Highlighted areas: Scope items to be approved

FM 455

FROM US 75 TO APPROXIMATELY 0.75 MILES EAST OF SH 5

PROJECT SCOPE

SERVICES TO BE PROVIDED BY THE ENGINEER

The work to be performed by the Engineer under this contract shall consist of providing engineering services

1. Engineering and survey tasks required for the preparation of right of way mapping for approximately 2.35 miles of FM 455 from US 75 to 0.75 miles east of SH 5.

2. Engineering and survey tasks required for the preparation of plans, specifications, and estimates (PS&E) for approximately 2.35 miles of FM 455 from US 75 to 0.75 miles east of SH 5.

The Engineer will prepare PS&E, provide survey data and preliminary cost estimate for the entire length of the project. Construction plans, details, and quantities including grading, paving, drainage, traffic control, signalization, storm water pollution prevention plans, miscellaneous details, permanent signing, striping and pavement markings, will be provided by the Engineer for the PS&E portion of the project.

All PS&E will be developed in English units and produced on 11" x 17" mylar sheets. The engineering work under this contract is outlined according to function code as arranged in the Generalized Scope of Services. Prior to beginning any work, the Engineer shall collect, review and evaluate all available existing data pertaining to the project and prepare the PS&E in accordance with the requirements and policies of the Texas Department of Transportation and Collin County. The Engineer may be incorporating additional plan work and quantities by others into the project plans (number and insert sheets only).

To every extent possible, the Engineer will utilize TxDOT's standard drawings, standard specifications, special provisions or special specifications. If a special provision or special specification must be developed for the project, it shall be in TxDOT format and, to the extent possible, incorporate references to approved TxDOT test procedures. The Engineer will coordinate with all local, state and federal agencies and utility companies through the Collin County project staff.

A CD of all CADD files (in Microstation dgn format) will be furnished to Collin County for all drawings at the completion of the project.

TASK 1 – PROJECT MANAGEMENT AND COORDINATION

The Engineer, in coordination with the Collin County Contract Manager (hereinafter referred to as Contract Manager), will be responsible for directing and coordinating all activities associated with the FM 455 project (hereinafter referred to as the project).

1.1 - Progress Reports, Invoices and Billings

Engineer's Project Manager/Engineer (hereinafter referred to as Project Manager) will review the schedule and prepare monthly progress reports for review by the Contract Manager. Invoices for all work completed during the period will be submitted monthly for the Engineer and all subconsultants. Monthly progress reports will include:

1. Activities during the reporting period;
2. Activities planned for the following month;
3. Problems encountered and actions to remedy them
4. Overall status, including a tabulation of percentage complete by task, management

schedule showing progress and supporting documentation.

5. Minutes of meetings.

Deliverables

Monthly Progress Report

Monthly (approximately) invoice and billings.

1.2 - Coordination/Administration

The development and maintenance of effective communication among the project team, Collin County, TxDOT and other entities will be one of the key factors in achieving the successful completion of the project. The Engineer will oversee the preparation of all documents and manage all project activities as follows:

1. Project Coordination. All correspondence and coordination will be handled through and with the concurrence of the Contract Manager.

2. Lines of Communication. Communications between the Engineer and TxDOT will be through the Contract Manager unless otherwise directed in writing by the Contract Manager. The Engineer shall designate one Texas Registered Professional Engineer to be the Project Manager and be responsible throughout for project management and all communications, including billing, with the Contract Manager.

3. Project Administration. The Engineer will manage all project activities, including scheduled and unscheduled meetings, direction of team and staff, correspondence with and response to Collin County and TxDOT which would include assistance to TxDOT in the preparation of responses to inquiries.

4. Coordination Meetings. Meetings will be held with the local, state and federal agencies; property owners with significant issues which may be affected by the project; utility owners; other consulting firms; etc., as needed or required by the State. Before meetings, the Engineer will discuss the agenda for the meetings with the Contract Manager, or designee, to ensure that released information is appropriate and correct. Data collected during the project will not be released to any agency or to the public without prior approval of the Contract Manager. The Engineer will document all meetings and forward copies of meeting minutes to the Contract Manager. Additionally, the Engineer will maintain an ongoing catalogue of meeting participants, dates, locations, estimated number of attendees, names of attendees if appropriate, and matters discussed. Engineer will keep the mailing list updated and current.

