AGENDA ITEM
A12

AGENDA PLACEMENT FORM

(Submission Deadline – Monday, 5:00 PM before Regular Court Meetings)

Date: 6-10-26

Meeting Date: 6-22-26

Submitted By: Colt Friedrich

Department: Engineering

Signature of Elected Official/Department Head:

Colt Friedrich

Court Decision:
This section to be completed by County Judge's Office



6.22.2026

Description:

Consideration of agreement with Pape-Dawson Consulting Engineers, LLC for consulting and engineering services for Transportation Bond Program Project 4.1: FM 917 Segment 3 - Thomas St to Egan. With authorization for County Judge to sign.

(May attach additional sheets if necessary)

Person to Present: Colt Friedrich

(Presenter must be present for the item unless the item is on the Consent Agenda)

Supporting Documentation: (check one) ☐ PUBLIC ☐ CONFIDENTIAL

(PUBLIC documentation may be made available to the public prior to the Meeting)

Estimated Length of Presentation: 1 minutes

Session Requested: (check one)

☑ Action Item ☐ Consent ☐ Workshop ☐ Executive ☐ Other _____

Check All Departments That Have Been Notified:

☑ County Attorney ☐ IT ☑ Purchasing ☑ Auditor

☐ Personnel ☐ Public Works ☐ Facilities Management

Other Department/Official (list) _____

Please List All External Persons Who Need a Copy of Signed Documents In Your Submission Email

Approved in CC on 9/11/2023

PROFESSIONAL SERVICES AGREEMENT

This Professional Services Agreement ("Agreement") by and between Johnson County ("County") and Pape-Dawson Consulting Engineers, LLC ("Consultant"), located at 500 West 7th Street, Suite 1100, Fort Worth, Texas 76102, becomes effective on the date of approval in Johnson County Commissioners Court.

SCOPE OF SERVICES

Consultant agrees to perform the services set forth in the Scope of Services attached as Attachment A in a timely and professional manner with the professional skill and care ordinarily provided by competent engineers practicing under the same or similar circumstances and professional license as expeditiously as is consistent with professional skill and care and the orderly progress of the Work (the "Standard of Care"), and in accordance with all applicable laws and the terms of this Agreement.. If any services, functions or responsibilities not specifically described in this Attachment A are required for the proper performance and provision of these services, they shall be deemed to be included with the Attachment A.

ACCESSIBILITY OF DOCUMENTS

Consultant agrees that documents prepared by Consultant in the performance of the Scope of Services shown in Attachment A may be made available to the public, including land developers, upon request.

TERM AND RENEWAL OPTIONS

Upon approval of this Agreement by the Johnson County Commissioners Court, Consultant is authorized to begin the provision of services as described in the attached Attachment A. Consultant agrees to complete the services requested by the County in accordance with the attached schedule.

PAYMENT AND INVOICING

Compensation to Consultant for the services described in the attached Attachment A shall not exceed $5,349,777.60 as shown on Attachment B for the services under this Agreement, upon approval by the County. Consultant acknowledges that payment of compensation is contingent upon the allocation of sufficient funds for this Agreement by the Johnson County Commissioners Court.

Consultant is to advise the County of additional services that may be required to complete any services requested under this Agreement prior to those additional services being performed that are not part of this Agreement, and must obtain prior approval, in writing, by the County before those additional services are performed and invoiced.

a. If in the execution of services, the County may request Consultant to remove a service, prior to Consultant's performance of that service. Consultant agrees that the County will not be held responsible for costs associated with those services that were removed.

b. Payments will be made monthly in arrears, on a net 30-day basis. The fee is to be inclusive of all travel costs.
c. Invoices are to be detailed and reference the fees as shown in Attachment B. A summary of the work performed during the invoiced period should accompany the invoice submittal.
d. Submit invoices to: Johnson County Auditor's Office, Attention: Accounts Payable, 2 N. Main Street, Cleburne, Texas 76033, phone: 817-556-6305. Invoices should reference the Purchase Order number.

COMPLIANCE WITH LAWS

1. In providing the services required by this Agreement, Consultant agrees to perform the work hereunder in accordance with the Standard of Care and must observe and comply with all applicable federal, state, and local statutes, ordinances, rules, and regulations, including, without limitation, workers' compensation laws, minimum and maximum salary and wage statutes and regulations, and non-discrimination laws and regulations. Consultant shall be responsible for ensuring its compliance with any laws and regulations applicable to its business, including maintaining any necessary licenses and permits.

2. Chapters 2271, 2252, and 2274 Texas Government Code Verification.

(a) *Boycott of Israel Prohibited*. In compliance with Section 2271.001 et seq. of the Texas Government Code, Consultant verifies that neither it nor any of its affiliates currently boycott Israel and neither it nor any of its affiliates will boycott Israel during the term of this Agreement. "Boycott Israel" is defined in Section 808.001(1) of the Texas Government Code.

(b) *Scrutinized Business Operations Prohibited*. In compliance with Section 2252.151 et seq. of the Texas Government Code, Consultant warrants and represents that: (1) neither Consultant nor any of its affiliates engages in scrutinized business operations in Sudan; (2) neither Consultant nor any of its affiliates engages in scrutinized business operations in Iran; and (3) neither Consultant nor any of its affiliates engages in scrutinized business operations with designated foreign terrorist organizations. "Scrutinized business operations in Sudan" is defined in Section 2270.0052 of the Texas Government Code. "Scrutinized business operations in Iran" is defined in Section 2270.0102 of the Texas Government Code. "Scrutinized business operations with designated foreign terrorist organizations" is defined in Section 2270.0152 of the Texas Government Code. Consultant further represents and warrants that neither Consultant nor any of its affiliates appears on any of the Texas Comptroller's Scrutinized Companies Lists.

(c) *Boycott of Certain Energy Companies Prohibited*. In compliance with Section 2276.002 of the Texas Government Code (added by 87th Legislature, S.B. 13), Consultant verifies that neither it nor any of its affiliates currently boycott energy companies and neither it nor any of its affiliates will boycott energy companies during the term of this Agreement. "Boycott energy company" is defined in Section 809.001(1) (added by 87th Legislature, S.B. 13) and means, without an ordinary business purpose, refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with a company because the company: (A) engages in the exploration, production, utilization, transportation, sale, or manufacturing of fossil fuel-based energy and does not commit or pledge to meet environmental standards beyond applicable federal and state law; or (B) does business with a company described by subsection (A).

(d) *Discrimination against Firearm Entities or Firearm Trade Associations Prohibited*. In compliance with Section 2274.002 of the Texas Government Code (added by 87th Legislature, S.B. 19), Consultant verifies that neither it nor any of its affiliates have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and neither it nor any of its affiliates will discriminate during the term of the Agreement against a firearm entity or firearm trade association. "Discriminate against a firearm entity or firearm trade association" is defined in Section 2274.001(3) (added by 87th Legislature, S.B. 19) and means, with respect to the entity or association, to: (i) refuse to engage in the trade of any goods or services with the entity or association based solely on its status as a firearm entity or firearm trade association; (ii) refrain from continuing an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; or (iii) terminate an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; the term *does not include*: (i) the established policies of a merchant, retail seller, or platform that restrict or prohibit the listing or selling of ammunition, firearms, or firearm accessories; and (ii) a company's refusal to engage in the trade of any goods or services, decision to refrain from continuing an existing business relationship, or decision to terminate an existing business relationship: (aa) to comply with federal, state, or local law, policy, or regulations or a directive by a regulatory agency; or (bb) for any traditional business reason that is specific to the customer or potential customer and not based solely on an entity's or association's status as a firearm entity or firearm trade association.

