



## **NON-PROJECT / NON-TASK SPECIFIC GENERAL ENGINEERING SCOPE OF WORK CDOT FRONT RANGE (REGIONS 1, 2, 4 and HQ)**

### **CONTRACT ADMINISTRATION:**

General administration of these contracts will be delegated to the Regions by contract. Active day to day administration and monitoring of contract task orders will be delegated to Regional Resident Engineers or CDOT Project Engineers within each task order.

Type of work may include all or parts of the following activities:

- A. General Engineering Services - The scope for general engineering and design services may include but shall not necessarily be limited to:
  - a. Provide conceptual drawings, graphs, data collection, or charts for the Region's planning, environmental, or other units as needed.
  - b. Conduct Studies - transportation, environmental, etc.
  - c. Provide support for region planning activities, including assistance with public meetings.
  - d. Provide design support for off systems or other modes of transportation alternatives.
  - e. Provide drafting support or CADD services. All CADD work for CDOT will be conducted using MicroStation and Inroads Software and configuration, latest versions used by CDOT.
  - f. Provide lighting plans and analysis.
  - g. Provide support research or search county, state or other areas for records or documents relevant to the project or task.
  - h. Provide or acquire design services as required to complete tasks not specifically defined in the outline, but that may be required by specific task order.
  
- B. Bridge/Structural Design Activities - The scope of work for bridge design activities may include:
  - a. Provide design services for various highway structures or portions of highway structures.
  - b. Furnish detailing services including drafting and quantity calculations for various highway structures or portions of highway structures.
  - c. Inspect and rate highway bridges.
  - d. Provide bridge design and detailed review of work performed by other designers.
  - e. Provide wall design and detailed review of work performed by other designers.
  - f. Provide structural selection reports and structure selection studies.
  - g. Provide a structure concept study.
  - h. Obtain structural data.
  - i. Provide foundation investigation report.
  - j. Coordinate with outside agencies, for example, railroad agencies.
  
- C. Roadway Design Activities - The scope of work for roadway design activities may include:
  - a. Provide design services including quantity calculations for the various components



of roadway construction, which could include intersection layout, interchanges, signals, structures, lighting, landscaping, irrigation design, ditch design, waterline, and sanitary sewer design.

- b. Furnish detailing and drafting services utilizing MicroStation and Inroads Software, latest CDOT adopted versions utilizing CDOT format. Other software required for design services and communication of information are Microsoft office products such as word, excel, power point. In addition, ProjectWise or FTP sites may be required for file sharing. Other formats or software products may be required for specific tasks such as traffic modeling or truck turning movements.
- c. Attend scoping reviews, design office reviews, field inspection reviews, and final office reviews and provide minutes as appropriate.
- d. Prepare (PS&E Package) final plans, specifications and provide the CDOT project manager with detailed estimates that can be entered into CDOT Trns-port application system
- e. Prepare revisions under-advertisement to plans or specifications when necessary.
- f. Design and layout of intersections and interchanges.

D. Hydrology Activities - The scope of work for the hydrology activities may include:

- a. Collect historical drainage data.
- b. Establish drainage basin data.
- c. Select run-off parameters and predict peak flow.

E. Hydraulics Design Activities - The scope of work for hydraulics design activities may include:

- a. Furnish the size and location of drainage structures.
- b. Furnish storm sewer design.
- c. Furnish erosion protection design and NPDES requirements.
- d. Furnish quantity calculations for drainage structures including irrigation and permanent BMP's for surface drainage.
- e. Design of water and wastewater systems.
- f. Irrigation system designs including, but not limited to, typical ditches, traveling gun irrigation systems and other center pivot systems.

F. Landscape Architectural Activities - The scope of work for landscape architectural activities may include:

- a. Provide estimates of quantities of native seeding and mulching for the FIR plans.
- b. Determine most economic landscape alternative, finalize concept, and complete the plan.
- c. Verify that an acceptable safe recovery distance exists between traveled way and all trees to be planted.
- d. Coordinate all special permits that may be required.
- e. Coordinate ROW requirements.
- f. Write Special Provisions and submit to the CDOT/PM with the completed roadside plans.
- g. Submit the approved plan/special provisions to the Design Engineer for inclusion in the Project Plans.
- h. Verify availability of plant materials and submit letter to the CDOT/PM certifying that



