EXHIBIT A

Scope of Professional Services

Collin County Outer Loop (CCOL) Segments 2 & 4
US 380 to the Rockwall County Line

Purpose

The Scope of Work to be performed by the ENGINEER under this contract will consist of Schematic Design and Environmental services including data collection, route studies, conceptual and geometric schematic design, local environmental document preparation and right-of-way (ROW) mapping for the ultimate build-out of the Collin County Outer Loop facility along Segments 2 & 4, approximately 14 miles from US 380 to the Rockwall County Line the "Project". The ENGINEER will begin by utilizing the existing Technically Approved Alignment (CH2M Hill, August 2012) as a baseline to which alignment adjustments may be made due to subsequent residential and commercial development, major utility construction and adjacent roadway projects by others as well as constraints discovered through environmental field work, wetland delineation, hydraulic analysis, and detailed schematic design. The project study area will be limited to SH 78 on the West and the Hunt County line on the East. The Scope of Work may also be amended to include preparation of the final plans, specifications and estimate (PS&E) for a 2-lane access roadway (the ultimate northbound frontage road) with curb and gutter at the COUNTY's written request and executed under a supplemental agreement.

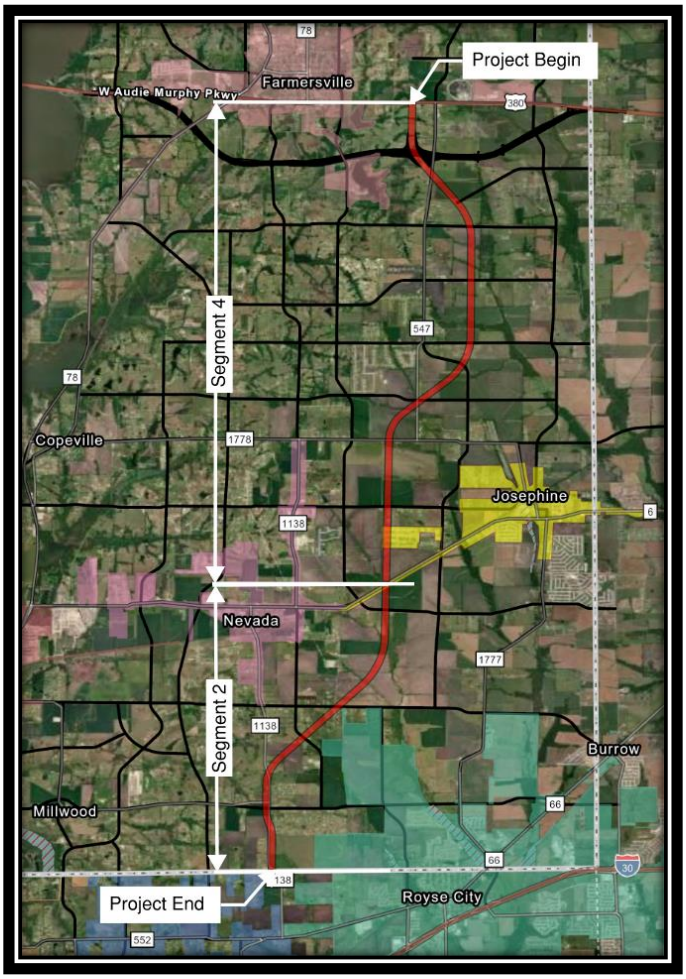

Figure 1 - Project Limits

Objective 1: Data Collection and Route Studies

Overview

Data collected under this objective provides the necessary information to support both the Schematic Design and the PS&E Design and other scope of services referenced throughout the contract. Route Studies assumes the refinement of the previously established Outer Loop alignment in areas where development has occurred, or environmental fatal flaws need to be minimized/avoided before taking the full corridor (roadway and utility) through the schematic completion. No new end-to-end routes will be developed.

Task 1	**Data Collection**
Task 2	**Design Criteria and Typical Section Development**
Task 3	**Route Studies**

TASK 1: DATA COLLECTION

- Task 1A – Desktop Data collection

  The determination of data requirements, availability, and sources will be coordinated with the COUNTY. Once the data needs and sources are identified, the ENGINEER will contact the appropriate agencies and organizations to obtain the data. The ENGINEER will obtain electronic and/or hard copies from the COUNTY and other sources.

  The data to be collected will include, but is not limited to:

  - Previous study documentation and data (such as the 2012 CH2M Hill study, 2011 NCTCOG Regional Outer Loop Corridor Feasibility Study and the Collin County Mobility Study) including travel demand modeling results, exhibits, design, and reports.
  - Readily available project files and data for current projects/studies crossing or abutting sections within the Project Limits such as the TxDOT FM 6, TxDOT US 380 and Rockwall County Outer Loop Study).
  - Municipality and stakeholder planning documents (city comprehensive plans, zoning information, thoroughfare maps, preliminary plats, design schematics, and regional plans).
  - Utility plans and documents from appropriate municipalities and utility companies.
  - Previously prepared drainage studies and readily available flood plain information and studies from the Federal Emergency Management Agency (FEMA), the US Army Corps of Engineers (USACE), and Natural Resources Conservation Service (NRCS) and other relevant governmental agencies.
  - 6-inch resolution imagery (2021) from the NCTCOG.
  - 0.5-meter, 9.25-cm accuracy LiDAR data via NCTCOG to develop existing ground contours.
  - Readily available soil data for the designated area.
  - Fully developed condition land use data (shape files or any usable format).

- Desktop-level environmental constraints mapping data (shapefiles and other geospatial data) from NCTCOG, TCEQ and other local, state and federal existing environmental databases. This includes NDD, SURGO, NWI, historic aerials, city/county planning documents, and PALM data. The ENGINEER will review the collected data from this information and integrate additional data into the study file to evaluate tasks for supporting documentation. The ENGINEER will collect additional field data, as needed, following review and discussion with the COUNTY.

- Task 1B - Field Reconnaissance

  The ENGINEER will perform a corridor-wide site reconnaissance to develop field notes and digital photos and validate previously collected data along the project corridor. Resource-specific field surveys will be conducted as described under Task 5. This will include both environmental and engineering staff for the purposes of:

- Identifying possible jurisdictional waters including wetlands, floodplains, and general land cover and habitat characteristics, etc. to support historic resources, archeological resources, and biological resource field surveys as described under Objective 5.
- Drainage structures and floodplain field review

TASK 2: DESIGN CRITERIA AND TYPICAL SECTION DEVELOPMENT

Task 2A – Design Criteria Development

The ENGINEER will utilize freeway, ramp, frontage road and cross street design criteria for TxDOT 4R guidelines for urban arterials from the December 2022 TxDOT Roadway Design Manual and AASHTO Policy on Geometric Design of Highways and Streets guidelines.

- The ENGINEER shall develop a design criteria matrix that includes the following roadway design elements such as design speed, lane and shoulder widths, pavement structure and slopes, horizontal curvatures, horizontal and vertical clearances, range of vertical profile grades, and side slopes.
- The ENGINEER will use the design criteria to identify the maximum and minimum values for drainage criteria and will identify the project-preferred values.
- The ENGINEER shall prepare and submit a preliminary Roadway Geometric Design Criteria Worksheet to the COUNTY for review and approval and shall attend an initial Kick-Off Meeting to establish and agree on fundamental aspects and concepts and to establish the basic features and design criteria for the project. This meeting will be coordinated with the Rockwall County Outer Loop projects to ensure continuity.
- The ENGINEER will work to avoid or minimize impacts on utilities mapped via this project.

Task 2B –Ultimate Typical Section Development

The ENGINEER will develop existing typical sections of intersecting cross streets as well as proposed typical sections for the Collin County Outer Loop freeway corridor and future cross street typical sections that depict the ultimate freeway section number and type of lanes, shoulders, median width, curb offsets, cross slope, border width, clear zone widths, and ROW limits, in draft and final form preceding then following the activities below:

- The ENGINEER will develop a series of potential proposed typical sections that suit the needs of both the COUNTY and current/future stakeholders (Utilities), maintaining regional corridor consistency as well as not precluding future technologies. Typical section development will include coordination with utility owners in the area to assess future plans, technical needs and opportunities for creating an adjacent or integrated combined utility corridor. The spatial needs for the technologies (e.g. inductive charging, technology lanes (AV/CV and freight options), and ITS needs such as dynamic messaging signs and communication equipment) identified for inclusion will be technically assessed and incorporated into the typical sections. Future (proposed) cross streets will be drafted as depicted in the County's or Cities' thoroughfare plans with the intent to locate "stub outs" along the frontage roads to facilitate better-phased construction by other entities (cities/TxDOT). The COUNTY will not purchase extra ROW along cross streets to facilitate future cross-street widening.
- The ENGINEER will work with the COUNTY to select a proposed typical section and then will prepare a Technical Memorandum, highlighting the flexibility offered with each of the final typical sections, including any applicable exhibits.