5. Coordination with Utility Companies. The Engineer will work closely with utilities to ensure that all lines are adjusted in conformance to TxDOT's Utility Accommodation Policy. The Engineer will work directly with the utility companies and include in the PS&E information for each line, describing the owner, type of utility, size and elevation. As the project progresses, the engineer will provide the utility companies with any necessary schematics or plan sheets in order for them to make an accurate determination of where the proposed roadway will be. The Engineer will include the utility companies in the 30% and 60% reviews in order to better coordinate the relocation of utilities. Utility owners are responsible for the preparation of relocation plans.

6. Correspondence. The Engineer will submit all written materials, letters, survey forms, etc. used to solicit information or collect data for the project to the Contract Manager, or designee, for review and acceptance before its use or distribution. Copies of all outgoing correspondence and all incoming correspondence will be provided to the Contract Manager, or designee, on a continuing basis. Correspondence and reports will bear the state and federal project numbers as appropriate. Word processing will be prepared using Microsoft Word or compatible Word formats. CDs will be IBM compatible.

Copies of External correspondence and correspondence between the Engineer, Collin County, and TxDOT will be provided. Internal correspondence is not to be provided to the Contract Manager.

7. Release of Information. The release of any related information will be approved by the Contract Manager.

8. Document Printing and Distribution. The Engineer will be responsible for printing copies of all draft and final documents, reports, newsletters, etc. produced for the project except where defined by each specific task. TxDOT will be responsible for the distribution of all draft and final documents, except the newsletters, to appropriate agencies and the public.

9. Project Close-out. Upon project completion, the Engineer will submit all original files to Collin County. Copies of the transmitted materials will be retained by the Engineer for three (3) years after delivery of originals to Collin County. Original contract and subcontract file shall remain in the possession of the Engineer.

Deliverables
All incoming correspondence.
All outgoing correspondence.

1.3 - Control/Scheduling

Engineer will prepare a detailed, graphic project schedule indicating tasks, subtasks, critical dates, milestones, deliverables and review requirements. The project schedule will be in a format which depicts the order and interdependence of the various tasks, subtasks, milestones, and deliverables for each task identified herein. Progress will be reviewed as set forth in section 1.5. Should these reviews indicate a substantial change in progress; the schedule will then be reviewed at a Project Team meeting.

Engineer will also prepare a less detailed graphic project schedule with major project milestones. This schedule should be of a size that is readily reproducible and understandable to the lay public.

Deliverables
Readily reproducible detailed project schedules (3 copies)
Readily reproducible project schedule for the lay public (3 copies)

1.4 - Subconsultant Management

Engineer will prepare subcontracts for subconsultants, monitor subconsultant activities (staff and schedule), and review and recommend approval of subconsultant invoices. Subconsultant progress reports and invoices will be incorporated into the monthly progress report and invoice described in Subtask 1.1.

Deliverables
Subconsultant Contracts. (2 copies)
Monthly Subconsultant Progress Reports. (1 copy with attachments)
Monthly Subconsultant Invoices. (1 copy)

1.5 - Quality Control /Quality Assurance

The Engineer will conduct an independent comprehensive quality assurance/quality control review at milestone points during the project, to appraise both technical and business performance and provide direction for project activities. These milestones will occur at the 30, 60, 90, and the 100% submittals. Once the department has reviewed a submittal, a meeting will be arranged to discuss the progress of the work in detail. Multiple iterations of 30, 60, 90 or 100% plan reviews due to preference or scope changes will be addressed under a separate scope and fee.

Deliverables
PS&E review packages for 30%, 60%, 90%, and 100% submittals (5 copies each)
Note: This contract assumes one submittal for each PS&E milestone (30%, 60%, 90% and 100%).

TASK 5 FIELD SURVEYING (FC 130 & 150)

All surveys will meet or exceed the appropriate category/condition in the current Texas Society of Professional Surveyors *Manual of Practice for Land Surveying in Texas.* Right-of-way surveying: Will meet or exceed a Category 1A, Condition II Land Title Survey. Topographic Surveys: Includes improvements, cross-sections, DTM's, profiles, etc., and will meet or exceed a Category 6, Condition I survey. Horizontal Control Survey: Will meet or exceed a Category 7, Condition I survey. Vertical Control Survey: Will meet or exceed a Category 8, Condition II survey. This shall be accomplished in a neat and workmanlike manner subject to approval by the State.