3. **Legal Compliance**. Each party shall comply with the provisions of all applicable laws relating to the performance of its obligations under this Agreement. Each party is responsible for obtaining its own legal advice concerning its compliance with applicable laws.

4. **Prohibition of Political Activity**. None of the funds provided under this Agreement shall be used for influencing the outcome of any election, or the passage or defeat of any legislative measure. This prohibition shall not be construed to prevent the Parties' compliance with the Texas Public Information Act. No funds provided under this Agreement may be used directly or indirectly to hire employees or in any other way fund or support candidates for the legislative, executive, or judicial branches of government, the State of Texas, or the government of the United States. None of the funds provided under this Agreement shall be paid to any official or employee who violates any of the provisions of this Section.

5. **Form 1295 Certificate of Interested Parties**. Consultant acknowledges and agrees that it has fully, accurately, and completely disclosed all interested parties in the Form 1295 electronically filed with the Texas Ethics Commission, at https://www.ethics.state.tx.us/filinginfo/1295/, as required by law, and that the attached signed copy attached as **Exhibit G** is a full and true copy of said filed form.

6. **Conflict of Interest**. Consultant assures that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code and has filed or will promptly file the Conflict of Interest Questionnaire (CIQ Form) with the Johnson County Clerk no later than the 7th business day after the date Consultant becomes aware of facts that require the form to be filed. Completed forms are to be sent to:

Johnson County
Attn: Christopher Boedeker, County Judge
2 N. Main Street, Cleburne, TX 76033

INSURANCE REQUIREMENTS

Consultant shall take out, pay for and maintain always during the prosecution of the work under this Agreement, the following forms of insurance, in carriers acceptable to and approved by Johnson County:

a. Worker's Compensation/Employer's Liability
    1. Worker's Compensation – statutory
    2. Employer's Liability - $500,000
b. Comprehensive General Liability:
    1. Bodily injury/Personal injury/Property damage - $1,000,000 per occurrence/$2,000,000 aggregate
c. Automobile Liability:
    1. Combined Single Limit (CSL) - $500,000 per occurrence
d. Errors and Omissions Insurance
    1. Minimum limits - $1,000,000 per occurrence/$1,000,000 aggregate
    2. Deductible - $200,000 self-insured

LIMITATION OF LIABILITY

Except as limited by applicable law (including those provisions applying to governmental agencies under the Constitution of the State of Texas), the total aggregate liability of Consultant to County for any all injuries, claims, losses, expenses, or damage whatsoever from any cause or causes, including, but not limited to, strict liability, breach of contract, breach of warranty, negligence, or errors or omissions (collectively, the "Claims") shall not exceed the greater of (1) the proceeds of Consultant's available liability insurance coverage required under the Agreement for coverage of any Claims; or (2) the compensation paid by County to Consultant pursuant to this Agreement. Under no circumstances shall either Party be liable to the other in connection with the Agreement, any services performed hereunder, or the Project, for any incidental, indirect, special, exemplary, punitive, or consequential damages of any kind or nature whatsoever including, without limitation, loss of goodwill or lost profits or revenue.

FINANCIAL RESPONSIBILITY

Consultant is responsible for its incurred expenses in performing this Agreement unless otherwise noted. To the extent permitted by the Constitution and the laws of the State of Texas, Consultant indemnifies and holds harmless the County against any and all claims, lawsuits, settlements, judgments, costs, penalties and expenses, including attorney's fees, for damage caused by or resulting from an act of negligence, intentional tort, intellectual property infringement, or failure to pay a subcontractor or supplier committed by the Consultant, its agent, or another entity over which the Consultant exercises control. The indemnity provided for herein will not apply if and to the extent of any liability resulting from the negligence or intentional misconduct of the County in instances where such negligence causes personal injury, death, or property damage. In the event that the County and Consultant are found jointly liable by a court of competent jurisdiction, liability and expense reimbursement must be apportioned comparatively in accordance with the laws of the state of Texas.

AGENCY-INDEPENDENT CONTRACTOR

Neither Consultant nor any employee thereof is an agent of the County and neither the County nor any employee thereof is an agent of Consultant. This agreement does not and shall not be construed to entitle either party or any of their representative employees, if applicable, to any benefits, privilege, or other amenities of employment of the other part.

ASSIGNMENT

Neither party may assign this Agreement.

THIRD PARTY BENEFICIARY EXCLUDED

This Agreement does not incur to the benefit of any specific third party. The parties to this Agreement do not consent to the waiver of sovereign or government immunity under Texas state or federal law to the extent either party may have that immunity under law.

ENTIRE AGREEMENT

This Agreement represents the entire and integrated agreement between the County and the Consultant and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both the County and Consultant.

This Agreement is comprised of the following documents:

- This Agreement
- Request for Qualifications F2025021 Bid Documents and Consultant Response
- Consultant Proposal
- Any exhibits attached hereto, conditions of the contract (special, supplementary and other conditions), all addenda issued prior to execution of this Agreement and all modifications issued subsequent thereto.

To the extent of an ambiguity among the various documents, the terms in this Agreement will prevail.

This Agreement may not be modified, altered, changed or amended in any respect, unless in writing and signed by both parties. For avoidance of doubt, this Agreement may not be modified orally.

The law of the State of Texas governs this Agreement. Venue for any action regarding this Agreement must be in the district courts of Johnson County, Texas.

This Agreement is effective upon the date of approval in Johnson County Commissioners Court.

TERMINATION

Either party may terminate this Agreement by:

a. Providing written notice to the other party at least fourteen (14) days prior to the date of termination;
b. Providing in the written notice the date of termination; and
c. Sending the written notice by certified mail return receipt requested to the party at its address.

EXECUTION OF AGREEMENT

This Agreement may be executed in separate or multiple counterparts. All of such counterparts shall be deemed to be one and the same Agreement, but only one copy with evidence of signatures shall be required for proof of this Agreement. The exchange of copies of this agreement and of signature pages by electronic transmission shall constitute effective execution and delivery of this agreement as to the parties and may be used in lieu of the original agreement for all purposes. Signatures of the parties transmitted or executed electronically shall be deemed to be their original signatures for any purpose whatsoever.

Johnson County

Christopher Boedeker, County Judge
Johnson County
2 N. Main Street
Cleburne, Texas 76033

Consultant

Pape- Dawson Consulting Engineers, LLC,
John Tyler, P.E., RAS
Managing Principal, Transportation
2000 NW Loop 410
San Antonio, TX, 78213

Johnson County

Christopher Boedeker
County Judge

Consultant

John Tyler, P.E., RAS
Managing Principal, Transportation

CERTIFICATION OF AVAILABLE FUNDS IN THE AMOUNT OF $5,349,777.60:

Auditor's Office

ATTACHMENT A

SERVICES TO BE PROVIDED BY THE ENGINEER

Project: **FM 917**

Limits: **From Thomas St to Egan RR**

County: **Johnson**

The Engineer shall provide preliminary engineering services for development of a design schematic, environmental documents, and studies in support of the schematic work, public involvement, permit procurement, data collection and analysis, mitigation and remediation, monitoring, drainage, conceptual traffic control, traffic projections, traffic engineering and operations including capacity analysis, traffic simulations, safety analysis, and 3-D modeling, surveying and mapping, parcel descriptions, utility engineering investigation, and utility coordination for on system State roadway of FM 917 from Thomas St to Egan RR in Johnson County, Texas.