Task 2C – Interim Typical Section Development

The ENGINEER will develop proposed typical sections for the interim condition of the Collin County Outer Loop with a single frontage road serving two-way traffic. Typical Sections will depict the number and type of lanes, shoulders, and clear zone widths. The ENGINEER will review the need for flared

intersection approaches to cross streets including turn lanes, center two-way left turn lanes (TWLTL) and the need for incident management or passing zones within the corridor.

TASK 3: ALIGNMENT REFINEMENT AND VALIDATION STUDY

- Task 3A – Base File Creation

  The ENGINEER will review the data collected and from this information will:

  - Integrate data into the study file as it becomes available.
  - Develop base CAD files (Microstation V8i) that will be utilized for corridor evaluation.
  - Map known environmentally sensitive areas from desktop data collection.
  - Consider existing features: Existing roadways, floodplains, streams, developments, and major structures.
  - Consider future features: Planned thoroughfares, utility corridors/improvements, and approved plats.
  - Identify property boundaries and legal descriptions based on GIS data provided by COUNTY and surveyed data from previous Segment 2 & 4 County Projects.

- Task 3B – Alignment Refinement Study

  The ENGINEER will take the previously approved Segment 2 & 4 alignment in the immediate vicinity of the areas noted below where adjustments need to occur. In the areas of change, the ENGINEER will prepare a roll plot exhibit as well as a fatal flaw matrix for the COUNTY's consideration and selection of a single refined alternative.

  Areas of alignment adjustments for the purposes of:

  - Avoiding the High Meadows Estates subdivision in the city of Josephine constructed after the prior CCOL study.
  - Connection to the US 380 Farmersville Bypass Alignment through coordination with the City and US 380 project team.
  - Minimizing or avoiding Bois D Arc Creek and other jurisdictional water impacts found through desktop analysis.
  - Identifying potential adjustments to avoid the Oncor substation under design as well as other existing and proposed utilities identified to the project team.
  - In coordination with the Rockwall County Outer Loop project team, consider alignment presented via the Rockwall County Outer Loop project.
  - Other constraints identified through environmental desktop evaluation, and stakeholder coordination.

  The ENGINEER will develop a roll plot exhibit of all adjustments recommended as well as Individual roll plot exhibits of each alternative corridor alignment for the purposes of coordination with the COUNTY, stakeholders, and display at Public Meetings.

  The ENGINEER will develop a technical report providing the basis for the adjustments recommended.

The ENGINEER will advance the adjustment approved by the COUNTY through the conceptual schematic design process as outlined in Objective #2.

- Task 3C – Ramping Line Diagram

  The ENGINEER will develop a diagrammatic ramping concept exhibit for discussion with the COUNTY as well as future inclusion on the Conceptual Schematic Roll Plots showing the following information:

  - Line diagram of proposed Outer Loop corridor and major current and future cross streets as defined in County and City thoroughfare plans, which may be subject to change during discussions with cities and TxDOT.
  - Line diagram showing proposed ramping configuration based on spacing and control of access criteria defined in the TxDOT Roadway Design Manual or as directed by the COUNTY.
  - The number of lanes on each mainlane, ramp, and frontage road will be determined in conjunction with traffic engineering tasks outlined in Objective #3.

Deliverables	
► All design files and deliverables in electronic format (PDF as specified by the County, DOC, DGN, DWG, SHP, KMZ etc.) ► Roadway Geometric Design Criteria Worksheet ► Typical sections for the Collin County Outer Loop freeway corridor ► Typical section Technical Memorandum ► Combined roll plot exhibit and individual roll plots of all the recommended alignment adjustments	► Combined roll plot exhibit and individual roll plots adjusted alignments recommended. ► Technical report describing the basis for the adjustments recommended. ► Ramping Line Diagram Exhibit

Objective 2: 30% Conceptual and Geometric Schematic Design

Overview

The ENGINEER will utilize the approved corridor and ramping line diagram, from Objective #1 to develop a detailed schematic of the ultimate build-out of the Collin County Outer Loop to determine the freeway so that the ENGINEER may develop an interim design consisting of a single frontage road to accommodate a phased construction approach.

Task 1	**30% Conceptual Schematic Development (Ultimate Design)**
Task 2	**60% Geometric Schematic Development (Ultimate Design)**
Task 3	**Final Geometric Schematic Development (Ultimate Design)**

TASK 1: 30% CONCEPTUAL SCHEMATIC DEVELOPMENT

The Engineer will prepare a schematic layout to a scale of 1"=100' in roll plot form depicting the proposed improvements for the project. The 30% conceptual schematics will be a plan view only. Profile work will be done only to the extent necessary to lay out the proper horizontal geometry.

The conceptual schematics shall contain the following design elements:

- Preliminary horizontal alignments (mainlanes, ramps, frontage roads, cross streets, and direct connectors (US 380 I/C).
- Mainlane, Ramp, Frontage Road and Cross Street geometry (from thoroughfare plans) including pavement edges, striping, the face of curbs and shoulder lines.
- Multilevel interchange geometry, including ramps and direct connectors, at the proposed US 380 bypass and the CCOL.
- Grade separations design with major existing and future cross streets as identified in the COUNTY and CITIES' Thoroughfare Plans.
- Preliminary structure locations (bridges and retaining walls).
- Display property boundaries using County Appraisal District Data.
- 500' wide Proposed ROW and control-of-access locations.
- Existing and proposed typical sections for proposed mainlanes, frontage roads, ramps, and major cross streets based on City/County information.
- Projected traffic volumes for opening and design years in line diagram form for use in Traffic Modeling.
- Locations of existing and proposed utilities.

Cost estimates will not be developed as a part of this task

TASK 2: 60% GEOMETRIC SCHEMATIC DEVELOPMENT

Following Task 1, the ENGINEER will refine the conceptual schematic design and add detail to further evaluate and detail out a geometric schematic design as follows:

Geometric Design Tasks:

- Refine horizontal alignments (mainlanes, ramps, frontage roads and cross streets).
- Design necessary superelevation rates and transition distances in accordance with the Design Criteria.
- Design preliminary profiles of (mainlanes, ramps, frontage roads, cross streets, and direct connectors) based on preliminary horizontal alignments including display of mainlane vertical curve data, including "K" values.
- Show the preliminary location of major and minor cross culverts including preliminary sizing. Studied floodplain areas within the project corridor will be displayed based on available GIS data. (refer to Objective #4 for more detail).
- Determine preliminary bridge configuration including overall length, span lengths, and an assumed structure depth. Bridge sizing will not include bridge layouts and will be based on the needed span length, an assumed substructure depth, and the proposed profile. Appropriate vertical clearances will be designed between cross streets and other roadways according to TxDOT's RDM.
- Allow space for a Shared-use Path (SUP) facility adjacent to the freeway according to TxDOT's RDM and Bike and Ped manual, RDM, accommodating city, county and regional (NCTCOG, TxDOT) trail plans.
- Display property boundaries based on County Appraisal District Data and/or property boundaries from previous CCOL Seg. 2&4 project.
- Refine control of access limits based on preliminary ramp locations using TxDOT's Access Management criteria or others provided by the COUNTY.
- Evaluate potential utility conflicts.
- Develop large guide signage for display on the roll plots.
- Intersection approach geometry, such as frontage roads and cross streets, will be designed using a typical number of through, right-turn and left-turn lanes, with the turn bay lengths sized using assumptions rather than through traffic analysis.

3D Open Roads Modeling

- The ENGINEER shall develop a 3D model of the mainlanes, ramps, and frontage roads and other geometry depicted in the geometric schematic using Open Roads Designer. Roadway templates will be developed along with preliminary end conditions throughout the corridor according to the proposed design requirements.
- Digital cross-sections will be developed to illustrate that the project stays within PROW limits and cross-section sheets will be developed at a later design stage.

Once the COUNTY approves the 60% geometric design, the ENGINEER will proceed with ROW mapping (as described in SS1) as well as concurrent PSE development (as described in Special Services 2: Plans, Specifications, and Estimates Development)

TASK 3: FINAL GEOMETRIC SCHEMATIC DEVELOPMENT

Following Task 3, the ENGINEER will perform final refinements of the geometric schematic design for the ultimate design according to COUNTY and Stakeholder input.

Deliverables	
► 30% Conceptual Design Schematic Roll Plots	► Final Geometric Design Schematic Roll Plots
► 60% Geometric Design Schematic Roll Plots	► 3D model produced using Open Roads Design
	► All design files and deliverables in electronic format (DGN, DWG, SHP, etc.)

Objective 3: Traffic Projections and Traffic and Safety Analysis

Overview

Task 1	Travel Demand Model Updates
Task 2	Develop Traffic Projections
Task 3	Microsimulation

TASK 1: TRAVEL DEMAND MODEL UPDATES

Utilize the NCTCOG TDM to transition model runs developed from the Collin County Mobility Study for the purposes of developing traffic projections in Task 2, as well as collaborating with the Rockwall County and Kaufman County Outer Loop Teams to continue the development of a regional Outer Loop TDM.