The State may periodically inspect equipment and procedures of the Surveyor. The Surveyor will notify the State when survey crews are working on the project.

All conventional horizontal control surveys shall have a minimum of two sets of direct and reverse sightings at each occupied control traverse point. Vertical control surveys shall utilize the three-wire method or digital electronic level.

All static GPS surveys will meet or exceed the current Federal Geodetic control committee's "Geometric Geodetic Accuracy Standards and Specifications for using GPS relative positioning techniques." Any deviation from these standards must be mutually agreeable and documented in writing.

5.1 Right-of-way Mapping (FC 130) (Not to exceed 20 parcels)

- Obtain ownership data
- Prepare ownership maps (Deed Sketch)
- Boundary survey of each parent tract
- Boundary determination by Registered Professional Land Surveyor
- Create parcels based upon Engineers alignment and Right-of-way widths.
- Create survey sketch for each parcel to be acquired (not to exceed 20)
- Create metes and bounds description for each parcel to be acquired (not to exceed 20)
- Computation sheets for Survey Closure and Area for each parcel
- Create overall Strip map of all parcels
- Monument proposed right-of-way (Set corners)

** All parcels will be signed and sealed by a Registered Professional Land Surveyor **

5.2 General Design Surveying (FC 150)

- Obtain right of entry (short of litigation) to adjacent properties, as required
- Establish bench mark circuit and project control.
- Provide a data sheet for each primary control monument set.
- Establish secondary control points as needed for data collection.
- Profile and cross-section existing drainage facilities.
- Establish project baseline and appropriate offset(s) - recover and verify.
- Prepare a final design/topographic drawing in digital format showing all additional features located in the field, an ASCII coordinate file of all points located in the field and a hard copy of the coordinates.
- Provide vertical difference shift from NAVD88 datum to NGVD29 datum.

TASK 6 ROADWAY DESIGN CONTROLS (FC 160)

6.1 Grading Design

- Refine the horizontal and vertical alignment of the roadway and cross streets based upon the approved schematic layout.
- Typical Section sheets must be prepared and submitted for approval.
- Prepare plan and profile sheets.
- Design Cross Sections shall be submitted in electronic format and on roll plots only.
- Determine Cut and Fill Quantities

6.2 Plan Profile Sheets

Using the approved schematic as the base drawing, prepare plan profile sheets at 1"=100' scale on 11" X 17" sheets.

- Driveway Profiles/Details/Summary
- Miscellaneous Roadway Details
- Summary of Roadway Quantities

Acquire all applicable Statewide and District standards. Modify standards as needed. Fill in the title block with project number, CSJ and page number etc. Plot sheets and incorporate into the plans.

TASK 7 DRAINAGE (FC 161)

7.1 Preliminary Drainage/Hydraulics

Delineate drainage area boundaries based on USGS topographic maps and onsite survey, if required. Calculate discharges by determining conveyance paths, channel slopes, time of concentration, runoff coefficients/SCS curve numbers required to calculate design year flows.

7.2 Hydraulic Drainage Study and Documentation

Hydraulic computations for culverts, channel, and storm sewers/inlets

7.3 Layout, Structural Design and Detailing of Drainage Features

Culvert Sizing (THYSYS Culvert, HEC RAS, or GEOPAK DRAINAGE) will be performed for PS&E design (26.35 miles). Culvert replacements, new storm sewers, modification of existing storm sewers, inlets, manholes, trunk lines, new culverts will be designed for the project. Each cross culvert will be designed to pass the design year storm without exceeding allowable headwater requirements established by the State. Prepare hydraulic data sheets as needed.

7.4 Storm Sewer Plan Profile

Design storm sewer plan and profile system for the portion of the project. Design tasks include drainage area delineation, inlet sizing and location, conduit sizing, and development of layout sheets. Standards and design year frequency shall conform to TxDOT requirements.

7.5 Culvert Layouts

Prepare culvert layouts sheets for each cross drainage structure in accordance with State standard details, the TxDOT Hydraulic Manual and the hydraulic computations developed in task 7.1. It is assumed that there will be no more than two (6) culverts to be designed for the project.

