole data including invert elevations	X	X
X	X		Culverts report		X
X	X		Access report	X	
X	X		Topographic survey notes	X	
X	X	X	Contour plan checked for errors	X	
X	X	X	Survey control diagram	X	
X			Field books	X	
		X	Electronic Survey Files	X	
		X	Survey TMOSS Data	X	
X		X	Monument Records	X	
X	X	X	Control & Monumentation Plan Sheets	X	
X	X		Aerial Photography Index Map Sheets	X	
X	X		Aerial Photography Contact Sheets	X	
			Permits		
X	X		401 Permit		Na
X	X		Dewatering / 402 Permit		Na
X	X		404 Permit		Na
X	X		SB 40 Permit		Na
X	X		Wildlife Certification		Na
X	X		CDPS Storm Water Permit		Na
X	X		CDPHE Discharge Permit		Na
			Preliminary Design		
		X	Electronic Survey Data	X	
X	X		Traffic Data & Recommendations		X
X	X		Geology & Soils Investigation Report	X	
X	X		Pavement Design Report	X	
X	X		Existing Bridge Condition Report		X
X	X		Foundation Investigation Report		X

<i>Table 1...SUBMITTALS (CONT.)</i>					
Hard Copy	Electronic Copy		Preliminary Design (Cont.)	CDOT/OTHER	CONSULTANT
	PDF	Orig.			
X	X		Engineering Geology Plan Sheet(s)	X	
X	X		Preliminary Hydraulics & Hydrology Report		X
X	X	X	Preliminary Storm Water Management Plan	Na	Na
X	X		Utility Relocation Recommendations		X
X	X	X	Ditch Structure Plans		X
			Right-of-way		
X	X		Memorandum of Ownership	X	
X	X	X	Preliminary Ownership Map (include in FIR Plan set)	X	
X	X		Structural Selection Report		
X	X		Foundation Investigation Request	X	X
X	X		Final Materials Recommendations	X	
X	X		Final Pavement Selection Report	X	
X	X		Intersection Traffic Report		X
X	X		Traffic Report		X
X	X		Preliminary Cost Estimate		X
X	X	X	FIR Plan Set for Design-/Build RFP		X
X	X		List of deviations from Standard Design Criteria		X
X	X	X	Corrected FIR Plan Set		X
X	X		Final Hydraulics & Hydrology Report		
			Right-of-way		
X	X		Area Calculations	X	X
X	X	X	Authorization Plans	X	
X	X		Legal Descriptions	X	
X	X	X	Final Right-of-way Ownership Map	X	
X	X	X	Stabilization Plans		
			Traffic Engineering		
X	X		Safety Assessment	X	X
X	X	X	Signing/Pavement Marking Plans		X
X	X		Signal Warrant Study		
X	X	X	Signalized Intersection Plans & Specifications		X
X	X	X	Traffic Control Plan		X
			Roadside Planning		
X	X	X	Landscape Plan & Specifications		X
X	X		Certification of Plant Availability		
X	X	X	Irrigation Plans & Specifications		X
X	X	X	Bike path Plans & Specifications		X
X	X	X	Sound Barrier Plans & Specifications		X
X	X	X	Truck Escape Ramp Plans & Specifications		
X	X	X	Rest Area Plans & Specifications		
<i>Table 1...SUBMITTALS (CONT.)</i>					
Hard Copy	Electronic Copy		Roadside Planning (Cont.)	CDOT/OTHER	CONSULTANT
	PDF	Orig.			
					X
X	X	X	Lighting Plans & Specifications		X
X	X	X	Structure Final Review Plans & Specifications		X
X	X	X	Construction Phasing Plan		X