- Task 1A - Potential Future Consideration Build Pairings
    - SH 78
    - Future MTP/Build-out
    - US 380 connections
- Task 1B - Establishment of "No-Build" Conditions for a basis of comparison

TASK 2: DEVELOP TRAFFIC PROJECTIONS

Traffic Projections Methodology Memo with the proposed traffic growth rates for the corridor. The memo will also provide percent trucks, design hourly volume (K) factor, and directional distribution (D) factor. It will be based on the Rockwall County traffic projections and prior TDM runs.

Average Daily Traffic (ADT) and AM and PM Peak Hour Traffic Projections for opening year and design year for up to 12 interchanges for no-build and the preferred alternative. These projections will include graphical representations of the anticipated traffic movements along the corridor and will be suitable for inclusion in the design schematic and environmental document.

- Task 2A – Traffic Projections for Air and Noise Analysis
    - Traffic projections will be used for air and noise analysis as part of the environmental documentation.
- Task 2B - For Microsimulation Analysis
    - Traffic projections will be used for microsimulation analysis. Routing assessment will be performed via TDM Select Link Analysis and Cordon Line to develop traffic projections.

TASK 3: MICROSIMULATION

- Task 3A - During Route Studies, the ENGINEER will:

  An Initial Screening Analysis will be performed based on traffic data with reference to data gathered within Task 2 – Develop Traffic Projections.

  Initial screening evaluations will include:

- Ramp Spacing
    - Highway Capacity Software (HCS 2023) (Merge/Diverge/Weave – Ramp Spacing). An LOS diagram will be produced depicting the performance of HCS analyses.
- Interchange / Intersection Capacity Analysis
    - Capacity Analysis for Planning of Junctions (Cap-X) Tool for the purpose of evaluating interchange type and number of lanes applications.
    - Synchro Intersection Operational Assessments and LOS analysis (at up to ten critical locations, such as FM 6, US 380).
- Safety
    - Highway Safety Software will be used to provide a high-level traffic safety comparison between no-build and the preferred alternative. Comparisons performed will be in the measure of percent change in predicted crashes. This task will help determine safety design features.

- **Task 3B - During 30% Conceptual Schematic and 60% Geometric Schematic Design, the ENGINEER will:**

  Conduct a modeling/operations analyses using data obtained within Task 2 – Develop Traffic Projections.

  Traffic Modeling to be conducted includes:

  - Development of Synchro Intersection Analysis to assess critical intersection evaluations, such as future intersection connections with FM 6, US 380 to support schematic development..
  - In the event that a configuration considers the implementation of a roundabout, SIDRA software will be used.
  - Corridor traffic models will be developed to evaluate projected peak hour traffic conditions.
    - Considered traffic analysis scenarios include:
        - Opening Year AM/PM
        - Design Year AM/PM
        - Collin County Build-Out AM/PM
    - Synchro Analysis models will include study area interchanges and adjacent signalized intersections in support of concept development and the proposed alternative.
    - The ENGINEER will develop and summarize performance measures of effectiveness for the traffic analyses (e.g., average delay, levels of service, freeway density, travel speed, throughput, and queue lengths). The Engineer will coordinate the findings and results of the traffic analysis with the schematic development.
    - Focus areas for other project coordination include:
        - US 380 Project Connections (North-end)
        - FM 6 Intersection (Mid-Point)
        - Rockwall County Outer Loop (South-end)

- The ENGINEER will use Highway Safety Manual-based methods (safety performance functions/SPFs and crash modification factors/CMFs) or tools (Highway Safety Software) to consider safety implications for the preferred alternative. The ENGINEER will perform predictive crash analyses for the design year. The Engineer will determine countermeasures to improve safety.

- Vissim models under a supplement if requested by the county. Production of Vissim models would be triggered as needed in the event of operational findings of intersection and freeway operational challenges within the study network.

- **Task 3C -During the Final Geometric Schematic Design, the ENGINEER will:**

  Traffic analysis models, using Synchro software, will be developed to determine traffic operations in interim conditions. These models will be used to facilitate the assessment of geometric configurations and intersection traffic control.

  Prepare a Traffic and Safety Analysis Report to summarize modeled conditions and resulting analysis software outputs. It will include recommendations for improving traffic flow and safety along the corridor.

Deliverables	
► Traffic Projections Methodology Memo	► Traffic Modeling White Paper
► Average Daily Traffic (ADT) and AM and PM Peak Hour Traffic Projections for opening year and design year for up to 12 interchanges for no-build and preferred alternative	► Traffic and Safety Analysis Report with recommendations

Objective 4: Hydrologic and Hydraulic Analysis

Drainage analysis will be performed in accordance with the Collin County Drainage Design Standard (September 28 ,2020) and TCTCOG Integrated Stormwater Management (iSWM) Technical Manual (Hydrology and Hydraulics). Approximate sizing of drainage structures will be provided only on schematic plan for the interim conditions or single frontage road.

Task 1	**Drainage Analysis for Minor Drainage Structures**
Task 2	**Drainage Analysis for Major Drainage Structures**

TASK 1: DRAINAGE ANALYSIS FOR MINOR DRAINAGE STRUCTURES

The ENGINEER will perform the following tasks to complete the analysis for minor drainage structures, defined as drainage structures less than 20 ft wide or contributing drainage area less than 200 acres or non-FEMA crossing will be considered as minor drainage structures and will be evaluated as mentioned in task 1.:

- Task 1A - Drainage Area Delineation

  Delineate drainage area boundaries based on United States Geological Survey (USGS) contour maps, North Central Texas Council of Governments (NCTCOG) contour maps or other suitable topographic maps, if available.

- Task 1B – Hydrologic Analysis

  Perform hydrologic analysis to estimate peak discharges for various frequency storm events (5-yr, 10-yr, 25-yr, and 100-yr) by determining flow paths, channel slopes, time of concentration, runoff coefficients, Land use and other hydrologic input parameters as required to determine various frequency storm peak flow for the contributing drainage area. All hydrologic analyses will be performed using Atlas 14 precipitation data.

- Task 1C – Hydraulic Analysis

  Perform Hydraulic analysis to determine approximate cross-drainage structure sizes denoting size, type, orientation, flowlines, tailwater, and headwater conditions. Approximate sizing will be shown on the schematic (plan only) along with needed drainage easements for interim condition (single frontage road) only. HY-8, culvert master or similar culvert analysis software will be used to size minor culvert crossings.

- Task 1D – Prepare Preliminary Drainage Report

  Prepare a preliminary drainage report for all minor drainage structures including hydrologic and hydraulic analysis.

TASK 2: DRAINAGE ANALYSIS FOR MAJOR DRAINAGE STRUCTURES

The ENGINEER will perform the following tasks to complete the analysis for major drainage structures, defined as drainage structures greater than 20 ft. wide or contributing drainage areas more than 200 acres or All FEMA crossings will be considered as major drainage structures and will be evaluated as mentioned in task 2.:

- Task 2A - Obtain and Review Available FEMA Effective Models & Reports.

The ENGINEER will obtain available effective flood models (Hydrology and hydraulics) including Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMs), Letters of Map Revisions (LOMR), and electronic data readily available from the County or request FEMA if needed.

- Task 2B - Drainage Area Delineation

  Delineate drainage area boundaries based on United States Geological Survey (USGS) contour maps, North Central Texas Council of Governments (NCTCOG) contour maps, FEMA data, or other suitable topographic maps, if available.

- Task 2C – Hydrologic Analysis

  Perform hydrologic analysis to estimate the peak discharges for various storm events (5-yr, 10-yr, 25-yr, and 100-yr) by determining flow paths, channel slopes, time of concentration, runoff coefficients, Soil Conservation Service (SCS) curve numbers and other hydrologic input parameters as required to determine frequency-discharge relationships using hydrologic models. If discharge data is available from FEMA or any agencies, calculated discharges will be used as a check. It is assumed that effective models have been updated with Atlas 14 precipitation data and county will provide the fully developed land use condition data.

- Task 2D - Hydraulic Analysis

  Develop or update the effective hydraulic model to estimate water surface Elevation of open channels for existing/pre-project and proposed design conditions in accordance with Collin County drainage design standards and to meet Federal Emergency Management Agency (FEMA) requirements, as necessary. All relevant conveyance features, (channels, culverts, slab bridges, encroachments) will be included in the hydraulic analysis using HEC-RAS, HEC-HMS, HY-8, culvert master, or other models as approved by Collin County. Approximate sizing will be shown on the schematic (plan only) along with needed drainage easements for interim condition (single frontage road) only.

- Task 2E - Develop Alternative Drainage Schemes

  Based on the results of the hydrologic and hydraulic models, develop alternative schemes to alleviate potential adverse drainage issues associated with highway construction. Determine the optimum drainage scheme to be used for schematic design.

- Task 2F - Identify Easement Requirements

  The Engineer shall identify any required drainage easements needed to accommodate drainage facilities at inlet and discharge points along the route.