- designated plants are available.
- i. Provide recommendations for alternative landscape designs and recommendations for Best Management Practices for temporary and permanent erosion protection.
  - j. Provide Storm Water Plan Sheets with BMP locations and quantity calculations.
  - k. Design wetland mitigation areas.
- G. Geotechnical Services for Design - The scope of work for design services include:
- a. Provide field sampling and testing of existing pavements and soils necessary for proper pavement design as per the CDOT Pavement Design Manual.
  - b. Perform boring and subsurface geotechnical investigations for Structure Selection Reports.
  - c. Provide testing results used in the design process that are certified by a professional engineer.
  - d. Provide other geotechnical services as requested in writing, including but not limited to subsurface investigations, instrumentation, foundation reports, landslide evaluations, MSE wall designs, soil nail designs, and retaining wall designs.
- H. Environmental Services - The scope of work for environmental services may include:
- a. Review environmental conditions, determine required permits.
  - b. Delineation and mitigation recommendations of wetlands.
  - c. Prepare and/or review environmental documents for CDOT projects.
  - d. Conduct and prepare environmental surveys and clearance reports.
- I. Design Services under Construction – the Scope of Work for design services under construction may include:
- a. Review of actual subsurface conditions to verify structural design.
  - b. Review and approval of shop drawings.
  - c. Changes in design based on field conditions.
  - d. Services as needed per PE stamp requirements on design drawings.
  - e. Claim and schedule analysis.
  - f. Analysis of VE proposals.
  - g. Analysis of construction phasing false work, shoring, methods statements, and CPM schedules (Microsoft Project and/or Primavera).
- J. Utility Investigation Activities – the scope of work for utility investigation may include:
- a. The Consultant shall conduct and document an investigation of the project area to determine existing utility conditions within the project limits. As part of the investigation the Consultant will meet with all utility providers and collect utility key maps for all utilities in the project area, identify all known utilities, ownership, type, size and special conditions should utility relocation be required, and research and obtain copies of utility easements (public and private) and utility franchise agreements to determine conditions under which the utility was established in its present location (e.g. by revocable permit or by a privately



owned easement. The utility investigation requirements are to meet Quality Levels A and/or B as required under CI/ASCE 38-02.

b. Project Goals

- 1) Quality Level B involves the use of Quality Level D and C methods of utility investigation plus the use of surface geophysical techniques to determine the existence and horizontal position of underground utilities. This activity is called "designating." The information obtained in this manner is surveyed to project control. Two-dimensional mapping information is obtained. This information is usually sufficient to accomplish preliminary engineering goals.
- 2) Quality Level A involves the use of Quality Level D, C and B methods of investigation plus the use of minimally intrusive excavation methods at critical points to determine the precise horizontal and vertical position of underground utilities, as well as the type, size, condition, material, and other characteristics. This activity is called "potholing" (sometimes called Locating). It is the highest level presently available. When surveyed and mapped, precise plan and profile information is available for making final design decisions.
- 3) 3D Modeling involves the use of CADD to depict the precise horizontal and vertical profile of each utility in areas of high conflict. This tool is only utilized in areas where precision locating and design of utilities is essential for project success.

c. Utility Investigation Methodology

- 1) Project Scoping
  - a) This work is included in the Project Scoping Plan Set for the Project Scoping meeting
  - b) Quality Level B Utility Investigation
  - c) Use existing survey project control data, GIS data, plans and electronic data from utility providers, and field survey to prepare utility design plans that meet ASCE Quality Level B.
- 2) FIR (Field Inspection Review)
  - a) This work is performed at 30% design, prior to FOR Plan development
  - b) Quality Level A Utility Investigation
- 3) FOR (Final Office Review)
  - a) This work is performed at 60% design, during FOR Plan development
  - b) 3D Modeling
- 4) PS&E (Plans, Specifications & Estimate)
  - a) Ready for Utility Clearance and Advertisement

d. Deliverables

- 1) Project Scoping:
  - a) The end product (the CADD file or project plans) that contain the horizontal location of utilities, ownership, type, and size of the line including any special conditions of the line.