1. GENERAL REQUIREMENTS

1.1. Coordination.

The Engineer shall coordinate issues and communications with County's internal resource areas through the County's Project Manager. The County will communicate the resolution of issues and provide the Engineer direction through the County's Project Manager.

The Engineer shall notify the County and coordinate with adjacent engineers on all controls at project interfaces. The Engineer shall document the coordination effort, and each engineer must provide written concurrence regarding the agreed project controls and interfaces. In the event the Engineer and the other adjacent engineers are unable to agree, the Engineer shall meet jointly with the County (and potentially State) and each adjacent engineer to resolve disagreements. If the engineers are unable to resolve an issue with the County (and potentially State) as mediator(s), the County (and potentially State) may decide the issue and the decision will be final.

The Engineer shall prepare each exhibit necessary for approval by each railroad, utility, TxDOT and other governmental or regulatory agency in compliance with the applicable format and guidelines required by each entity and as approved by the County. The Engineer shall notify the County in writing prior to beginning any work on any outside agency's exhibit.

1.2. Progress Reporting and Invoicing.

The Engineer shall invoice according to function code breakdowns shown in Attachment A– Services to be Provided by Engineer, of the Contract for Engineering Services and Attachment B – Fee Schedule, of this work authorization. The Engineer shall submit each invoice in a format acceptable to the County and then the County may distribute files to Bond Program Manager as they see fit

With each invoice, the Engineer shall include a completed projected vs. actual invoice form. The Engineer shall submit a monthly written progress report to the County's Project Manager regardless of whether the Engineer is invoicing for that month.

The Engineer shall complete the services according to the milestone work schedule established in the work authorization. The Engineer shall submit a monthly written progress report to the County indicating the actual work accomplished during the month, scheduled work to be accomplished for the month, the estimated work to be accomplished for the coming month, problems encountered and actions taken to remedy them, list of meetings attended, and overall status. The progress

report must use a bar chart diagram to indicate the percentage complete of each task shown on the previous report and the percentage complete of each task. The Engineer is required to meet with the designated County project manager or environmental coordinator on a monthly basis for progress tracking purposes unless prior written agreement is made with County not to hold a meeting in any given month. The Engineer shall submit minutes of the meeting summarizing the events of the meeting within seven calendar days after each meeting.

The Engineer shall prepare a project work schedule, using the latest version of Primavera software or another scheduling program approved by the County in writing. The schedules shall indicate tasks, subtasks, critical dates, milestones, deliverables, and review requirements in a format that depicts the interdependence of the various items. The work schedule must incorporate an allocation of time for stage reviews of the design schematic and the environmental documents by County and TxDOT personnel. The Engineer shall present the work schedule to the County for review and acceptance and provide assistance in interpreting the proposed work schedule. The Engineer shall provide advance written notice to the County if the Engineer is not able to meet the scheduled milestone review date.

Once the project has been completed and accepted by the County and State, the Engineer shall deliver all electronic files to the County within 30 calendar days of County's written request.

Final payment is contingent upon the County's receipt and confirmation by the County's Project Manager that the electronic files can be opened and are usable utilizing the current version of the software in use by the County.

The Engineer shall prepare a letter of transmittal to accompany each document submittal to the County or on the County's behalf. At a minimum, the letter of transmittal must include the TxDOT control-section-job (CSJ) number, the highway number, county, project limits, and County project number.

1.3. Traffic Control.

The Engineer shall provide all planning, labor, and equipment to develop and to execute each traffic control plan (TCP) needed by the Engineer to perform services under this work authorization. The Engineer shall comply with the requirements of the most recent edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). The Engineer shall submit a copy of each TCP to the County/State for approval prior commencing any work on any County or State roadway. The Engineer shall provide all signs, flags, and safety equipment needed to execute the approved TCP. The Engineer shall notify the County and State in writing 2 weeks in advance of executing each TCP requiring a lane closure and shall not begin lane closure without having obtained County and State's written approval. The Engineer shall ensure that its field crew possess a copy of the approved TCP on the job site at all times. Upon request by the County/ State, the field crew must make the TCP available to the County/ State for inspection. The Engineer shall assign charges for any required traffic control to the applicable function code.

1.4. Right of Entry.

Prior to performing any work outside of the State or County's right of way, the Engineer shall request right of entry from public and private land owners to allow services (e.g. environmental services, surveying services, geotechnical services) to be performed and shall request concurrence from the County/State. The Engineer shall prepare right of entry permissions, which must be signed by the landowner. Letters or other materials seeking right of entry must contain explicit reference to the kinds of activities for which right of entry is requested and an indication of the impacts (if any) that will result from performance of these services. The Engineer shall not commit acts which will result in damages to private property and shall make every effort to comply with the wishes and address the concerns of private property owners.

1.5. Level of Effort.

For this work authorization, the Engineer shall base the level of effort at each phase on the prior work developed in earlier phases without unnecessary repetition or re-study. As directed by the County, the Engineer shall provide written justification regarding whether or not additional or repeated level of effort of earlier completed work is warranted, or if additional detail will be better addressed at a later stage in the project development.

1.6. Quality Assurance (QA) and Quality Control (QC).

The Engineer shall provide peer review at all levels. For each deliverable, the Engineer shall retain evidence of their internal review and mark-up of that deliverable as preparation for submittal. A milestone submittal is not considered complete unless the required milestone documents and associated internal mark-ups are submitted. The Engineer shall submit the Engineer's internal mark-up (e.g., red-lines, comments) developed as part the Engineer's quality control step. When internal mark-ups are requested by the County in advance, the County may reject the actual deliverable if the Engineer fails to provide sufficient evidence of quality control. The Engineer shall clearly label each document submitted for quality assurance as an internal mark-up document.

The Engineer shall perform QA and QC on all survey procedures, field surveys, data, and products prior to delivery to the County (and potentially State). If, at any time, during the course of reviewing a survey submittal it becomes apparent to the County(and potentially State) that the submittal contains errors, omissions, or inconsistencies, the County (and potentially State) may cease its review and immediately return the submittal to the Engineer for appropriate action by the Engineer. A submittal returned to the Engineer for this reason is not a submittal for purposes of the submission schedule.

1.7. Underground excavation

If necessary, the Engineer shall contact the Texas Excavation Safety System, Inc. (DIGTESS) or call telephone number 811 to have underground utilities marked prior to digging holes for right-of-way monuments, utility engineering investigation, geotechnical investigation, or other purposes. The Engineer shall separately contact utilities not a part of the DIGTESS organization. The Engineer shall maintain documentation of all notification calls. The Engineer shall comply with Texas's excavation laws.

1.8. Preventative Measures to Prevent the Spread of Oak Wilt Disease Contamination

The Engineer shall take the following preventive measures while cutting, pruning, or removing oak trees in counties which have confirmed cases of oak wilt disease or when directed by the County (and potentially State):

A. When possible, employ alternative methods instead of pruning or cutting oak trees.

B. When possible, perform necessary pruning and cutting of healthy trees during January or February when sap beetles are least active.

C. Treat wounds with pruning paint in oak wilt disease infected counties to discourage insects, especially during warm weather.

D. Sterilize all pruning tools between each use on each tree with either Lysol spray or a 70 percent rubbing alcohol solution.

E. Dispose of the tree cuttings by burning, burying, or another approved method.

1.9. Personal Protective Equipment (PPE).

A. The Engineer shall, and shall require its subcontractors to:

1. Provide personal protective equipment (PPE) to their personnel,

2. Provide business vehicles for their personnel, and
3. Require their personnel to use PPE and drive only business vehicles while performing work on or near roadways.

