

SCOPE OF WORK

Region 2 Mapping the Probability of the Vulnerable Road User (VRU) Presence within El Paso and Pueblo Counties

CONTRACT TYPE: Specific Rate of Pay
SOW DATE: 1/29/2024
PROJECT NUMBER: 26290
PROJECT LOCATION: El Paso and Pueblo Counties
PROJECT CODE: R200-294

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

SECTION 1 PROJECT SPECIFIC INFORMATION
SECTION 2 PROJECT MANAGEMENT AND COORDINATION
SECTION 3 GENERAL INFORMATION
SECTION 4 PROJECT TASKS
SECTION 5 CONTRACT CONCLUSION
APPENDIX DEFINITIONS

Comments regarding this scope may be directed to:
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INSTRUCTIONS

Note: This Scope of Work (SOW) is to serve as a template for the Colorado Department of Transportation (CDOT) to develop and negotiate solid contracts with Consultant teams on projects and tasks. The Consultant shall coordinate all activities, tasks, meetings, communications, and deliverables with the CDOT/ Project Manager (PM) (or his or her designee) for this project. All submittals will be through the CDOT/PM or a designee, who will make appropriate distribution. Upon notice to proceed, the Consultant shall be responsible and will account for all effort contained in the Final Scope of Work.

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 1: PROJECT SPECIFIC INFORMATION

1. PROJECT BACKGROUND

Vulnerable road users (VRUs) are at the highest risk for fatalities and injuries in traffic crashes. In fact, if the USA eliminated VRU crashes, 11,000 lives could be saved annually. VRUs are defined here as people walking, biking, or rolling. Every fourth fatality in 2023 CDOT Region 2 was of a VRU. Despite the need, the project improvements addressing VRU crashes are fiscally constrained, and need prioritization.

Historic crashes can support project location ranking. However, VRU crashes are broadly and often randomly dispersed across the Region 2, making this criterion insufficient. So, historical crash data can be supplemented by the probability of the VRU presence information. If two similar locations have similar crash patterns, the one with a higher probability of the VRU presence should be prioritized.

2. PROJECT GOALS

This project is intended to improve traffic safety by producing a tool that will guide future prioritization of safety projects. So, the project's goal is to geolocate El Paso and Pueblo County's probability of the VRU presence, based on the relevant traffic generation factors: socioeconomic, demographic, land use, etc. The four objectives that address the goal are as follows:

- A. Identify and geolocate reasonable VRU traffic generation factors
- B. Assign weights/formulas and influence areas to VRU traffic generation factors
- C. Combine VRU traffic generation factors to produce ArcGIS-mapped probabilities of VRU presence
- D. Design and host an ADAAG-compliant website with the final report and the ArcGIS map of the probabilities of VRU presence.

3. PROJECT LIMITS

The project is limited to the following two counties within CDOT Region 2 area: El Paso and Pueblo.

4. WORK DURATION

The time for the work described in this scope is approximately **180 CALENDAR** days.

5. CONSULTANT RESPONSIBILITY AND DUTIES

Enter a general description of the work to be performed. The Consultant is responsible for:

- A. Project Management
- B. Project Coordination and Engagement
- C. Identifying and geolocating proven VRU traffic generation factors
- D. Assigning weights/formulas and influence areas to VRU traffic generation factors
- E. Combining VRU traffic generation factors to produce mapped probabilities of VRU presence
- F. Designing and hosting the ADAAG-compliant website with the final report and ArcGIS map of the probabilities of VRU presence.

6. WORK PRODUCT

The Consultant work products are:

- A. Meeting Minutes
- B. Project Coordination
- C. Schedules
- D. Final Report (digital)
- E. Geographic Information Systems (GIS) Data and Layers
- F. ADAAG- compliant Website.

Requirements are further described in the sections that follow. All work required to complete this Scope of Work requires the use of English Units.

7. WORK PRODUCT COMPLETION

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

SECTION 2: PROJECT MANAGEMENT AND COORDINATION

1. CDOT CONTACT

The Contract Administrator for this project is: Shane Ferguson, Region 2 Transportation Director.

Active day-to-day administration of the contract will be delegated to the CDOT/PM:

Name: Jelena Karapetrovic
Title: Engineer in Training III
Address: 5615 Wills Blvd, Pueblo, CO, 81008
Office phone: 719.546.5449
E-mail: jelena.karapetrovic@state.co.us

2. PROJECT COORDINATION

The consultant should anticipate that communication with the following entities might be needed to collect the local data that are not already publicly available.