- b) The CADD file or project plans should depict the lines following CDOT utility line type standards and colors, include all utility easements, and power source locations with easements.
  - c) Easements shown on plans
  - d) Produce a utility contact list: Including utility provider, contact name, email address, work & cell phone numbers. Used for both utility notes and specifications.
  - e) The utility plan sheets will include the utility line work with proper designation colors.
  - f) Complete scoping design for utility plans.
  - g) Include service line locations for water, sewer, electrical, communications and natural gas.
  - h) Show transmission main lines and secondary feed lines with labels.
  - i) Distinguish lines between CDOT owned facilities, local agency facilities and utility provider facilities.
  - j) Produce utility plan sheets for review with utility providers including an oversize plan sheet for coordination and meetings.
  - k) Include known easements for the utility providers; inside, adjacent to and outside CDOT ROW on the utility plans.
  - l) Provide a table for each utility provider that includes size and type of the providers' facilities.
  - m) Include manhole rim labels and inverts in and out labels that match CDOT project datum elevations.
- 2) FIR (Field Inspection Review)
- a) Provide a matrix of potential utility conflicts.
  - b) Provide for and manage the potholing services.
  - c) Provide a potholing map for survey locates.
  - d) Provide a potholing chart and incorporate pothole location into the FIR Utility Plans. In the event there is insufficient design available to perform the potholing activities pre FIR, the consultant shall coordinate the final potholing work into the FOR plan level submittal
  - e) Produce utility plan sheets for review with utility providers including an oversize plan sheet for coordination and meetings
  - f) Sewer/Storm manholes will be verified; rim elevations, inverts in and inverts out, include pipe size and pipe material. Include labels for other sewer appurtenances, lift stations, drop manholes, vents and force mains.
  - g) Water lines to be verified; elevations for valve boxes including size, pipe size and pipe material. Include labels for other water appurtenances, air vacs, PRV vaults, vents and curb stops.
  - h) Dry utility labels for vaults, pull boxes, manholes, drop down transformers and other providers attached to all overhead utility line poles.
  - i) Complete FIR design for utility plans
  - j) The utility plan sheets will include the utility line work with proper designation colors.
- 3) FOR (Final Office Review)
- a) Produce Utility notification letters to utility providers for acknowledgment of potential conflicts or relocations.



- b) Calculate quantities and produce a tabulation of utility pay items.
  - c) Incorporate notes on the utility plan sheets describing the anticipated relocation work.
  - d) Provide Utility 3-D modeling in high conflict areas where precision placement of utilities is deemed essential.
  - e) The utility plans sheets will include the utility line work with proper designation colors.
  - f) Include utility notes and specifications.
  - g) Complete FOR design for utility plans.
  - h) The consultant will finalize the identification of existing utilities (both wet and dry) that will be impacted by design and finalize the existing utility plans with call-outs indicating which existing utilities are impacted by the project.
  - i) Produce and/or obtain from the owner utility cost estimates to be used for utility reimbursement agreements.
  - j) Cross sections will show the utility location both vertically and horizontally and will include existing and proposed ROW lines.
  - k) Drainage profiles will show the utility location both vertically and horizontally and will include existing and proposed ROW lines.
  - l) Wall and bridge profiles will show the utility location both vertically and horizontally.
  - m) Landscape plans will include utility locations.
  - n) Signal and lighting plans will include utility locations.
- 4) Utility Coordination - Scoping
- a) Coordinate the utility permit.
  - b) Coordination of scoping meetings with all utility providers and meeting minutes.
  - c) Request and receipt of utility maps and easements from utility companies will be coordinated with CDOT project manager and with CDOT region utility engineer.
  - d) Conduct a review of utility information, obtain existing utility mapping from the utility providers.
  - e) Request franchise agreements from the local agencies.
  - f) Request identification for any secondary utility provider attachments to the main utility provider's facility.
  - g) Consultant to work with surveyor to adjust datum to match CDOT project.
- 5) Utility Coordination FIR (Field Inspection Review)
- a) Coordination of FIR meetings with all utility providers and meeting minutes. (Office and Field)
  - b) Review utility matrix conflicts with CDOT RUE and work on plan of action.
  - c) Review potholing map with CDOT.
  - d) Coordinate with CDOT, potholing company and survey company on potholing schedule.
  - e) Coordinate with the CDOT region utility engineer on utility notes and specifications.
  - f) Coordinate the utility permit.
  - g) Coordinate with project manager and CDOT RUE and affected utility companies on the FIR utility plans for distribution.



- 6) Utility Coordination FOR (Final Office Review)
  - a) Coordination of FOR meetings with all utility providers and meeting minutes. (Office and Field)
  - b) Coordination with the wet and dry utility providers on the potential relocation areas
  - c) Coordination with surveyor on the potential relocation areas
  - d) The consultant will coordinate with project manager and CDOT region utility engineer and affected utility companies on the FOR design.

K. Grant Writing Services

- 1) Funding needs analysis – Work with the CDOT to assess the validity of current funding priority areas and identify new priority areas for funding.
- 2) Grant Funding Research – Conduct research to identify grant resources including, but not limited to federal, state, foundation, agencies and organizations that support CDOT'S funding needs and priorities.
- 3) On-call Grant Research – In addition to the areas defined above other areas may be also identified through the Funding needs analysis process and throughout the duration of the contract.
- 4) Grant proposal Development – Provide grant proposal writing services associated with the completion of grant applications on behalf of CDOT, including the preparation of funding abstracts, production and submittal of applications to funding sources.

- L. Other Services - As requested Design and/or General Engineering SOW by the Regions and specified in the task orders for other services not specified above may be requested on an as needed basis.

The scope of work for these services will include the details of the SOW and General Engineering Requirements.