- Task 2G - Prepare Drainage Report

  Upon completion of the hydraulic analyses and alternative evaluations of potential improvements, the ENGINEER shall prepare a Drainage Report. A preliminary report will be submitted with the 60% schematic deliverable and the final report will be submitted with the 100% schematic submittal. The report shall include the following sections:

  - INTRODUCTION: Location, study objectives, general stream and watershed information, and other pertinent facts.
  - HYDROLOGY: Watershed description, soil and land use information, source of hydrologic data and methodology/models used to develop flow data, pertinent input data and parameters for hydrologic analyses; summary table of results for a full range of peak discharges for 5-yr, 10-yr, 25-yr, 50-yr, and 100-yr events.
  - HYDRAULICS: Overview of the hydraulic modeling process, including data sources, specific model uses, descriptions of existing drainage structures, discussion of design alternatives and the results of respective hydraulic modeling for the scenarios evaluated; hydraulic model output data including existing, hydraulic data sheet, and proposed conditions summary tables.
  - SUMMARY OF CONCLUSIONS / RECOMMENDATIONS: summary of study objectives, alternatives being considered, opinions of probable costs and identification of preferred design alternatives.
  - PHOTOGRAPHS, FIGURES AND APPENDICES: all items necessary to support the analysis.
  - Computer files of hydrologic and hydraulic modeling with appropriate labeling of location and submittal date.
  - FINALIZED DOCUMENT: one (1) copy of the final report.

Deliverables	
▶ Preliminary Drainage Report ▶ Final Drainage Report	

Objective 5: Environmental Studies

NCTCOG will prepare a Local Draft and Final Environmental Document to disclose the potential impacts of the proposed action. The level of documentation will support the County's ability to acquire ROW for the proposed action. If federal funds are obtained to assist with the purchase of ROW or for construction of the proposed improvements, additional coordination with outside agencies, field studies, and analyses under some resource categories will be required.

Overview

Task 1	**Purpose & Need**
Task 2	**Desktop and Field Studies**
Task 3	**Draft Environmental Document**
Task 4	**Final Environmental Document**

TASK 1: PURPOSE & NEED

- Task 1A -– Agency Scoping – Included under Objective 6 Public Involvement and Stakeholder Outreach
- Task 1.2 – Develop Initial Purpose & Need – To be provided by NCTCOG

TASK 2: DESKTOP AND FIELD STUDIES

- Task 2.1 – Data Collection

  To be provided by NCTCOG; BMcD will provide shapefiles and data collected under the tasks we are leading – communities and social setting, archeological resources, historical resources, and regulated/hazardous materials.

- Task 2.2 – Rights of Entry

  Identify areas where field surveys should be conducted and obtain rights of entry. Map parcels and develop right of entry request letter to be distributed under Collin County's signature. Two attempts will be made to obtain permission to access each property, if needed, before classifying the property as "access denied".

- Task 2.3 - Communities and Social Setting

  Collect and map population data including 2020 US Census data and NCTCOG data to describe the affected population demographics within and along the study corridor (e.g., race, ethnicity, household income, employment, age, languages spoken, limited English proficiency [LEP] etc.), using desktop data, map and identify community facilities (e.g., schools, libraries, places of worship, post offices, public services and government offices, etc.) and the populations served by each. Review EJSCREEN and CEJST tools to obtain additional data for potentially underserved and disadvantaged populations and those possibly exposed to environmental risks. Identify neighborhoods and isolated residences for use in determining potential displacements. Identify potential displacements and summarize impacts and mitigation efforts. Perform a windshield survey to identify signs in languages other than English, community facilities serving specific minority groups, signs of persons with disabilities or other vulnerable populations, low-income populations or neighborhoods, and signs of other modes of transportation. Discuss community cohesion and how the project may impact the local communities.

- Task 2.4 - Land Use– To be conducted by NCTCOG
- Task 2.5 – Archeological Resources

  Conduct archeological background study to identify previously surveyed areas, recorded sites, and areas of high probability for buried resources. Once alignments are established, conduct archeological surveys in areas of high probability and make eligibility determinations for identified sites. Obtain an Antiquities Permit from the Texas Historical Commission (THC) to conduct the field surveys. Develop an Archeological Background Study and Survey Report.

- Task 2.6 - Historical Resources

Conduct a non-archeological historical resources survey across the study corridor and within the visual area of potential effects (APE). Develop a Historical Resources Survey Report and make determinations of eligibility.

- Task 2.7 - Water Resources – To be Conducted by NCTCOG
- Task 2.8 – Traffic Noise -To be Conducted by NCTCOG
- Task 2.9 - Vegetation and Protected Species – To be Conducted by NCTCOG
- Task 2.10 - Regulated/Hazardous Materials

  Obtain an Environmental Data Request (EDR) database search to identify sites with a possible environmental risk such as active and former gas stations, industrial sites, landfills, auto repair shops, etc. Summarize potentially hazardous sites and denote the level of concern/risk for the proposed project. Conduct a windshield survey to verify site types, locations, and ownership. Assess the potential risk properties of environmental concern posed to the project - low, moderate, or high - and include the basis of those classifications.

TASK 3: DRAFT ENVIRONMENTAL DOCUMENT

The NCTCOG will develop a draft Environmental Documents to disclose the affected environment and anticipated impacts of the ultimate development of Segments 2 and 4 of the CCOL. An annotated outline of the Draft Environmental Document will be developed for review and comment/input by Collin County. Development of the Draft Environmental Document will include the following analyses and document sections:

TASK 4: FINAL ENVIRONMENTAL DOCUMENT

The NCTCOG will develop a Final Environmental Document to disclose changes in the Preferred Alternative in consideration of comments/input received during the public hearing from agencies and the public.

Consultant Deliverables	
► Archeological Background Study and Survey Report ► Historical Resources Background Study and Survey Report	► Hazardous Material Site Inventory Memorandum

Objective 6: Public Involvement and Stakeholder Outreach

Overview

Task 1	**Public Involvement Plan & Strategy Development**
Task 2	**Stakeholder Coordination & Charettes**
Task 2	**Public Meetings and Hearing**

TASK 1: PUBLIC INVOLVEMENT PLAN AND STRATEGY DEVELOPMENT

The ENGINEER will develop a public involvement plan and outreach strategy.

- Task 1A – Develop a Public and Stakeholder Outreach Plan Document

  A public and stakeholder outreach plan shall be prepared for approval by Collin County that specifies all public engagement activities to be performed. The plan will discuss outreach strategies for traditional public involvement, unique strategies for engaging stakeholders specific to the study area, and activities necessary to investigate and identify priority considerations for incorporating emerging technology elements into the corridor design.

- Task 1B – Develop Project Messaging and Communications Templates

  Communications materials and platforms shall be consistent with and integrated into existing County brand and communications platforms. A project webpage shall be developed to house all project updates, be used to gather contact information for those interested in the project and host the virtual public meetings. The ENGINEER and COUNTY will coordinate to host and/or integrate the project webpage within the County's website.

TASK 2: STAKEHOLDER COORDINATION

- Task 2A – Agency Scoping

  Develop materials for scoping package, including draft project study area, schedule, purpose and need, range of alternatives and methodologies and level of detail for analyzing alternatives to local, state, regional, and federal agencies, non-governmental organizations (NGOs), and special interest groups that have been reached out to on other segments. Agency scoping to be conducted virtually with email invites. Agencies will be given a 30-day to provide input/feedback.

  - Prepare contact list, prepare, and distribute scoping packets.
  - Develop a summary of the agency scoping meetings and document comments/input on the information provided, any unexpected concerns, anticipated studies, permits or other authorizations, and any significant issues that should be analyzed in depth in the environmental document.

- Task 2B – Conduct Stakeholder Meetings

  The ENGINEER will:

  - Make arrangements for and conduct up to 40 small group stakeholder meetings to discuss and review the schematic design and the environmental review process. Some of these meetings might be combined for convenience's sake and as appropriate. The Consultant shall prepare meeting agendas, presentations, materials and exhibits to be used during stakeholder meetings as needed, as well as written meeting summaries.

- Prepare reports and presentations for Collin County Commissioners Court meetings or workshops, as needed, to share project updates.

- A preliminary list of potential stakeholders is below and may include adjacent cities, property owners, developers, and various agencies:
  - Collin County Judge, Commissioner Hale/Williams and the Commissioners Court as well as staff.
  - Agencies and city staff:
    - NCTCOG
    - Farmersville
    - Josephine
    - TxDOT
    - Rockwall County (grouped)
    - Nevada (grouped)
    - Royce City (grouped)
    - Fate (grouped)
    - TxDOT and TxDOT project teams for US 380 (HNTB) and SH 6 (KCI)
    - Rockwall County and their Outer Loop consultant (HALFF)
  - Others:
    - School Districts
    - NTMWD
    - Oncor, Garland Power & Light
    - Other Utilities
    - Developers
    - Railroads

Task 2C – Regional Leader Work Groups

Conduct up to two stakeholder workgroup meetings with key regional representatives. Work Group Meetings would be held prior to the second public meeting and public hearing. Regional stakeholders will largely be identified from those listed above in Task 2A.