B. The PPE must meet all:

1. Current standards set by Occupation Safety and Health Administration (OSHA)
2. TxDOT requirements (e.g., safety glasses, Type 3 (TY 3) pants for night work).

C. Each business vehicle must be clearly marked with the Engineer's business name, or the name of the appropriate subcontractor, such that the name can be identified from a distance.

TASK DESCRIPTIONS AND FUNCTION CODES

The Engineer shall categorize each task performed to correspond with the Function Codes (FC) and Task Descriptions.

FUNCTION CODE 102 (110) – FEASIBILITY STUDIES

ROUTE AND DESIGN STUDIES

The Engineer shall prepare an alignment and proposed roadway schematic layout that includes projected traffic volumes and existing and proposed typical sections. The Engineer shall furnish Microsoft Office and MicroStation and OpenRoads computer generated media containing the roadway schematic layout to the County and State. All supporting attachments and exhibits must accompany the schematic layout. All MicroStation and OpenRoads computer generated files containing the roadway design schematic must be fully compatible with the software used by TxDOT without further modification or conversion.

The Engineer shall produce, obtain, review, and evaluate existing and twenty-year projected traffic data for use in the preparation of the schematic design layout. The data must be utilized in accordance with the requirements for schematic development and consistent with the policies of TxDOT.

The Engineer shall prepare preliminary drawings to identify any potential impacts and constraints within the project corridor, including impacts to the nature, cultural, and human environment. The potential impacts and constraints identified must include all existing and proposed utilities (both public and private), structures, burial grounds, neighborhood communities, historical landmarks, and undeveloped areas. Any potential utility conflicts and structural impediments must be identified as such. The Engineer shall propose alternative alignments that avoid or minimize displacements and damages and prepare any additional attachments or exhibits required to illustrate a preferred alternative alignment. The Engineer shall assist the County/State with agency meetings during the development of the schematic design as requested by the County. If requested by the County/State, the Engineer shall prepare a Notice and Opportunity to Comment and assist the County/State with stakeholder meetings, public meetings, a public hearing, noise workshops, and other events as requested.

An itemization of the schematic design and engineering work activity to be performed under this contract is detailed below. The Engineer shall prepare all designs in accordance with the latest version of:

A. *Roadway Design Manual*, published by TxDOT;

B. *TxDOT Project Development Process Manual*, published by TxDOT;

C. *Policy on Geometric Design of Highways and Streets*, published by the American Association of County Highway and Transportation Officials' (AASHTO);

D. *Standard Specifications for Construction of Highways, Streets, and Bridges*, published by TxDOT;

E. *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, published by TxDOT;

F. *Highway Capacity Manual (HCM)*, published by the Transportation Research Board (TRB);

G. *Highway Safety Manual (HSM)*, published by AASHTO;

H. *Hydraulic Design Manual*, published by TxDOT;

I. *Access Management Manual*, published by TxDOT; and

J. other County approved manuals and guides.

When design criteria are not identified in these manuals, the Engineer shall notify the County and State to request direction.

The design schematic horizontal layout must adhere to a design scale of 1 inch = 100 foot (or 1 inch = 200 foot, when directed by the County/State.) The Engineer shall develop the schematic layout, exhibits, and attachments in English units. All Microsoft Office, MicroStation, Keyhole Markup Language (KML), Keyhole Markup Language Zipped (KMZ), and Bentley OpenRoads computer graphic files furnished to the County/State must be submitted on USB flash drive to the County/State in their native format, which must be fully compatible with the programs currently used by the County/ State. Schematics must follow TxDOT and Federal Highway Administration (FHWA) standards. The schematic must follow TxDOT's computer-aided design and drafting (CADD) standards. The Engineer shall submit the schematic as an original document, accompanied with an original MicroStation formatted graphics file. Final copies of the schematic design must be signed and sealed by a professional engineer licensed in the state of Texas.

110.1. Schematic Design Work Outline.

A. Develop Base Maps

The Engineer shall develop the base maps to be used for the analysis and proposed schematic layout from existing construction and right of way (ROW) plans as available. The Engineer shall re-establish the existing centerline horizontal alignments for all roadways, identify existing ROW and easements, property owners, and the approximate location of major utilities based on a utility engineering investigation in the preparation of base maps.

B. Planimetrics and Aerial Mapping

The Engineer shall obtain planimetrics, digital terrain modeling (DTM), and aerial photographs from the County/State, if available.

C. Analyze Existing Conditions

Using collected data and base maps, the Engineer shall develop an overall analysis of the existing conditions to develop the schematic design. The analysis must include the following:

1. ROW and easement determination.
2. Horizontal alignment
3. Vertical alignment
4. Pavement cross slopes and pavement type
5. Soil exploration
6. Geotechnical testing
7. Highway-rail grade crossing studies, if applicable
8. Intersection design and analysis
9. Sight distance.
10. Large guide signs and roadside signing

11. Level of service
12. Safety (i.e., crash data)
13. Locations of critical constraints
14. Drainage
15. Traffic control and construction phasing sequence

D. Schematic Alternatives

The Engineer shall identify and analyze schematic alternatives to minimize potential adverse operational impacts, crash impacts, ROW impacts, environmental impacts, major utility conflicts, structural impediments, or exceptions to the County, TxDOT, and FHWA design criteria.

E. Deliverable Schematic

The Engineer shall evaluate and document the following in the analysis to optimize the design:

1. Efficient use of the allocated ROW
2. Control of access (COA) and driveway locations
3. Roadway and intersection geometry
4. Cross sections
5. Bicycle and pedestrian design.
6. Drainage and hydraulic design
7. Stopping sight distance
8. Level of service
9. Safety
10. Traffic and signal operations
11. Construction, ROW, easement, and utility costs
12. Construction sequencing
13. Traffic control during construction
14. Roadside safety appurtenances
15. Large guide signage
16. Environmental mitigation (e.g., noise walls, storm water best management practices (BMPs))
17. Bridge layouts and clearance
18. Railroads (if applicable)
19. Interface with existing high occupancy vehicle (HOV) lane, managed lanes, and park-and-ride facilities
20. Accommodation of ultimate corridor configuration.
21. Accommodation of future cross street expansion as described in local thoroughfare plan (if applicable)
22. Avoidance of utility lines (if feasible)

23. Impact of construction delays from utility relocations

F. Project Management and Coordination

1. The Engineer shall direct and coordinate the various elements and activities associated with developing the design schematic.
2. The Engineer shall prepare the detailed graphic project work schedule indicating tasks, critical dates, milestones, deliverables, and County/TxDOT review requirements. The project work schedule must depict the order of the various tasks, milestones, and deliverables. The Engineer shall review the schedule monthly and provide updates regarding its progress on the schedule to the County.
3. The Engineer shall submit written monthly progress reports to the County.
4. The Engineer shall provide ongoing quality assurance and quality control to ensure completeness of product and compliance with the County/State procedures.
5. The Engineer shall conduct site visits in both the AM and PM peak hour and develop a technical report that includes photographs outlining the findings and observations.

G. Data Collection

The Engineer shall conduct field reconnaissance and collect data as necessary to complete the schematic design. Data must include the following information.