X	X	X	Storm Water Management Plan		na
X	X		FOR Plans & Specifications		na
X	X		FOR Cost Estimate		na
X	X	X	Final Review Revisions		na
			Construction Plan Package		
X	X	X	Final Plans (11X17), Specifications (duplex) & Estimate Package for Ad.		na
X	X	X	Final Cross Sections		na
X	X		Schedule of Quantities		na
X	X		Design Decisions		na
X	X		Variances		na
X	X		Findings In the Public Interest		na
		X	Original Surface Digital Terrain		na
		X	Final Surface Digital Terrain Model		na
		X	Design Digital Terrain Model		na
X		X	Staking Data		na
X	X	X	Earthwork Quantities		na
X	X	X	Mass/Haul diagram		na
X	X		Project Calculations (2 copies)		na
X	X		Worksheets (2 copies)		na
X	X		Design Notes		na
X	X		Independent Design Review Reports		na
X	X		Roadway Design Data Submittal		na
X	X		Major Structure Design Final Submittal		na
X	X		Bridge Construction Pack		na
X			Record Plan Sets		na

SECTION 10

- CONTRACT CONCLUSION (CHECKLIST)

1 SUPPLEMENTAL WORK

It is anticipated that this contract may be supplemented for:

- A. Preliminary Design
- B. Final Design
- C. Construction Services
- D. Construction Engineering
- E. Final Earthwork Determination
- F. Completion of the “as-built” plans and/or final ROW plans

Note: cross out items that are not appropriate.

2 CONTRACT COMPLETION

This Contract will be satisfied upon acceptance of the following items if applicable:

- A. Project Schedule
- B. Project Progress Meeting Minutes
- C. Traffic Control Plan(s)
- D. All documents found In Research
- E. All Permission to Enter forms
- F. Monumented & Surveyed Ground Control Diagram(s)
- G. Legally Deposited Control Survey Diagram(s)_
- H. Digital TMOSS Data
- I. Photography Products
- J. Ownership Map
- K. Original Field Notes
- L. Survey Report (including monument recovery forms)
- M. Monumented and Sealed ROW Plans
- N. Legally Deposited Survey Plans
- O. Legal Descriptions (Signed and Sealed)
- P. NOAA-NGS Blue Book
- Q. Completion of review of contract submittals
- R. Design Plans, Specifications, and Final Estimate
- S. All Environmental Permits
- T. All environmental , Utility and ROW Clearances

- U. Hydraulic Report
- V. Structural Report
- W. Geotechnical Report
- X. Materials Report
- Y. Noise Study

APPENDICES

- A. REFERENCES
- B. SPECIFIC DESIGN CRITERIA
- C. DEFINITIONS

Comments regarding this scope may be directed to:

Bernie Rasmussen
CDOT Agreements Office,
(303)757-9400

APPENDIX A

REFERENCES

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

- A. A Policy on Design Standards-Interstate System
- B. A Policy on Geometric Design of Highways and Streets
- C. Guide for Design of Pavement Structures
- D. Standard Specifications for Highway Bridges
- E. Guide for the Design of High Occupancy Vehicle and Public Transfer Facilities
- F. Guide for the Development of Bicycle Facilities
- G. Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Part 1, Specifications and Part II, Tests
- H. Highway Design and Operational Practices Related to Highway Safety
- I. Roadside Design Guide

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

- A. CDOT Design Guide (all volumes)
- B. CDOT Bridge Design Guide
- C. CDOT Bridge Detailing Manual
- D. Bridge Rating Manual
- E. Project Development Manual
- F. Erosion Control and Storm Water Quality Guide
- G. Field Log of Structures
- H. Cost Data Book
- I. Drainage Design Manual
- J. CDOT Quality Manual
- K. CDOT Survey Manual
- L. CDOT Field Materials Manual
- M. CDOT Design Guide, Computer Aided Drafting (CAD)
- N. Erosion Control and Storm water Quality Guide
- O. Standard Plans, M & S Standards
- P. Standard Specifications for Road and Bridge Construction and CDOT Supplemental Specifications
- Q. Item Description and Abbreviations (with code number) compiled by Engineering Estimates and Marked Analysis Unit, CDOT
- R. Right-of-Way Manual, Chapter 2, Plans and Descriptions Procedures and General Information
- S. The State Highway Access Code

APPENDIX A

REFERENCES (CONTINUED)

- T. Utility Manual
- U. TMOSS Generic Format
- V. Field TMOSS Topography Coding
- W. Topography Modeling Survey System User Manual
- X. Interactive Graphics System Symbol Table