Task 2D – Emerging Technology Coordination and Strategy Development

Consultant shall perform the following tasks to support the development and implementation of an emerging technology plan that identifies key considerations for not precluding future technologies along the corridor:

- Hold a work session with county staff (and others as identified) to review findings and prioritize future technology considerations and elements for integration into the corridor's typical section and schematic design so as not to preclude future technologies along the corridor. Identify spatial elements needed to implement future technologies for the proposed typical sections

Task 2E – Utility Corridor Coordination

- Conduct up to 10 coordination meetings with utility providers in the study area with the intention to identify future utility lines and plans that could be concentrated with a future utility corridor in, or alongside the Collin County Outer Loop.

- Following coordination meetings and the development of a potential typical section (refer to Objective 1), conduct and document a Utility Corridor Charette with the purpose of discussing ROW needs and gathering input. Facilitate invitations to stakeholders to attend the Charette, and develop agenda and materials.

TASK 3: PUBLIC MEETINGS AND HEARING

Task 3A –Public Meetings and Hearing

The ENGINEER will conduct and document up to three (3) public meetings including the following:

- One (1) Project Kickoff meeting to reintroduce the project to the public and obtain current public sentiment and comments.
- One (1) Public Scoping meeting to be held virtually to communicate the purpose and need and environmental review criteria, present the established alignment and identify locations of alignment adjustments.
- One (1) Public Meeting following the 60% Geometric Schematic completion, displaying the results of the adjustments.
- One (1) Public Hearing following the completion of the final schematic design and presenting the draft environmental review document.

These meetings will be hosted both in-person and virtually via updates to the County website (except the Public Scoping meeting, which will be virtual only). This work includes preparing or coordinating the following:

- Logistics and venues
- Presentations, exhibits and handouts
- Meeting notices and project marketing such as:
  - Postcards mailed to all property owners and residents in the Study Areas
  - Newspaper ads
  - Press releases
- Electronic and hardcopy surveys
- Spanish and ASL translation services at the meeting and for select materials
- Law enforcement and security staff
- AV equipment
- Meeting and hearing summaries including responses to comments

Send out up to 3 email blasts to stakeholders in conjunction with each public meeting phase, including: study kickoff meeting, public meeting, and public hearing. Collin County will provide its email list for the first email blast.

- Compile, maintain, and update mailing and email lists of property owners, stakeholders, elected officials, agencies and organizations interested in the project.

- Provide social media strategy and editorial content/calendar for the County to post to its social media accounts including Facebook and NextDoor. This will include outreach to influential project champions with a significant social media presence.

- **Task 3B- Prepare a 3D fly-though video of the project for display at the Public Hearing**

The Engineer shall develop a three-dimensional (3D), modeled animation (fly-through) prior to the public hearing. The animation created shall consist of the aerials draped onto the existing 3D design surface and the proposed surface shall be merged and colored to look as realistic as possible to depict what the proposed alternative shall look like if constructed.

Deliverables	
► Public and stakeholder involvement plan, email and mailing lists ► County Website and electronic updates ► In-person and virtual public meeting/hearing materials and summary documentation ► Public Meetings: sign-in sheets, comment sheets, project information handout, and meeting summary report.	► Public Hearing sign-in sheets, comment sheets, project information handout, PowerPoint presentation, and meeting summary report. ► Typical Section and Future Technology spatial elements for the proposed typical sections ► Documentation of all stakeholder meetings and interviews ► 3D fly-though video

Objective 7: Project Management

Overview

Task 1	Schedule, Progress Reports, and Invoices
Task 2	County Update Meetings and Presentations
Task 3	QA/QC

TASK 1: SCHEDULE, PROGRESS REPORTS, AND INVOICES

- Task 1A – Schedule

  The ENGINEER will prepare and maintain a simple graphic milestone schedule indicating completion dates of major work items, deliverables, and reviews.

- Task 1B – Monthly Progress Reports and Invoicing

  The ENGINEER will submit monthly progress reports to the County. Monthly progress reports will include a description of all activities ongoing or completed during the reporting period, activities planned for the following month, problems encountered, and actions required to remedy them. The progress report will include a tabulation of percent complete by task.

  The ENGINEER will submit monthly invoices for all work completed during the period. Invoices shall be submitted in accordance with the rate schedule and function codes authorized in the contract.

- Task 1C – Subconsultant Coordination and Oversight

  The ENGINEER will prepare subcontracts for sub-consultants, direct and monitor sub-consultant activities, and review and recommend approval of sub-consultant work and invoices.

TASK 2: COUNTY UPDATE MEETINGS AND PRESENTATIONS

- Task 2A – Project Team Meetings

  The ENGINEER will schedule and conduct monthly project team meetings with Collin County. The purpose of these meetings is to discuss project status, plan upcoming events, and discuss and resolve any key project issues. Meeting minutes will be prepared by the ENGINEER and distributed for all meetings.

- Task 2B – Technical Presentations

  The ENGINEER will prepare and present up to two (2) technical PowerPoint presentations during the schematic design providing a briefing on project schedule, design development, and future tasks.

TASK 3: QA/QC

- Task 3A – Project Management and Quality Plan

  The ENGINEER shall:

  - Develop and distribute a high-level Project Management Plan to describe the scope of services, identify the task and sub-task responsibilities of team members, and define the formats for all memos, reports, graphics, mapping, and operational procedures for the project.

- Develop and distribute a high-level Project Quality Management Plan to define a quality control program and specific quality control practices. The Engineer shall maintain the QA/QC Plan throughout the duration of the project.
- Provide a Quality Control review of plans, calculations, documents, and other supporting design data based on the Project Quality Management Plan
- Provide a Quality Assurance audit of the QC review to ensure all comments were addressed and/or resolved.

- Task 3B – Deliverables: Comment Response and Resolution Process

  The ENGINEER shall:

  - Log any previous County or stakeholder comments in a Comment Response Log spreadsheet and provide a resolution for each comment.
  - Coordinate production of the milestone deliverable including printing, compiling electronic files, and preparation of a transmittal letter.

Deliverables	
► Monthly Progress Reports and Invoices	► PQMP
► Design Schedule	► Meeting Minutes
► PMP	► Comment Response Log

Special Services 1: Survey, Geotech, Right-of-Way and Utility Mapping

Overview

Task 1	**Survey**
Task 2	**Geotechnical Engineering**
Task 3	**Right-of-Way Mapping**
Task 4	**Utility Investigation**

TASK 1: SURVEY

General Standards

All surveys shall meet or exceed the standards set in the Professional Land Surveying Practices Act, the General Rules of Procedures and Practices promulgated by the Texas Board of Professional Engineers and Land Surveyors (TBPELS), and TxDOT's Survey Manual, latest edition, and shall be accomplished in an organized and workman-like manner, subject to the approval of the COUNTY.

TxDOT's Right-of-Way Procedures Preliminary to Project Release, Volume 1, (online at: http://manuals.dot.State.tx.us/) and TxDOT's Survey Manual, latest edition, will serve as a guide for the format and preparation of all right-of-way documents produced, including Right-of-Way maps, property descriptions (including parcel plats), and other Right-of-Way work products, unless otherwise directed by the COUNTY.

The North American Datum of 1983 (NAD83), Texas Coordinate System of 1983 (State Plane Coordinates), applicable to the zone or zones in which the work is performed, with values in U.S. Survey Feet, and a surface conversion based on the TXDOT Collin County Scale Factor of 1.000152710 (Reciprocal = 0.999847313317), will be used as the basis for all horizontal coordinates derived unless otherwise directed by the COUNTY.

Elevations will be based on the North American Vertical Datum 88 (NAVD88), unless otherwise directed by the COUNTY.

After the corridor evaluation is completed, the project will be flown to create a design-level survey from aerial photogrammetry and augmented with a field survey to fill voided areas (see survey section). The final corridor geometrics will be confirmed and refined, as needed, to best match the design-level survey and to meet the latest TxDOT Roadway Design Manual standards.

All GPS work, whether primary control surveys or other, shall meet or exceed the current TxDOT's GPS Manual of Practice, latest edition, to the order of accuracy specified in the categories listed below or in a work authorization. If the order of accuracy is not specified in this contract or in a work authorization, the work shall meet or exceed the order of accuracy specified in the publications listed in this paragraph.

All conventional horizontal and vertical control surveys shall meet or exceed the current, TxDOT's Survey Manual, latest edition, and the Texas Society of Professional Surveyors (TSPS) Manual of Practice for Land Surveying in the State of Texas, latest edition, to the order of accuracy specified, and in the categories listed below or in a work authorization. If the order of accuracy is not specified in this contract or in a work authorization, the work shall meet or exceed the order of accuracy specified in the publications listed in this paragraph.

In order to ensure accuracy and accountability of the services provided under this contract, the Surveyor may be required to certify work performed under this contract as true and correct according to, TxDOT's Survey Manual, latest edition, TxDOT's GPS Manual of Practice, latest edition, or the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

The Surveyor shall provide temporary signing and traffic control in and around survey operations. All signs, flags and safety equipment shall be provided by the Surveyor. The COUNTY shall be notified at least 48 hours in advance of any lane closures.