1. Available corridor major investment studies
2. Design data from record drawings of existing and proposed facilities.
3. Existing and future design year traffic data
4. Historical crash data
5. Roadway inventory information, including the number of lanes, speed limits, pavement widths and rating, bridge widths and ratings, and ROW widths.
6. Aerial photos, planimetric mapping, and DTM
7. Environmental data
8. Previously prepared drainage studies
9. Adopted land use maps and plans (if available)
10. Federal Emergency Management Agency (FEMA) flood boundary maps and flood insurance studies and models
11. Public and private utility information
12. Plat research for adjacent properties (if available)
13. Local major thoroughfare plan

H. Roadway Design Criteria

The Engineer shall develop the roadway design criteria based on the TxDOT *Roadway Design Manual* and AASHTO *Policy on Geometric Design of Highways and Streets* guidelines. The design criteria must include the following roadway design elements: design speed, lane and shoulder widths, pavement structure and slopes, horizontal curvatures, horizontal and vertical clearances, range of vertical profile grades, and side slopes. If there is a discrepancy between the two sources, the TxDOT *Roadway Design Manual* will govern unless otherwise directed by the County/State.

I. Preliminary Design Conference

The Engineer shall prepare and submit a preliminary Design Summary Report (DSR) to the County/State for review and approval and shall attend an initial kick-off meeting to establish and agree on fundamental aspects, basic features, concepts, and design criteria. This meeting will be coordinated with any adjacent roadway projects to ensure continuity with the design of the adjacent roadway projects. The Engineer shall prepare the meeting minutes, action items and revise the DSR throughout project development until geometric design schematic approval.

110.2. Schematic Design – General Tasks.

A. ROW Property Base Map

The Engineer shall obtain information on existing ROW, easements, and property information from as-built plans, ROW maps, and tax records. The Engineer shall prepare a base map depicting the information.

B. Typical Sections

The Engineer shall develop both existing and proposed typical sections that depict the number and type of lanes, shoulders, median width, curb offsets, cross slope, border width, clear zone widths, and ROW limits.

C. Environmental Constraints

The Engineer shall evaluate and document impacts to environmentally sensitive sites (as identified by the Engineer and verified by the County/State) during the schematic design process. Environmentally sensitive sites include natural, cultural, and the human environment. Examples are historic and archeological resources, burial grounds, neighborhood communities and residential areas, farmland, floodplains, wetlands, endangered species, rare habitats, wildlife corridors, wildlife crossings, parks and nature preserves, geologic features, undeveloped areas, and significant trees.

D. Drainage

1. The Engineer shall use data from as-built plans and FEMA maps to locate drainage out falls and to determine existing storm sewer and culvert sizes, design flows, and water surface elevations for use in the design of roadway geometry.
2. The Engineer shall conduct a preliminary drainage study to determine and evaluate the adequacy of the ROW needed to accommodate the proposed roadway and drainage system. The drainage study must:
    a. identify the impacts to abutting properties and the 100-year floodplain due to proposed highway improvements.
    b. identify the water surface elevations for the 2, 5, 10, 25, 50, and 100-year storm events.
    c. identify and locate outfalls.
    d. provide drainage outfall descriptions.
    e. provide overall drainage area map, sub-drainage area map, and storm water detention facilities.
    f. provide a drainage study report identifying the results of the study.
3. The drainage report, which must be signed and sealed by a professional engineer licensed in Texas, must include applicable hydrologic and hydraulic models (e.g., HEC-1 and HEC-2, HEC-RAS, HEC-HMS, XP-SWMM). The models must be approved by the local TxDOT district hydraulic engineer prior to generating any reports. If requested,

the Engineer shall prepare a final drainage study in accordance with one or more of the following: TxDOT Hydraulic Design Manual, local TxDOT district criteria, and any other specific guidance provided by the County/State. If requested by the County/TxDOT, the Engineer shall evaluate the adequacy of the existing drainage structures; otherwise, the Engineer shall not evaluate the adequacy of the existing drainage structures.

E. ROW Requirements

The Engineer shall determine the ROW requirements based on the proposed alignment, typical sections, design cross sections, access control, terrain, construction requirements, drainage, clear zone, maintenance, intelligent transportation system (ITS), and environmental constraints and mitigation requirements.

F. Construction Sequence

The Engineer shall evaluate and document the requirements for construction staging and traffic control throughout the development of schematic design to ensure that the proposed design can be constructed. The Engineer shall provide construction phasing assumptions to the County/TxDOT as requested and provide preliminary traffic control plan (TCP) layouts.

G. Design Exceptions

The Engineer shall identify design exceptions and waivers. The Engineer shall determine the necessity for each design exception or waiver for approval. If the County/State agrees that design exception or waiver is necessary, the Engineer shall prepare the TxDOT's required design exception or design waiver documentation. The Engineer shall document the operational and safety analysis for comparison of the no-build, build with standard design, and build with proposed design alternatives. For interstate facilities, the safety analysis must include the following:

1. Expected change in crashes from existing conditions to standard design conditions.
2. Expected change in crashes from existing conditions to the proposed design.

H. Traffic Data and Projections

The Engineer shall obtain the base year traffic data from TxDOT and Johnson County and develop the opening-year, interim-year (as requested by county/TxDOT), design-year (opening year +20), and pavement design year (opening year + 30) travel forecasts, and related traffic analysis in coordination with the TxDOT Transportation Planning and Programming Division (TPP). The developed traffic projections must be utilized for design and environmental analysis. The Engineer shall develop traffic forecasts for the mainlanes, cross streets, and intersections for no-build and build alternatives. These projections must include graphic representations of the anticipated daily movements along the corridor (suitable for inclusion in the design schematic and environmental document) and the traffic analysis for highway design table. The Engineer shall prepare a traffic projections methodology memo, based on the information provided in the traffic analysis package. The Engineer shall review the proposed methodology with the County /State and refine it based on these discussions. The Engineer shall submit the traffic volumes developed by the Engineer to the County/State for review and approval. The Engineer shall revise the traffic volumes based on the County/State's TPP's comments.

I. Financial Plan and Project Management Plan - Omitted

J. Traffic and Operational Analysis

The Engineer shall review and analyze traffic data (including percent trucks, design hourly volume, and directional distribution), existing roadway features (including number of lanes, offset to obstructions, lane widths, and intersection operation and geometry), traffic flow

patterns, and transit and traffic operations. The Engineer shall conduct capacity analysis studies for designated locations and sections of roadway and make recommendations for improving traffic flow. The Engineer shall use the HCM to analyze and make appropriate recommendations. The analysis must be done for existing/base year, opening year, design year (opening+20 year), and interim year (as requested) for existing and future conditions. Results of this analysis must be incorporated into the schematic design. The Engineer shall develop and submit to Johnson County and TxDOT a traffic and operational analysis report summarizing all analysis performed. The analysis must be performed using the latest versions of TxDOT-approved software (e.g., HCS, Synchro, SIDRA). The Engineer shall conduct Intersection Control Evaluation (ICE) Stage 1 using Capacity Analysis for Planning of Junctions (CAP–X) and Safety Performance for Intersection Control Evaluation (SPICE) for up to two intersections (as requested by the State). The Engineer shall develop and submit ICE Procedure Memo to summarize the results and recommendations.

K. Safety Analysis

The Engineer shall review and analyze historical crash data for the latest 5 full calendar years (i.e., January 1 to December 31, inclusive) with respect to crash characteristics such as severity, crash types, frequency, rates, patterns, clusters, and their relationship to crash contributing factors. The purpose of the historical crash analyses is to determine safety performance of the existing conditions to understand any safety issues within the study area.