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

- A. No. 400.2 Monitoring Consultant Contracts
- B. No. 501.2 Cooperative Storm Drainage System
- C. No. 514.1 Field Inspection Review (FIR)
- D. No. 516.1 Final Office Review (FOR)
- E. No. 1217a Survey Request
- F. No. 1304.1 Right-of-Way Plan Revisions
- G. No. 1305.1 Land Surveys
- H. No. 1601 Interchange Approval Process
- I. No. 1700.1 Certification Acceptance (CA) Procedures for Location and Design Approval
- J. No. 1700.3 Plans, Specifications and Estimates (PS&E) and Authorization to Advertise for Bids under Certifications Acceptance (CA)
- K. No. 1700.5 Local Entity/State Contracts and Local Entity/Consultant Contracts and Local Entity/R.R. Contracts under C.A
- L. No. 1700.6 Railroad/Highway Contracts (Under Certification Acceptance)
- M. No. 1905.1 Preparation of Plans and Specifications for Structures prepared by Staff Bridge Branch

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

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

5 **AREA:**

- A. Manual for Railway Engineering

APPENDIX B

SPECIFIC DESIGN CRITERIA

Note: The following criteria will be developed by the consultant and coordinated with the CDOT/PM prior to starting the design.

1. ROADWAY

A. BASIC DESIGN

The basis for design will be the data in CDOT Form 463, Design Data. A copy of the latest applicable design Data form will be furnished to the consultant

B. GEOMETRIC AND STRUCTURE STANDARDS

- a Design Speed
- b Horizontal Alignment and Curvature
 - i Applicable Superelevation Standards
 - ii Minimum radius of Curvature
 - iii Use of Spirals
- c Vertical Alignment:
 - i Maximum gradient – CDOT Design Guide
 - ii Length – CDOT Design Guide
- d Sight Distance:
 - i Stopping -
 - ii Passing -
 - iii Decision -
- e Superelevation, Applicable Standard
- f Frontage Roads, Separation Width
- g CDOT Access Code
- h Airway – Highway Clearances Design Guide
- i Bridges and Grade Separation Structures, Clearances to Structures and Obstructions, CDOT Design Guide
- j Curb and Gutters, Type

APPENDIX B
SPECIFIC DESIGN CRITERIA (CONTINUED)

C. GEOMETRIC CROSS SECTION

- a Travel Lane:
 - i Width –
 - ii Cross Slope –

- b Shoulder:
 - i Width –
 - ii Slope –
 - iii Paved/Nonpaved

- c Side Ditches:

CDOT Design Guide

- d Side Slopes
 - i Cut-Less than 3:1
 - ii CDOT Design Guide
 - iii Clear zone

- e Median:
 - i Width –
 - ii Treatment –

D. INTERSECTIONS AT GRADE:

- a Type - _____
- b Special Considerations –

E. TRAFFIC INTERCHANGES:

- a Type –
- b Ramp Type –
- c Special Considerations –

F. DESIGN OF PAVEMENT STRUCTURE:

- a Pavement Type - _____

- b Percent Trucks

APPENDIX B
SPECIFIC DESIGN CRITERIA (CONTINUED)

- c Economic Analysis Period –
- d Design Life –

G. MISCELLANEOUS DESIGN CONSIDERATIONS

- a Fence Type -
- b FEMA Category –
- c Design Flood Frequency

H. ROADSIDE DEVELOPMENT

- a Landscaping
- b Specifications for Revegetating Disturbed Areas to be provided by CDOT.
- c Noise Control
- d Type
- e Guardrail and End Treatments