The Surveyor shall provide all personnel, equipment, and survey supplies necessary for the performance of the activities required by this agreement or by any work authorization.

Data (original and processed) shall be provided to the COUNTY on a compact disk or other approved medium and shall be in the following formats: Microsoft Word for word processing, MicroStation, Geopak V8i for graphics applications.

Variations from these software applications or other requirements listed above shall only be allowed if requested in writing by the Surveyor and approved by the COUNTY.

The Surveyor shall perform Quality Control/Quality Assurance on all procedures, field surveys, data, and products prior to delivery to the COUNTY. If, at any time, during the course of reviewing a submittal of any item it becomes apparent to the COUNTY that the submittal contains errors, omissions, and inconsistencies, the COUNTY may cease its review and return the submittal to the Surveyor immediately for appropriate action by the Surveyor. A submittal returned to the Surveyor for this reason is not a submittal for purposes of the submission schedule.

The Standards for services that are not boundary-related but that relate to surveying for engineering projects may be determined by the project Engineer, construction specifications, or design specifications.

Survey Location

Survey will be performed along the approved corridor determined in Objective 2 , consisting of a preferred 500' corridor and a 300' corridor for the initial design phase.

Specific Work to Be Performed (Survey)

- The Surveyor shall establish up to fifty-three (53) primary Horizontal and Vertical Control Monuments, consisting of a 5/8" capped iron rod set in concrete, at approximately 2000' intervals along public rights-of-way and/or private property where right-of-entry has been granted. The monuments shall be set outside the future construction limits, when possible. GPS RTK will be utilized to establish the horizontal locations and differential leveling will be utilized to establish vertical values. Plan set control sheets (Horizontal & Vertical Control Sheet and a Survey Control Index Sheet) shall be produced. A Horizontal and Vertical Data Sheet (TXDOT Form 2462 or similar) shall be produced for each Monument. Each data sheet shall contain Grid and Surface horizontal coordinates, a Surface Adjustment Factor, an elevation and a locative sketch. Engineer shall supply this data to the County.

- Provide structure details of up to thirty (30) cross culverts and one (1) bridge locations including flow line elevations, top of road profile. Drainage structure details include headwalls, wingwalls, pipe sizes, pipe material. Uncovering, digging out, or excavation of pipes and/or culverts is specifically excluded.

- Hydrographic Surveys as ROE permits:

- Up to one hundred two (102) creek cross sections for hydraulic analysis. Cross Sections will be limited to Major Creeks 21 (11 XS), 21-A (13 XS), 33 (25 XS), 34 (19 XS), 35 (14 XS), 36 (14 XS), and 37 (6 XS), on public access property and on private property where right of entry has been granted.

    - Surveyor shall obtain Right-of-Entry permission prior to physically accessing any private property. All ROE to be approved by the County. Surveyor will utilize public records to determine ownership data and secure permission to enter private property for purposes of performing Land Surveying. A right-of-entry (ROE) letter will be prepared on County letterhead and mailed to each property owner in the project limits. ROE letters to be signed by a County representative or the Prime Consultant.

      Two (2) written and mailed attempts will be made to obtain written response will be requested either confirming or denying access each property. If needed, the Surveyor will make two (2) reasonable attempts to contact each landowner verbally prior to conducting any surveying fieldwork if written correspondence is not successful. A lack of response from the landowner after the second verbal attempt will classify the property as "access denied". A log of all contact with landowners will be maintained. Surveyor will not be responsible for coordinating entry for field work onto private property for any discipline other than land surveying.

- Prepare a final design and topographic drawing in MicroStation OpenRoads Designer showing all features located in the field, an ASCII coordinate file of the associated points located in the field and a hard copy of all field notes and field sketches.
- Locate up to 230 Subsurface Utility Engineering Quality Level "A" Test Holes as designated by others.
- Determine boundary lines and rights-of-way lines for approximately 164 existing parcels and/or rights-of-way that are within or adjacent to the technically preferred alignment.
- Prepare a base Digital Terrain Model and contours from the NCTCOG LiDAR Panels(s). Breakline, feature, and planimetric extractions from the NCTCOG LiDAR data are excluded from the scope.
- Merge supplemental survey data into specified NCTCOG LiDAR Panel(s).

All Surveying shall be performed under the direct supervision of a Registered Professional Land Surveyor licensed and in good standing with the State of Texas.

Deliverables	
ROE Contact Log, copies of ROE permission letters	ASCII file of points, georeferenced photos, field notes and field sketches
Microstation ORD DGN file containing planimetrics, DTM, contours, breaklines, and property lines and ownership information (combined with previous survey data along corridor) as surveyed on the ground	Control Monument Data Sheets GIS ROW Geodatabase

TASK 2: GEOTECHNICAL ENGINEERING

Specific Work to Be Performed (Geotech)

- The Engineer shall perform a literature (desktop) review of select existing geotechnical and pavement reports in the vicinity of the proposed alignment for the purpose of providing a preliminary pavement design for the main lanes and frontage roads.
- To document these findings, the engineer will prepare a memo, containing information such as subsurface conditions, geotechnical considerations for pavement design, depth of coverage and PVR calculations, suitable replacement fills and compaction requirements, and bedrock range for bridge foundation design.

Deliverables	
Preliminary Geotechnical Memo	

TASK 3: RIGHT-OF-WAY MAPPING

Specific Work to Be Performed (Right-of-Way)

- The Surveyor will prepare an overall Parcel Exhibit Map. The Surveyor shall use the 2023 NCTCOG Aerial mapping image as a backdrop for the new parcel configuration that comprises the length of the new Right-of-Way corridor. The overall Parcel Exhibit Map will show the new right-of-way lines, parcel boundaries, current ownership, bearings and distances and set or found monumentation for the new right-of-way corridor. Each 22"x 34" sheet will cover approximately 2300 feet of length of the new

right-of-way corridor. The Parcel Exhibit Map shall not be signed nor sealed by a Registered Professional Land Surveyor.

- The Surveyor will prepare up to one hundred sixty-four (164) Parcel Exhibits (parcel plat). These will show the individual configurations that comprise the new right-of-way corridor. These will show new right-of-way lines, parcel boundaries, current ownership, bearings and distances and set or found monumentation. They will be reviewed by COUNTY and ENGINEER representatives for correctness and parcel configuration. These will include area designations for any determined prescriptive easement areas within the boundaries of the Parcel Exhibits and shown for appraisal purposes. There are approximately one hundred sixty (160) Parcels that need Right-of-Entry permission within the Right-of-Way corridor. If Right-of-Entry can't be obtained, the Surveyor will be unable to set the new Right-of-Way monuments on those Parcels. The Surveyor may prepare Parcel Exhibits utilizing alternative Right-of-Way monumentation in lieu of set physical monuments. New Right-of-Way monuments may be set after Collin County obtains title to these parcels.
- The Surveyor will prepare up to one hundred sixty-four (164) Metes and Bounds descriptions that describe the Parcel boundaries. These will be signed and sealed by a Texas Registered Professional Land Surveyor and will become part of each Parcel Exhibit and suitable for acquisition purposes. These will be prepared after Parcel Exhibits have been reviewed and approved by others.
- The Surveyor will use an outside Abstractor to abstract up to 164 parcels. The Abstractor will research easements back for a period of seventy-five (75) years. Each current parcel deed could have multiple previous smaller tracts that comprise the current total acreage. In this event, each separate smaller tract will need Abstracting research for the previous seventy-five (75) years also.
- The Surveyor will use the Abstractor findings to place the existing easements in relation to current parcel boundaries. This could include existing drainage easements, existing gas easements, existing electrical easements, existing right-of-way easements/dedications and other existing utility easements that may affect the right-of-way corridor alignment, placement of new easements and prescriptive right-of-way locations. This includes field crew time to locate additional utility appurtenances aiding in the placement of newly discovered existing easements.
- All Surveying shall be performed under the direct supervision of a Registered Professional Land Surveyor licensed and in good standing with the State of Texas.

Deliverables	
▶ DGN files containing bearings, distances, monumentation of each parcel configuration (with easements) required to reproduce the overall Parcel Exhibit Maps. ▶ Three (3) copies of signed and sealed Parcel Exhibits that include the associated Metes and Bounds for one hundred sixty four (164) Parcels with PDF copies.	▶ Two hard copies (22"x34" & 11"x17") and PDF copies of the overall Parcel Exhibit Map.

TASK 4: UTILITY INVESTIGATION

Introduction

The ENGINEER will perform the SUE work required for this project in general accordance with the recommended practices and procedures described in ASCE Publication CI/ASCE 38-02 (Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data). As described in the mentioned ASCE publication, four levels have been established to describe the quality of utility location and attribute information used on plans. The four quality levels are as follows:

- Quality Level D (QL"D") – Information derived from existing records.
- Quality Level C (QL"C") - QL"D" information supplemented with information obtained by surveying visible above-ground utility features (i.e. valves, hydrants, meters, manhole covers, etc.).
- Quality Level B (QL"B") – Two-dimensional (x, y) information obtained through the application and interpretation of non-destructive surface geophysical methods. Also known as "designating" this quality level provides the horizontal position of subsurface utilities within approximately one foot.
- Quality Level A (QL"A") – Also known as "locating", this quality level provides precise three-dimensional (x, y, z) information at critical locations by exposing specific utilities. Non-destructive vacuum excavation equipment is used to expose the utilities at specific points which are then tied down by survey.