Predictive, or quantitative safety analysis, involves using HSM-based methods that use safety performance functions (SPFs) and crash modification factors (CMFs) to estimate anticipated change in crashes from existing condition to the proposed design. The predictive safety analysis must be done for no-build and build conditions for design year. The purpose of the predictive safety analysis is to compare the safety performance of the no-build and build alternatives to help determine the preferred alternative and to determine the countermeasures, if necessary, to improve safety. Predictive safety analysis must be performed using HSM based tools including HSS, Safer-By-Design Toolor other tools acceptable to the State. The Engineer shall develop and submit to the County/State a safety analysis report summarizing all analysis performed.

L. Bicycle and Pedestrian Accommodations

The Engineer shall comply with the *United Countys Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations*. The inclusion of bicycle and pedestrian facilities must be evaluated when the project is scoped. Public input when applicable, as well as local city and metropolitan planning organization for bicycle and pedestrian plans must be considered in this evaluation.

M. Interstate Access Justification - Omitted

N. Toll-Managed, Express, High Occupancy Vehicle, Managed Lanes, Other Special-Use Lanes, and Transit Elements - Omitted

O. Project Implementation Plan - Omitted

110.3. Conceptual Design Schematics.

The Engineer shall develop conceptual design schematics in MicroStation format to evaluate various methods of handling traffic while providing access in key areas.

The Engineer to provide maximum of ten alternative route concepts, with a maximum of three Conceptual Design Schematics (30% level). The conceptual schematics are to be plan view only. Profile work must be done only to the extent necessary to lay out the proper horizontal geometry.

The schematics must contain the following design elements:

A. Mainlane roadway alignment

B. Pavement edges, face of curbs, and shoulder lines of mainlanes, intersections, interchanges, and connecting highways or streets.

C. Typical sections of existing and proposed roadways

D. Anticipated structure locations (including wildlife crossings and fencing structures)

E. Anticipated retaining wall and sound wall locations.

F. Anticipated conveyance of major drainage elements

G. Preliminary ROW and easement requirements and control-of-access locations

H. Direction of traffic flow and the number of lanes on all roadways

I. Existing and projected traffic volumes

J. Existing utilities

K. Waters of the United States (WOTUS)

110.4. Geometric Design Schematics.

The Engineer shall develop a single geometric design schematics based on the on preferred conceptual schematics after the basic layout, lane arrangement, and anticipated ROW and easement impacts depicted on the conceptual schematics are approved. The Engineer shall use Bentley OpenRoads tools in performing this task. The geometric design schematics must include both a plan view and profile view.

A. The geometric schematic plan view must contain the following design elements:

1. Bentley OpenRoads calculated roadway alignments for mainlanes, general purpose lanes, ramps, direct connectors, bridges, HOV lanes, managed lanes, express lanes, collector distributor roads, frontage roads and cross streets at major intersections and grade separations
2. Horizontal curve data shown in tabular format.
3. Pavement edges, curb lines, and sidewalks for all roadway improvements
4. Typical sections of existing and proposed roadways
5. Proposed bridge structures, including bridge deck, abutment, bent, and rail locations
6. Proposed retaining walls and sound walls.
7. Proposed cross-drainage structures with outfall flow arrows and significant drainage features or waterways identified.
8. Existing utilities and proposed utilities
9. Existing property lines and respective property ownership information
10. Existing ROW and easements
11. Proposed ROW and easements adequate for preparation of ROW maps
12. Waters of the US (WOTUS)
13. Control-of-access limits.
14. Existing and projected traffic volumes
15. Location and text of the existing and proposed guide signs and the preliminary locations for changeable message signs

16. Lane lines, shoulder lines, and direction of traffic flow arrows indicating the number of lanes on all roadways.

B. The geometric schematic profile view must contain the following design elements:

1. Calculated profile grade and vertical curve data including “K” values for all curves and sight distance values for crest vertical curves on the mainlanes.
2. Existing ground line profiles along the mainlanes
3. Grade separations and overpasses including preliminary abutment and bent locations, girder type, and span lengths.
4. Calculated vertical clearances at grade separations and overpasses.
5. Anticipated cross-drainage structures with approximate inlet and outfall elevations.
6. Proposed ditch grading (special grading), if it does not follow the typical section.
7. Approximate locations of existing and proposed major utility crossings.
8. The calculated profile grade for frontage roads, connectors, ramps, and cross streets will be shown on separate Supplemental Profile rolls.

110.5. Cross-Sections.

The Engineer shall use a Bentley 3D OpenRoads model to generate preliminary cross-sections at 50 feet intervals (unless otherwise directed by the County/State) and at culvert locations in conjunction with the geometric schematic. The Engineer shall determine earthwork volumes for use in the cost estimate. The Engineer shall prepare 11 inch x17 inch or roll plots of the cross-sections.

110.6. Retaining Walls.

The Engineer shall prepare preliminary retaining wall concepts to be shown on schematics, typical sections, and cross sections.

A. The Engineer shall determine if any additional walls are required and verify the need for and length of the retaining wall as shown on the ultimate schematic.

B. The Engineer shall compute and tabulate retaining wall quantities for preliminary design milestone plans submittal.

110.7. Renderings and Traffic Simulation.

The Engineer shall develop renderings, three-dimensional (3D) models, illustrations, and animations as a means of expression and understanding for what the owner of a project envisions and what the public perceives. In support of the public outreach effort, the County/State will choose reasonable build alternatives, which the Engineer shall carry forward into creating one rendering and one traffic animation for each of the various alternatives. The Engineer shall create a 3D model for the reasonable build alternatives from: horizontal and vertical alignments, existing and proposed DTMs, proposed typical sections, traffic counts, and ground photography.

The animations and renderings must give the public and stakeholders a clear awareness and appreciation for the reduction of traffic congestion and how traffic is to flow into and out of the project area.

110.8. Preliminary Construction Sequence.

The Engineer shall prepare preliminary construction sequence layouts in conjunction with the geometric design schematic depicting the phasing and traffic detours anticipated to safely convey traffic. The layouts must demonstrate that adequate horizontal and vertical alignments are maintained, sufficient lane widths and shoulder widths or barrier offsets are feasible, and construction zones are adequate for constructability of all proposed features. Proposed

construction detours must ensure that adequate superelevation is provided. The layouts must indicate how existing pedestrian and bicycle facilities are accommodated for each phase.

110.9. Preliminary Cost Estimate.
The Engineer shall prepare a preliminary cost estimate for the project, including the costs of construction, required ROW and associated improvements, and eligible utility adjustments. Current State/TxDOT unit bid prices must be used in preparation of the estimate.

110.10. Engineering Summary Report.
The Engineer shall prepare an engineering summary report to summarize the design criteria, traffic analysis, preliminary cost estimate and basis of estimate, construction sequence description, and utility conflict issues.

110.11. *(Support or Attendance at Value Engineering Study*). (Omitted)

110.12. Agency Coordination and Public Involvement.

A. The Engineer shall assist the County/State in conducting meetings with property owners, stakeholders, and various agencies to discuss and review the schematic design. The Engineer shall document and respond to issues related to the schematic design.

B. The Engineer shall prepare a Notice and Opportunity to Comment as needed and assist in conducting public meetings and public hearings during the project development process. The Engineer shall prepare schematic exhibits, constraints maps, and other necessary exhibits, and assist the County/State with all presentations.

C. The Engineer shall coordinate, schedule, reserve, and pay for all meeting locations and facilities.

D. For all public involvement activities, the Engineer shall prepare the adjacent property owner list; mail out and pay for notices; draft letters to public officials; prepare, publish and pay for notices to major and local newspaper; hire court reporter and law enforcement for public meetings and hearing; and provide audio and visual rental equipment and changeable message boards.