7.6 Miscellaneous Drainage Details

Prepare any and all necessary plan details necessary to clarify the construction requirements of the drainage facilities.

7.7 Summary of Drainage Quantities
Compute quantities and summarize in the plans and prepare a bid item list and estimated prices for all drainage facilities.

7.8 Storm Water Pollution Prevention Plan (SW3P)
Prepare erosion control layout sheets showing all necessary erosion control devices such as: sediment control fences, rock filter dams, soil retention blankets, riprap slope protection and other devices as required. Provide any plan details necessary to clarify the construction requirements of the erosion control plans.

TASK 8 SIGNING, MARKINGS AND SIGNALIZATION (FC 162)

8.1 Signing & Pavement Markings
Prepare signing and pavement marking layouts in accordance with TxDOT design standards and the Texas Manual of Uniform Traffic Control Devices (TMUTCD).

A. Guide Sign Sizing/Details
- Use TxDOT sign sizing criteria to size and detail custom guide signs. Small Sign Summary
- Determine the mounting requirements for each sign or sign cluster based on TxDOT SMD standards.
- List all the signs on the TxDOT standard summary sheets together with totals for each mount type.

B. Pavement Marking Details
- Prepare any and all necessary plan details necessary to clarify the construction requirements of the striping plan.

C. Summary of Pavement Markings
- Compute quantities and summarize in the plans, prepare a bid item list and estimated prices for each item.

TASK 9 MISCELLANEOUS (ROADWAY) (FC 163)

9.1 Traffic Control Plan, Detours and Sequence of Construction
Traffic Control Plans (TCP) are required for all projects. A detailed TCP shall be developed when traffic handling during construction involves complications for which a feasible solution is not covered by the current Texas MUTCD, the current Barricade and Construction (BC) Standards or the current Traffic Control Plan Standards (TCP). The following items are required on all TCP Layouts:
- The existing and proposed traffic control devices that will be used to handle traffic during each construction sequence. Include signals, regulatory signs, warning signs, construction warning signs, guide signs, route markers, construction pavement markings, channelizing devices, portable changeable message signs, flashing arrow boards, barricades, barriers, temporary illumination, etc.
- The proposed traffic control devices (stop signs, signals, flag person, etc.) at grade intersections during each construction sequence.
- Where detours are provided, typical cross sections shall be shown.
- Road construction work hours shall be directed by the State and specified for all phases of the TCP.
- In conjunction with the Traffic Control Layouts, develop typical cross sections showing lane widths, edge conditions, channelization and proposed construction area.
- Develop typical driveway staging plans for similar driveways. Develop custom driveway staging layouts for special conditions.

- Summaries

9.2 Miscellaneous Details
- Temporary erosion control
- Permanent Erosion Control (top soil, sodding, soil retention blankets, drill seeding, fiber mulch and vegetative watering)

9.3 Compute and Tabulate Quantities

9.4 Agreements
Exhibits for Utility Agreements (English units) at 30%, 60%, and 90% review points. This will consist of paper copies of Plan & Profile sheets, typical sections, cross sections, traffic signal and illumination foundation locations and title sheet.

9.5 Estimate
Compute and tabulate all quantities using State bid items and descriptive codes. Prepare an engineer's estimate for the 30%, 60%, 90% and final submittals.

9.6 Construction Duration Estimate
Prepare a construction duration estimate using approved production rates in Microsoft Project or Primavera software.

9.7 Specifications and General Notes
Specifications and General Notes will be developed in Microsoft Word.

NO FUNCTION CODE - CONSTRUCTION PHASE SERVICES

The Engineer will provide general engineering services relating to shop drawing reviews, forming detail reviews, erection sequence reviews, change order document preparation, original construction document modifications to reflect as-built conditions, and other support tasks, as necessary to support the construction of the FM 455 Project. These services will be developed under a separate scope and budget at such time as the project is let to construction.

The Provider shall collect, review and evaluate all of the available existing data pertaining to the proposed project and prepare the plans, specifications and estimates in accordance with the requirements and policies of the TxDOT.