It is the responsibility of the SUE provider to perform due-diligence with regard to records research (QL "D") and the acquisition of available utility records. The due-diligence provided for this project will consist of contacting the applicable "one call" agency, visually inspecting the work area for evidence of utilities; and reviewing the available utility record information. Utilities that are not identified through these efforts will be hereforth referred to as "unknown" utilities. The ENGINEER's personnel will perform a field visit to the defined work area to validate utility data collected and identify any "unknown" utilities. However, the ENGINEER is not responsible for designating and locating "unknown" utilities that were not detected during the record research and field surveying phase.

Scope of Work

The scope of work described may be modified, with COUNTY concurrence, during the performance of the SUE fieldwork if warranted by actual field findings.

For this project, the ENGINEER will provide QL"D" and "C" for the width of the approved corridor including along any proposed intersections. A SUE CAD file will depict the type and horizontal location of the designated utilities. The size and material type will be provided only if the information is indicated on available record drawings.

The ENGINEER will perform all surveying that is required for the collection of SUE field data.

Deliverables	
▶ QL"C" and QL "D" SUE CAD file	

Special Services 2: Plans, Specifications, and Estimates Development

Overview

Following completion and approval of the Schematic, the COUNTY may engage the ENGINEER to develop detailed PS&E plans to support the construction of a 2-lane access roadway (the ultimate northbound frontage road) as developed in the Schematic.

The following scope will be refined by the ENGINEER and executed at the written request of the COUNTY under a supplemental agreement.

Task 1	**Roadway Design**
Task 2	**Drainage Design**
Task 3	**Traffic Design**
Task 4	**Structural Design**
Task 5	**Bid Preparation**
Task 6	**Bid Phase Services**

TASK 1: ROADWAY DESIGN

- Task 1A - GENERAL

  Typical Sections

  The ENGINEER will prepare the existing and proposed typical sections of the roadways on standard 11" x 17" plan sheets as developed in Task 2C above.

  Miscellaneous Sheets

  The ENGINEER will prepare the following General Sheets:

  - Title Sheet
  - Index of Sheets
  - Project Layout Sheets at 1" = 100' scale
  - Summary of Quantities
  - Survey Control Data Sheets

- Task 1B - TRAFFIC CONTROL

  Traffic Control Plan (TCP)

  The ENGINEER will prepare traffic control and sequence of construction plans at a scale of 1" = 100'. The TCP plan will show staged construction of the cross street improvements to maintain local access. The plans will identify work areas, temporary paving, temporary shoring, signing, detour alignments, barricades, temporary drainage and other traffic control related items as required. A narrative will be prepared and submitted to the COUNTY for review and incorporation into the plans. Traffic control will utilize TxDOT standard details and meet the requirements of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

  Traffic Control Advance Warning Layout

  In conjunction with the Traffic Control Layouts, the ENGINEER will develop an overall advance warning layout in conformance with TxDOT standard requirements.

Traffic Control Typical Sections

In conjunction with the Traffic Control Layouts, the ENGINEER will develop typical cross sections showing lane widths, edge conditions, channelization and proposed construction area.

Develop Sequence of Construction, Narrative, and General Notes

The ENGINEER will develop a sequence of construction for the proposed improvements including a written narrative and any applicable general notes.

Traffic Control Layouts

The ENGINEER will prepare layouts (1" = 100') showing the travel lanes and construction area for each phase of construction. Included in the layouts will be temporary signing and striping, channelization devices, barricades and a narrative of the sequence of work.

Intersection Staging Plans

The ENGINEER will develop typical intersection staging plans for similar intersections. The ENGINEER will develop custom intersection staging layouts only for special conditions.

Driveway Staging Plans

The ENGINEER will develop a typical driveway staging plan for similar driveways. The ENGINEER will develop custom driveway staging layouts only for special conditions.

TCP Quantities Summary Sheet (standard TCP items not covered by item 502 "Barricades and Traffic Handling")

The ENGINEER will develop TCP Quantity Summary Sheets.

Detour Plans

For offsite detour routings on existing streets, roads, or highways, the ENGINEER will provide layouts of proposed routing, showing "trail blazing" signs at intersections.

Traffic Control Standard Details

The ENGINEER will identify and include applicable TxDOT traffic control standard details for inclusion in the plans.

- Task 1C - ROADWAY DESIGN

Horizontal Alignment Data Sheet

The ENGINEER will provide a plan sheet with all applicable horizontal alignment data (Geopak output) along the project.

Removal Sheets

The ENGINEER will provide removal layouts showing items to be removed at a scale of 1" = 100'. Surface features to be removed including driveways, streets, storm sewer piping, storm sewer inlets, abandoned water mains and abandoned sanitary sewer mains will be identified with approximate quantities on the removal sheets. It is assumed the franchised utilities will either remove their own equipment or will abandon it in place. Information on abandoned water mains and sanitary sewer will be provided by others. The removal of buildings and building foundations located within the proposed ROW is assumed to be within the scope of this contract and will be identified for removal.

Roadway Plan and Profiles

The ENGINEER will develop the plan sheets and profile sheets at a scale of 1" = 100' for the Collin County Outer Loop Access Road and cross streets for this project. The ENGINEER will refine the vertical alignment for the roadway based upon the approved design criteria and design ultimate schematic. The horizontal curve data and vertical curve data will be shown including "K" values. The vertical profiles will use the approved design ultimate schematic as the starting profile, with minor adjustments as necessary.

The plan and profile sheets will include the following:

- List to be developed upon PSE scoping.

Intersection Layout Sheets

The ENGINEER will develop contour plans and intersection details for intersections (as listed above). Layouts will be at a scale of 1" = 20'.

Driveway Profiles / Details Summary

The ENGINEER will analyze driveways within the project and develop driveway profiles as needed to ensure that driveways function as intended. (For example, residential driveways will be designed to accommodate passenger cars; commercial driveways will be designed to accommodate trucks (WB-50). The ENGINEER will delineate the limits of construction outside of the right of way needed to secure an adequate driveway profile. The ENGINEER will calculate and summarize driveway quantities.

Driveway details (dimensions, grades, and quantities) will be prepared in a tabular format.

Miscellaneous Roadway Details

The ENGINEER will prepare plan details necessary to clarify the construction requirements of the paving facilities.

Roadway Cross Sections

The ENGINEER will prepare proposed cross sections at a scale of 1" = 10' horizontal and 1" = l0' vertical (on 11"X17" format) or appropriate scale for detail and review. Cross sections will be created at all critical locations and on 100-foot increments for Collin County Outer Loop Access Road and cross streets with construction beyond the radius return.

The ENGINEER will determine the quantities of cut and fill for each cross section and provide the earthwork quantities in a tabular format in the plans.

Assembly of Roadway Standards

The ENGINEER will select standard details applicable to the roadway design as needed for construction and include in the plans for the 60%, 90%, and final submittals.

- Task 1D - PAVEMENT DESIGN

The ENGINEER will perform pavement design and submit to the COUNTY for review and approval. The ENGINEER will submit a signed and sealed pavement design report to the COUNTY. The pavement design repost must be reviewed and approved by the COUNTY prior to the pavement design's implementation. Pavement design reports will document assumptions and design considerations.

TASK 2: DRAINAGE DESIGN

- Task 2A - HYDROLOGY

The ENGINEER will subdivide the overall drainage areas into sub-areas and calculate the discharge directed to each proposed culvert or inlet. Prepare drainage area map identifying all sub-areas. The ENGINEER will prepare drainage area maps on standard 11" x 17" plan sheets.

Offsite drainage area maps

The ENGINEER will provide offsite drainage area maps for the site at a scale of 1" = 2000'.

Storm sewer inlet area maps

The ENGINEER will design storm sewer improvements for the Collin County Outer Loop Access Road. The runoff to each inlet and bridge and deck drainage will be calculated in accordance with COUNTY criteria using the appropriate design frequency and as defined in the TxDOT Hydraulic Manual and as shown on standard TxDOT runoff and inlet computation plan sheets.

The ENGINEER will provide storm sewer inlet area maps at a scale of 1" = 500'.

- Task 2B - HYDRAULIC DESIGN

Hydraulic Design for Culverts, Bridge Waterways & Storm Sewer

The ENGINEER will perform necessary hydraulic computations for the design of this project utilizing HEC-RAS, GEOPAK Drainage, HY-8, Culvert master or other hydraulic modeling software approved by the COUNTY. Calculations will include culverts, bridge waterways, channels, storm sewers and inlets.

The ENGINEER will provide all hydraulic calculations to the COUNTY by showing the necessary information in the final plan set.