- A. Cities
- B. Counties
- C. Metropolitan Planning Organizations (MPO's)

SECTION 3: GENERAL INFORMATION

1. NOTICE TO PROCEED

Work shall not commence until the written Notice-to-Proceed is issued by CDOT. CDOT must concur in time lost reports prior to the time lost delays being subtracted from time charges. Subject to CDOT prior approval, the time charged may exclude time lost for:

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

2. PROJECT COORDINATION

- A. Routine Working Contact: Routine working contact shall be between the CDOT/PM and the Consultant Project Manager (C/PM) as defined in the Appendix
- B. Project Manager Requirements: Each Project Manager shall provide the others with the following:
 - A written synopsis or copy of their respective contacts by telephone and in person
 - Copies of pertinent written communications.

3. ROUTINE REPORTING AND BILLING

The Consultant shall 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
- C. 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 C/PM must be approved by the CDOT Contract Administrator. All tasks assigned to the Consultant must be conducted by a person on the Consultant team that is qualified and has specific expertise in that task. The qualified person is a professional with the necessary education, certifications (including registrations and licenses), skills, experience, qualities, or attributes to complete a particular task.

This contract requires that the prime firm or any member of its team be pre-qualified in the following disciplines for the entire length of the contract: **Management (Contract Admin) and Traffic Engineering.**

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. Estimating- Transport (an AASHTO sponsored software) as used by CDOT
- B. Specifications- Microsoft Word
- C. Scheduling- Microsoft Project
- D. Geographic Information System (GIS)- ArcGIS w/CDOT's geodatabase, formatting configurations & standards.

6. COMPUTER DATA COMPATIBILITY

The data format for submitting computer files shall be compatible with the latest version of the adopted CDOT software as of Notice to Proceed for the contract. The Consultant shall immediately notify the 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 Section 5, Table 1 - Submittals, for additional information regarding current formats and the acceptable transmittal media.

SECTION 4: PROJECT TASKS

Note: This list establishes the Consultant’s responsibility. The consultant shall maintain the ability to perform all work tasks that are indicated below with the forms and conditions contained herein, and the applicable CDOT standards.

1. PROJECT MEETINGS

The types and numbers of meetings shall be flexible and determined by an interactive process as approved by the CDOT/PM.

A. Initial Project Kick-Off Meeting

Schedule and facilitate initial project kick-off meeting. All appropriate disciplines should be included in the scoping meeting. Create an invitation list, send notices with a draft agenda prior to the meeting, and provide meeting minutes to all those invited. The scoping meeting will also be used to clearly identify scope elements, responsibilities, and coordination necessary to complete the work.

B. Progress Meetings

CDOT and Consultant team will meet periodically as required (typically every month virtually). The meetings will be used to review activities required to be completed since the last meeting, problems encountered/anticipated and potential solutions, project schedule update, action items, and coordination required with other agencies.

C. Update Calls

CDOT and Consultant team will meet virtually periodically (typically bi-weekly) to discuss project updates, meeting action items and monthly invoices.

D. Meeting Minutes

Project meeting minutes shall be completed by the Consultant and provided to the CDOT/PM within one week of the actual 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.

E. Comment Resolution Meeting

The meeting will be after the draft report, map and website are complete. CDOT/PM and the Consultant will discuss final requirements before the documents are accepted. The Consultant’s responsibility is to address all the comments before the final submission.

2. PROJECT MANAGEMENT

A. Managing Approach

At the kick-off meeting, or shortly thereafter, the consultant will create and provide an approach for managing the project (i.e. involved staff, key team positions), including task orders, a schedule, document and agency reviews and other project needs. The Consultant shall coordinate all the work tasks being accomplished by all parties to ensure project work completion stages are on schedule.

B. Develop a Project Schedule and Assign Tasks

The Consultant is responsible for coordinating the required work schedule for tasks accomplished by CDOT and other agencies. Prepare the initial project schedule for review by the CDOT/PM and consultant team and refine to provide detail as requested. Modifications will be made as necessary in collaboration with CDOT and appropriate justification. The tasks covered by this Scope of Work are expected to take up to **180 calendar days** to complete.