E. The Engineer shall attend pre-meetings at the local TxDOT district in preparation for every meeting and hearing, as directed by the County.

F. The Engineer shall compile public comments received and responses to comments and prepare the required documentation for all public involvement activities. The Engineer shall comply with the environmental compliance toolkits related to public involvement.

G. Public Involvement Deliverables

1. Exhibits and layouts, PowerPoint presentation and script, meeting agendas, technical handouts, online surveys, and meeting minutes to assist the County/State in coordination with local, state, and federal agencies and officials, and railroads. The Engineer shall provide hard copies for these meetings and electronic versions in MS Word and PDF format.

2. Hard copy and electronic copy of the 3D rendering static image for the preferred alternative.

3. Electronic copy of draft and final fly through 3D animation model video using generic traffic for the preferred alternative

4. Prepare hard copies roll plots and digital files of rendered orthographic plots of the defined project area, TxDOT’s request at 1”= 100’ scale.

110.13. Schematic Design Project Deliverables.

In conjunction with the performance of the services included under Function Code 110 of this attachment, the Engineer shall provide the following draft and final documents and associated electronic files as applicable.

A. Draft and final copies of the engineering summary report

B. Draft and final copies of the IAJR for interstates or the traffic and operational analysis report and safety analysis report for non-interstates

C. Draft copies of the preliminary drainage study

D. Draft and final copies of the geometric schematic layouts on 11 inch x 17 inch cut sheets or rolls, as requested by the County/State

E. Draft and final copies of the conceptual design schematics roll plots.

F. Draft and final copies of the geometric schematic layouts (1 inch = 100 feet)

G. Draft and final copies of the design schematic profiles rolls

H. Draft and final copies of the design schematic cross-sections on 11 inch x 17inch cut sheets or roll plot format, as requested by the County

I. Copy of the preliminary cross-sections in a roll plot format or 11 inch x17 inch format, as requested by the County/State

J. Electronic 3D model copy of the preliminary cross-sections created using OpenRoads tools.

K. Six final copies of the preliminary drainage study

L. Electronic submittal of the hydrologic and hydraulic model digital files from the drainage study

M. Copies of the preliminary construction sequence layouts in a roll plot or 11 inch x 17 inch format, as requested by the County/State

N. Copies of the preliminary construction sequence typical sections in 11 inch x17 inch format

O. Electronic copy of the 3D rendering and traffic simulation for the reasonable build alternatives

P. Electronic files shall be furnished to the County/State on a USB flash drive.

Q. Traffic data schematics

R. Traffic projections methodology memo

S. Average daily corridor traffic projections report

T. Risk management plan

U. Participation in CER

V. Draft project management plan

W. Draft financial plan

X. ~~(Final project management plan)~~ Omitted

Y. ~~(Final financial plan)~~ Omitted Line schematics with traffic data shown.

Z. Documentation of public involvement activities

AA. Utility plan – electronic file in latest version of MicroStation fully compatible with OpenRoads civil design system

BB. Design exception and design waiver documents.

CC. Hard copy of a draft hydraulic report for review and comment

DD. Culvert hydraulic data sheets and preliminary culvert layouts

EE. Drainage report – one hard copy of final drainage report, one electronic copy of the entire drainage report in PDF format, and computer files of hydrologic and hydraulic modeling with appropriate labeling of location, CSJ, and submittal date

FF. Retaining wall layouts

GG. Geotechnical report

HH. Cost estimates for each milestone submittal

II. KMZ or KML file of conceptual design schematic created from applicable DGN files for reviewing in Google Earth

JJ. Final schematic 3D model created using OpenRoads software.

KK. Draft and final copies of traffic analysis report

FUNCTION CODE 120 (120) – SOCIAL/ECON/ENV STUDIES

SOCIAL, ECONOMIC, AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT

120.1. Environmental Documentation Standards.

Each environmental service provided by the Engineer must have a deliverable. Deliverables must summarize the methods used for the environmental services and the results achieved. The summary of results must be sufficiently detailed to provide satisfactory basis for thorough review by the State, FHWA, and (where applicable) other agencies with regulatory oversight. All deliverables must meet regulatory requirements for legal sufficiency and adhere to the requirements for reports enumerated in the State's National Environmental Policy Act of 1969 (NEPA) Memorandum of Understanding (MOU).

A. Quality Assurance/Quality Control Review

For each deliverable, the Engineer shall perform quality assurance quality control (QA/QC) reviews of environmental documents and on all supporting environmental documentation to determine whether documents conform with:

1. Current Environmental Compliance Toolkit guidance, documentation requirements, and templates published by TxDOT's Environmental Affairs Division (ENV) and in effect as of the date of receipt of the documents or documentation to be reviewed;
2. Current state and federal laws, regulations, policies, guidance, agreements, and memoranda of understanding between the State and other state or federal agencies; and
3. Guidelines contained in Improving the Quality of Environmental Documents, A Report of the Joint AASHTO/ACEC Committee in Cooperation with the Federal Highway Administration (May 2006) for:
    a. Readability, and
    b. Use of evidence and data in documents to support conclusions.

Upon request by the County/State, the Engineer shall provide documentation that the QA/QC reviews were performed by qualified staff.

B. *(~~The Engineer shall maintain the project environmental record in TxDOT's Environmental Compliance Oversight System (ECOS), including project review, completing the work development plan screens, uploading documents, and completing activities as assigned by the District~~.) Omitted*

C. Deliverables must contain all data acquired during the environmental service and be written to be understood by the public in accordance with the TxDOT's Environmental Toolkit guidance, documentation standards, and current guidelines, policies, and procedures.

D. Electronic versions of each deliverable must be written in software that is fully compatible with the software currently used by the State and provided in the native format of the document for future use by the State. The Engineer shall supplement all hard copy deliverables with electronic copies in searchable Adobe Acrobat (.pdf) format unless another format is specified. Each deliverable must be a single, searchable .pdf file that mirrors the layout and appearance of the physical deliverable. The Engineer shall deliver the electronic files on USB flash drive in both the document's native format and the PDF format.

E. When the environmental service is to apply for a permit (e.g., United States Coast Guard (USCG) permit or USACE permit), the Engineer shall provide the permit and all supporting documentation to the County/State as the deliverable.

F. Submission of Deliverables

1. Deliverables must consist of documentation to support the preparation of an Environmental Assessment (EA). Technical reports and documentation must be prepared to support the applicable environmental classification (e.g. CE, EA, or EIS). Additionally, an Open-Ended (d) list Categorical Exclusion Classification Request Form must be prepared to classify the project as an Open Ended (d) list CE, if needed.

2. All deliverables must comply with all applicable state and federal environmental laws, regulations, procedures, and TxDOT's Environmental Compliance Toolkits, documentation requirements, and templates.

3. On the cover page of any environmental documentation, the Engineer shall insert the following language in a way that is conspicuous to the reader or include it in a CE project record:

   "The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 17, 2025, and executed by FHWA and TxDOT."

G. The State will provide the State's and other agency comments on draft deliverables to the Engineer and the County. The Engineer shall revise the deliverable:

1. To include any State commitments, findings, agreements, or determinations (e.g., wetlands, endangered species consultation, Section 106, or Section 4(f)), required for the transportation activity as specified by the State;

2. To incorporate the results of public involvement and agency coordination;

3. To reflect mitigation measures resulting from comments received or changes in the transportation activity; and

4. To include with the revised document a comment response form (matrix) in the format provided by the State.

H. The Engineer shall provide photographs and graphics that clearly depict details relevant to an evaluation of the project area. Comparable quality electronic photograph presentations

must be at least 1200 x 1600 pixel resolution. The County/State can request images/graphics be provided in another format or quality.