Bridge Hydraulic Reports

The ENGINEER will utilize the hydrologic study prepared during the schematic phase and HEC-HMS (or best available) data to determine discharges at the proposed crossings for the following FEMA regulated waterways:

- List to be developed upon PSE scoping

The ENGINEER will conduct a field investigation to document the creek characteristics in the vicinity of the proposed crossings. The hydrologic model will be developed with existing land use conditions and future developed conditions. It is assumed that no channel realignment design and CLOMR/LOMR effort will be required.

The ENGINEER will develop a hydraulic model of the existing channels and conditions using the channel survey data and field observation notes, and calibrate the model using available FEMA maps and information. The ENGINEER will develop a hydraulic model of the proposed crossing utilizing the existing hydraulic model and incorporating the proposed structure.

The ENGINEER will analyze and check scour impacts for the 100-year flood and the lower of the 500-year or overtopping event to the proposed crossing structures for scour potential and channel stability and wit) incorporate scour protection into the crossing structure design if determined to be necessary. The ENGINEER will prepare the Hydraulic Reports for named creeks in accordance with the COUNTY and STATE criteria comparing the existing creek conditions with the proposed roadway crossing. The ENGINEER will prepare working maps, profiles, cross sections, and tables to be included with the drainage report.

- Task 2C - DRAINAGE STRUCTURE DESIGN

Culvert Layouts

Prepare non-bridge class culvert crossing and bridge class culvert (crossing layout sheets for cross-drainage structures in accordance with State standard details, the TxDOT Hydraulic Design Manual and the hydraulic computations developed utilizing HY-8 or other approved method. Prepare layouts at 1" = 20' on 11"x17" plan sheets unless otherwise directed.

Storm Sewer Plan & Profile Sheets

Prepare storm sewer plan and profile sheets depicting storm sewer, inlets and manholes necessary to drain the facility and convey the runoff to the designated discharge points. The storm sewer plan profiles will be consistent with the hydraulic computations developed using Geopak Drainage or other approved method, and the TxDOT Hydraulic Design Manual. Inlets, manholes and junctions will be in accordance with TxDOT standard details. Prepare layouts at 1" = 100' on l1"xl7" plan sheets unless otherwise directed.

Miscellaneous Drainage Details

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

Assembly of Drainage Standards

The ENGINEER will select standard details applicable to the drainage design as needed for construction and include in the plans for the 60%, 90%, and final submittals.

- Task 2D - OPEN CHANNEL DESIGN

Special Ditch/Channel Layout Sheets

The ENGINEER will prepare special ditch and/or channel grading layout sheets at l"=50' scale showing proposed grading contours, typical channel section, and limits of grading. Earthwork associated with proposed ditch and/or channel excavations will be tabulated and included in earthwork summary.

- Task 2E - STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SW3P Data Sheet

The ENGINEER will prepare SW3P on standard TxDOT SW3P plan sheet.

SW3P Layouts

The ENGINEER will design a SW3P erosion control plan consistent with the project construction phases that will minimize sediment discharge from the project site through runoff. The ENGINEER will prepare an erosion control plan at a 1" = 500' scale for each phase of construction.

Post-Construction Plans (BMP Control for TNRCC Section 401)

The ENGINEER will analyze/design the use of vegetative filter strips, grassy swales, special ditch grading, and other non-structural BMP controls within the proposed corridor. Any other BMP control designs, such as permanent detention and/or sedimentation ponds will be considered as additional services.

Temporary Drainage

The ENGINEER will review the temporary drainage during phased construction by running cross sections at major phases of the TCP. The ENGINEER will review drainage for positive flow and perform a low point review. Temporary drainage will not include hydrologic study but may include temporary pipes and ditch flow lines included in the phases of construction.

TASK 3: TRAFFIC DESIGN

- Task 3A - SIGNING AND PAVEMENT MARKINGS

  Signing and Pavement Marking Layout (Assumed 9 plan sheets)

  The ENGINEER will prepare a traffic signing and pavement marking layouts at a scale of 1" — 200' feet on a standard 1 l " x 17" plan sheets. The layouts will identify the locations of proposed signing and permanent pavement markings in accordance with applicable TxDOT standards and the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

  Summary Tables (Assumed 1 plan sheet)

  The ENGINEER will prepare a small sign summary table utilizing TxDOT standard sheets.

  Assembly of Sign and Marking Standards

  The ENGINEER will select standard details applicable to the signing and marking design as needed for construction and include in the plans for the 60%, 90%, and final submittals.

- Task 3B - ILLUMINATION

  The ENGINEER will refer to TxDOT's Highway Illumination Manual and other deemed necessary State approved manuals for design of safety lighting at the following intersections.

  - Will develop the list upon PSE scoping

  The ENGINEER will prepare circuit wiring diagrams showing the number of luminaires on each circuit, electrical conductors, length of runs, and service pole assemblies.

- Task 3C - SIGNALIZATION

  No traffic signals are anticipated for the Project, if they become necessary the design will be provided as Additional Services.

TASK 4: STRUCTURAL DESIGN

- Task 4A - RETAINING WALLS

  The ENGINEER will produce complete Retaining Wall Layouts and Structural Details for the proposed retaining walls. The ENGINEER will develop the foundation design in accordance with the TxDOT's Bridge Division Geotechnical Manual.

- Task 4B - BRIDGES

  Will prepare a list and detailed summary of bridge type upon PSE scoping.

  Bridge Layouts

  The ENGINEER will prepare bridge layouts in accordance with TxDOT's Bridge Division Manuals. The ENGINEER will determine the location of each soil boring needed for foundation design in accordance with the TxDOT Geotechnical Manual.

  Structural Details

  The ENGINEER will prepare structural details for bridges. The details will include abutment details, interior bent details, span/unit details and I-girder details. The bridge design will also accommodate future expansion for a widened section. TxDOT standards will be used if possible. Prestressed concrete I-Girder units will be designed to be continuous slab, with no integral concrete end diaphragms. Bents will be standard TxDOT multi-column bents with standard circular columns and rectangular bent caps

and will not include aesthetic details. The ENGINEER should size the bridge to meet drainage requirements.

Foundation Design

The ENGINEER will develop the foundation design in accordance with the TxDOT's Bridge Division Geotechnical Manual.

Bridge Total Quantities and Cost Estimates

The ENGINEER will provide all of the bridge quantities by construction phase and the estimate of probable cost for the bridge.

Bearing Seat and Control Elevations

The ENGINEER will provide bearing seat elevations for each beam and control elevations for each abutment and bent.

General Guidelines for Bridge Design

The ENGINEER will make final design calculations and provide information to the COUNTY. The bridge designs will be in accordance with TxDOT's Bridge Division manuals. TxDOT standard details will be used to the extent possible.

- Task 4C - BRIDGE CLASSIFICATION CULVERT LAYOUTS

  The ENGINEER will prepare culvert layouts for submission to the Bridge Division for culverts that meet criteria for bridge classification culverts.

TASK 5: BID PREPARATION

- Task 5A - BID PREPARATION

  The ENGINEER will provide the following related to bid preparation of roadway elements including:

  - Estimate of quantities, summary table sheets, and an estimate of probable cost using TxDOT bid items to be provided at the 30%, 60%, 90% and final submittal and at major project milestones.
  - Construction timeline using Microsoft Project or similar scheduling software at the 90% and final submittal.
  - Standard Specifications, Bid Forms and Contract Documents for the Project at the 90% and final submittal. Sections to be included are: Advertisement for Bids, Instructions to Bidders, Governing Specifications and Special Provisions, General Notes, Bid Form, Base Bid Schedule, Construction Agreement, Texas Statutory Payment and Performance Bond, Performance Bond and Maintenance Bond.

- Task 5B - QUALITY CONTROL

  The ENGINEER will perform a Quality Control / Quality Assurance review based on the requirements in the Project Quality Management Plan (PQMP) including the following:

  QAQC will be performed prior to each submittal and the ENGINEER's QAQC review set will be provided with each submittal.

Deliverables	
► 30% Plans	► Hydraulic Report Draft
► 60% Plans	► Hydraulic Report Final
► 90% Plans	► Cost Estimate
► Final Plans	► Construction Schedule
► QC Set	► Forms
► Design Criteria	

TASK 6: BID PHASE SERVICES

The ENGINEER will assist the COUNTY with the pre-bid conference and in the final selection of a Contractor for construction of the project. The ENGINEER will prepare and furnish bid documents to prospective bidders and keep record of recipients. The cost for bid package reproduction and delivery will be determined by reproduction cost plus shipping and handling, and will be the responsibility of prospective bidders. The ENGINEER will assist the COUNTY in receiving prospective bidder inquiries, and preparing and issuing addenda as necessary. The ENGINEER will assist the COUNTY in opening and evaluating bids for responsiveness, including developing a tabulation spreadsheet summarizing each bid. The ENGINEER will prepare a Notice of Award; assemble, deliver, and execute contract documents for construction; and prepare a Notice to Proceed. The ENGINEER will incorporate addenda into contract documents and issue a conformed set. During construction, the ENGINEER will receive, answer, and keep record of Requests for Information (RFI's) and Shop Drawings submitted by the Contractor.