The Provider shall furnish a notice to the utility companies along this proposed project with a layout of the project in order for the utility companies to identify and locate their utilities on the layout. The Provider shall locate horizontally and vertically, and have exposed by the appropriate utility company all underground utilities when necessary within the proposed right of way. The Provider shall design to avoid conflicts with or minimize major relocation of utilities. The Provider shall send plan sheets with a list of utilities to be adjusted to TxDOT as shown on the approved project schedule.

The engineering work required in this contract will be assigned through Work Orders which will identify specific tasks to be accomplished as outlined in the generalized Scope of Services Addendum to this Attachment C, entitled "Services to be Provided by the Engineer". The engineer shall furnish all equipment, materials, supplies, and incidentals required to perform the above-mentioned engineering work.

Deliverable Items Required by the Provider
- To be determined per each work order

REFERENCES

The work will be performed in accordance with the following manuals and standards, but not limited to:

- Standard Specifications for Construction of Highways, Streets, and Bridges - TxDOT.
- Special Provisions and Special Specifications - TxDOT.
- P.S.& E. Preparation Manual - TxDOT.
- Division of Bridges and Structures Operation and Planning Manual - TxDOT.
- Division of Bridges and Structures Hydraulic Manual - TxDOT.
- Division of Bridges and Structures Design Examples - TxDOT.
- Division of Bridges and Structures Bridge Design Guide - TxDOT.
- Division of Bridges and Structures Detail Manual - TxDOT.
- Division of Bridges and Structures Foundation Exploration and Design Manual - TxDOT.
- Standard Specifications for Highway Bridges - AASHTO.
- Division of Highway Design Operations and Procedures Manual - TxDOT.
- Division of Highway Design Operations and Procedures Manual Part IIB –
- Environmental and Public Involvement Procedures During Project - Specific Planning and Development - TxDOT.
- A Policy on Geometric Design of Highways and Streets ("The Green Book") - AASHTO.
- Highway Capacity Manual Special Report 209 - Texas Research Board (TRB).
- Technical Advisory T6640.8A - FHWA.
- Noise Guidelines - TxDOT.
- Air Quality Guidelines - TxDOT.
- Flexible Pavement Design Manual - TxDOT.
- Guide for the Design of Pavement Structures, 1996 - AASHTO.
- Texas Manual on Uniform Traffic Control Devices - TxDOT.
- Standard Highway Sign Designs for Texas - TxDOT.
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and
- Traffic Signals - AASHTO.
- Utility Accommodation Policy - TxDOT.
- Utility Manual -TxDOT.
- Division of Right of Way, ROW Manual - Book I - TxDOT.
- Division of Right of Way, ROW Manual - Book II - TxDOT.
- Code of Federal Regulations, Title 23 - "Highway" - Federal Register Administrative Order No. 5-89 - Signing, Sealing and Dating of Engineering Documents TxDOT.
- Administrative Circular No. 26-91 – Minimum Signing, Sealing and Dating Procedures for Department Engineering Documents – TxDOT.
- Administrative Circular No. 25-84 - Soils Information for High Mast Lighting, Overhead Sign Bridges, and Retaining Walls - TxDOT.
- Administrative Circular No. 33-87 - Preliminary Retaining Wall Layouts to be submitted to Division of Bridges and Structures - TxDOT.
- Administrative Circular No. 25-92 - Division of Bridges and Structures to be responsible for all geotechnical engineering support for foundations, retaining walls, and embankment stability and settlement - TxDOT.

NOTES:

All design shall be in accordance with the above references, except where variances are permitted in writing by the TxDOT.

The ENGINEER is responsible for purchasing all references, which are required for the project.

The ENGINEER will provide all equipment, material, labor and supplies except as shown in Attachment B, necessary to accomplish the work under this contract.

Consultant is responsible for revising PS&E for any change orders that result from design errors and/or omissions by the Engineer.

The Engineer will perform the services to be provided under this agreement out of their office or offices listed below:

Office Location	
Roadway, Drainage, and Preliminary Design	Dannenbaum Engineering Company, -Dallas, LLC

The work effort will be managed out of the Dannenbaum Engineering Company, -Dallas, LLC office located at:

4141 Blue Lake Circle. Suite 240, Dallas, Texas 75244

If, for reasons unknown, the above office is closed, the Engineer will assume all additional costs associated with completing the work effort from an out-of-city office