C. Quality Assurance/ Quality Control (QA/QC)

Prepare and submit a QA/QC plan as part of the planning documents noted above and commit to adhering to the QA/QC process throughout the project.

3. IDENTIFY AND GEOLOCATE PROVEN VRU TRAFFIC GENERATION FACTORS

VRU crashes are shown to be correlated with socioeconomic and demographic factors, such as population age and motorization level. Younger and older users are overrepresented in VRU crashes, due to inferior cognitive or visual abilities. Also, safe and accessible VRU transportation service is often a necessity for households without motor vehicles.

Additionally, land use and accessibility might impact the VRU demand, and ultimately the crash exposure. For example, hospitals and health, recreation or event centers, schools, parks, trails, bus stops, Central Business Districts, or high-density housing might disproportionately generate VRUs. Therefore, this task is to identify factors impacting VRU traffic production and attraction.

Most of the information needed is already publicly available. So, CDOT expects the Consultant to, at a minimum, use the data from:

- State of Colorado
- US Census Bureau
- USDOT Equitable Transportation Community (ETC)
- Colorado Statewide Travel Model
- Locally obtained data.

4. ASSIGN WEIGHTS AND INFLUENCE AREAS TO VRU TRAFFIC GENERATION FACTORS

The Consultant will assign a coherent weight (or a formula) and an area of influence to each VRU traffic generation factor identified in Task 3. For example, a hospital and a trail could differently impact the VRU presence. A hospital's influence area might be a radius, while trail's might be a longitudinal buffer. Also, a 300-bed hospital and a health clinic might reasonably need different weights or a formula.

5. COMBINE VRU TRAFFIC GENERATION FACTORS TO PRODUCE MAPPED PROBABILITIES OF THE VRU PRESENCE

The Consultant will produce the layered and weighted interactive ArcGIS map of the VRU presence probability. Each of the VRU generation factors will be on a separate layer with an assigned impact area. The final map will cohere overlapping layers to yield the probability of the VRU presence.

The map should allow turning layers on or off, but also deviating from the default weights and impact area sizes. In addition, the map will allow predicting the VRU presence probability with future developments. Assume a new school will be built in five years. The map will allow recalculating the VRU presence probability at the location based on the added traffic generator and the expected buildout year.

6. DESIGN AND HOST A WEBSITE WITH THE FINAL REPORT AND ARCGIS MAP OF THE PROBABILITIES OF VRU PRESENCE

The Consultant will host an ADAAG-compliant website with the final report and the interactive ArcGIS map of the probabilities of VRU presence. The final report and the map will be accompanied with detailed user instructions. The consultant is expected to host the website for one year. However, CDOT Region 2 will be the owner of all the data.

SECTION 5: CONTRACT CONCLUSION

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

- A. Project Schedule
- B. Project Progress Meeting Minutes
- C. All documents found in Research
- D. Final Report- The report will have a literature review of similar efforts, and a comprehensive methodology
- E. ArcGIS map of the probability of the VRU presence- the layered and weighted interactive ArcGIS map of the VRU presence probability within CDOT Region 2's counties El Paso and Pueblo
- F. Website- The website with the final report and the map will be hosted by the Consultant for a year and will be ADAAG-compliant.

TABLE 1 – SUBMITTALS

Note: This list establishes the 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.

Hard Copy	Electronic Copy		Work Tasks	CDOT (C)	Consultant	Not Applicable
	PDF	Orig.				
	X	X	Periodic Reports		X	
	X		Billings		X	
	X		Meeting Minutes		X	
	X		Project Schedule		X	
	X		Final Report		X	
		X	ArcGIS Map		X	
		X	Website		X	
	X		Correspondence with Agencies, Entities, and Public		X	

APPENDIX: DEFINITIONS

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

ADAAG	Americans with Disabilities Accessibility Act Guidelines
CA	Contract Administrator – The CDOT Manager responsible for the satisfactory completion of the contract by the consultant
CDOT	Colorado Department of Transportation
CDOT/PM	Colorado Department of Transportation Project Manager – The CDOT Engineer responsible for the day-to-day direction and CDOT Consultant coordination of the project effort (as defined in Section 2 of this document)
CONSULTANT	Consultant for the project
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 (as defined in Section 2 of this document).
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.
GIS	Geographic Information Systems
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).
PM	Program Manager
PROJECT	The work defined by this scope