I. LIGHTING

- a Type

APPENDIX C DEFINITIONS

1	AASHTO-	American Association of State Highway & Transportation Officials
2	ADT-	Average two-way 24-hour Traffic in Number of Vehicles
3	AREA-	American Railway Engineering Association
4	ATSSA-	American Traffic Safety Services Association
5	AT&SF-	Atchison, Topeka & Santa Fe Railway Company
6	ADAAG-	Americans with Disabilities Accessibility Act Guidelines
7	BAMS-	Bid Analysis and Management Systems
8	BLM-	Bureau of Land Management
9	BNRR-	Burlington Northern Railroad
10	CA-	Contract Administrator. The CDOT Manager responsible for the satisfactory completion of the contract by the consultant.
11	CAP-	CDOT's Action Plan
12	CBC-	Concrete Box Culvert
13	CDOT-	Colorado Department of Transportation
14	CDOT/PM-	Colorado Department of Transportation Project Manager – The CDOT Engineer responsible for the day to day direction and CDOT Consultant coordination of the design effort.
15	CDOT/STR-	Colorado Department of Transportation Structure Reviewer – The CDOT Engineer responsible for reviewing and coordinating major structural design
16	CDPHE-	Colorado Department of Public Health and Environment
17	CEQ-	Council on Environmental Quality
18	COG-	Council of Governments
19	COGO-	Coordinate Geometry Output
20	CONSULTANT-	Consultant for this project
21	CONTRACT ADMINISTRATOR-	Typically a Region Engineer or Branch Head. The CDOT employee directly responsible for the satisfactory completion of the contract by the Consultant. The contract administration is usually delegated to a CDOT Project Manager.

APPENDIX C
DEFINITIONS (CONTINUED)

22	C/PM-	Consultant Project Manager – The Consultant Engineer responsible for combining the various inputs in the process of completing the project plans and managing the Consultant design effort.
23	DEIS-	Draft Environmental Impact Statement
24	DHV-	Future Design Hourly Volume (two-way unless specified otherwise)
25	DRCOG-	Denver Regional Council of Governments
26	D&RGW-	Denver & Rio Grande Western Railroad
27	EA-	Environmental Assessment
28	EIS-	Environmental Impact Statement
29	ESAL-	Equivalent Single Axle Load
30	ESE-	Economic, Social and Environmental
31	FEIS-	Final Environmental Impact Statement
32	FEMA-	Federal Emergency Management Agency
33	FHPG-	Federal Aid Highway Policy Guide
34	FHWA-	Federal Highway Administration
35	FIPI-	Finding In Public Interest
36	FIR-	Field Inspection Review
37	FONSI-	Finding of No Significant Impact
38	FOR-	Final Office Review
39	GPS-	Global Positioning System
40	MAJOR STRUCTURES-	Bridges and culverts with a total clear span length greater than twenty feet. This length is measured along the centerline of roadway for bridges and culverts, from abutment face to abutment face, Retaining structures are measured along the horizontal distance along the top of the wall. Structures with exposed heights at any section over five feet and total lengths greater than a hundred feet as well as overhead structures including (bridge signs, cantilevers and butterflies extending over traffic) are also considered major structures.

APPENDIX C
DEFINITIONS (CONTINUED)

41	MPO-	Metropolitan Planning Organization (i.e. Denver Regional Council of Governments, Pikes Peak Area Council of Governments, Grand Junction MPO, Pueblo MPO, and North Front Range Council of Governments).
42	MS4-	Municipal Separate Storm Sewer System
43	NEPA-	National Environment Policy Act
44	NGS-	National Geodetic Survey
45	NICET-	National Institute for Certification in Technology
46	NOAA-	National Oceanic and Atmospheric Administration
47	PAPER SIZES-	See Computer-Aided Drafting Manual (CDOT); Table 6-13 and Table 8-1
48	PE-	Professional Engineer registered in Colorado
49	PM-	Program Manager
50	PLS-	Professional Land Surveyor registered in Colorado
51	PRT-	Project Review Team
52	PS&E-	Plans, Specifications and Estimate
53	PROJECT-	The work defined by this scope
54	ROR-	Region Office Review
55	ROW-	Right-of-Way: A general term denoting land, property, or interest therein, usually in a strip acquired for or devoted to a highway
56	ROWPR-	Right-of-Way Plan Review
57	RTD-	Regional Transportation Director
58	T/E-	Threatened and/or Endangered Species
59	SH-	State Highway Numbers
60	TMOSS-	Terrain Modeling Survey System
61	TOPOGRAPHY-	In the context of CDOT plans, topography normally refers to existing cultural or man-made details.
62	UD & FCD-	Urban Drainage and Flood Control District
63	USCOE-	United States Army Corp of Engineers

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