120.2. Environmental Assessment (EA) Content and Format.

A. The Engineer shall provide an EA and ensure that:

1. The EA meets the requirements of 23 CFR §771.119 and TAC, Title 43, Part 1, Chapter 2 and the EA content is sufficiently detailed to meet regulatory requirements for legal sufficiency and current (at the time of creation) TxDOT ENV guidance and Environmental Compliance Toolkits.

2. Exhibits to be included in reports or EAs must not exceed 11 inches x 17 inches and must be in color. Text pages must be 8.5 inches x 11 inches. Exhibits and text in reports or EAs must be reproducible via photocopying without loss of legibility. The EA documents must be reproduced on plain white paper unless otherwise approved in advance in writing by the State.

3. The EA must use quality maps and exhibits and must incorporate by reference and summarized background data and technical analyses to support the concise discussions of the alternatives and their impacts.

B. Minimum Deliverables: (Additional deliverables to be identified in a work authorization based on work assigned.)

1. Draft EA

2. Revised Draft EA

3. Draft EA for Public Hearing

4. Final EA with FONSI

120.3. ~~*(Environmental Impact Statement (EIS) Content and Format.)*~~ Omitted

120.4. ~~*(Environmental Re-evaluation Form.)*~~ Omitted

120.5. Environmental Technical Analyses and Documentation.

A. Definition of technical analyses and documentation for environmental services.

In general, technical analyses and documentation for environmental services might include a report, checklist, form, or analysis detailing resource-specific studies identified during the process of gathering data to make an environmental decision.

The State may determine what technical reports and documentation are necessary for any given project. The Engineer shall prepare all technical reports and documentation for the State with sufficient detail and clarity to support environmental determinations. All technical reports must be compliant with TxDOT's Environmental Compliance Toolkits, documentation requirements, and templates. The environmental document must reference the technical reports.

Environmental technical reports and documentation must include appropriate NEPA or federal regulatory language in addition to the purpose and methodology used in delivering the service. Technical reports and forms must use templates and documentation standards as applicable and include sufficient information to determine the significance of impacts.

B. Minimum Deliverables:

1. Draft technical analyses and documentation

2. Final technical analyses documentation

C. The exact environmental technical analyses and documentation must be determined at the work authorization level, but can include:

1. Section 4(f) Evaluations

   The Engineer shall provide Section 4(f) Evaluations. The Section 4(f) Evaluation must conform to the appropriate TxDOT Section 4(f) checklist for exceptions, de minimus, and programmatic evaluations. For individual Section 4(f) Evaluations, the format and outline must be approved by the State beforehand. All Section 4(f) Evaluations must meet the requirements set forth in TxDOT's Environmental Compliance Toolkits. The 4(f) Section of the environmental document states the reason a Section 4(f) evaluation is being completed. The 4(f) Section of the environmental document discusses the presence of all Section 4(f) properties located in the project area.

2. Section 6(f) Evaluation

   The Engineer shall determine if Land and Water Conservation Fund Act funds were used for the Section 4(f) property in accordance with the regulatory requirements and TPWD guidelines and document.

3. Environmental Public Involvement (23 CFR §771.111)

   The Engineer shall provide public involvement activities, which might include:

   a. Developing a plan for public involvement activities, public involvement plan. The plan must specify all activities to be performed and alternatives to be discussed during public involvement activities. Public involvement activities must be carried out in compliance with TxDOT protocols. The plan must also discuss outreach strategies for both the general public and targeted strategies for environmental justice and limited English proficiency populations

   b. Compiling, maintaining, and updating a mailing list of people, agencies, and organizations interested in the transportation activity.

   c. Making all arrangements for public meetings and hearings, including the site of the meetings, mailing and publishing notices, preparation of exhibits, provision for taping or transcription of proceedings, security, and any other arrangements as directed by the State. The Engineer shall not hold public meetings or hearings in the absence of State and County personnel.

   d. Submitting all legal notices to the State and County for review no less than six weeks prior to publication

   e. Arranging a meeting with the State and County to review all exhibits and other materials to be used prior to public meetings or hearings.

   f. Obtaining the State's approval for all legal notices, exhibits, and other materials

   g. Providing personnel to staff meetings and hearings; including, people to perform registration, make presentations, and answer questions. Staffing levels of personnel to be provided must be identified in the work authorization.

   h. Developing and submitting to the State and County a meeting or hearing documentation packet

   i. Developing and sending acknowledgement or response letters to commenters at public meetings or hearings. The Engineer shall not distribute acknowledgement or response letters without prior approval by the State and County.

   j. Developing, publishing, and distributing a newsletter on the transportation activity, including compiling and maintaining a mailing list. The Engineer shall not distribute the newsletter without prior approval by the State and County.

k. Submitting to the State and County a request for development and maintenance of a website to disseminate information on the transportation activity and to gather comments from the public.

l. Providing materials and information regarding the transportation activity to the State to be posted on the State-developed website.

m. Ensuring the website conforms to state law, Texas Department of Information Resources requirements, TxDOT policies and procedures, and TxDOT Brand Guidelines.

4. Community Impacts Analysis

The Engineer shall provide community impact analyses. Community impacts includes environmental justice, limited English proficiency, and other issues as addressed in TxDOT environmental guidance. The Engineer shall perform community impact assessments in accordance with TxDOT protocols. Community impact analyses might include:

a. Community Impacts Assessment Technical Report Form; or

b. Community Technical Report. The report must follow guidance provided in TxDOT's Community Impacts Assessment Toolkit. The assessment may include:

(1) Identification of environmental justice communities within the study area;

(2) A community profile;

(3) A displacement analysis;

(4) An access and travel pattern analysis;

(5) A community cohesion analysis;

(6) Determination if the project would have disproportionately high and adverse impacts on environmental justice communities. All impacts identified in the Community Impact Assessment and other relevant studies (i.e. noise analysis) must be considered to determine if the impacts disproportionately affect environmental justice communities;

(7) Identification of possible mitigation measures to avoid or minimize any adverse impacts to the environmental justice population within the project area;

(8) Summary of public involvement process including methods used to accommodate persons with limited English proficiency; and

(9) Identification of possible mitigation measures including those to avoid and minimize any adverse impacts to the environmental justice population within the project area.

5. ~~*(Induced Growth Impact Analysis and Cumulative Impacts Analysis)*~~ Omitted

6. Air Quality Studies

The Engineer shall prepare all required technical reports and the air quality section of all environmental documents in accordance with the current version of the TxDOT *Environmental Handbook for Air Quality* and Air Quality Toolkit. The State may determine what technical reports and documentation are required for any given project. The required technical reports and documentation might include:

a. Transportation Conformity Report Form and applicable coordination

b. Hot-Spot Analysis Technical Report and applicable coordination,

c. ~~*(Carbon Monoxide Traffic Air Quality Analysis technical report,)*~~ Omitted

d. Qualitative mobile source air toxics (MSAT) analysis,

e. Quantitative MSAT technical report and conference call,

f. Congestion management process analysis,

g. Applicable disclosure statements in the environmental document as prescribed in the TxDOT Guidance for Preparing Air Quality Statements,

h. ~~*(Air quality cumulative and induced growth impacts analysis as specified above in paragraph 120.5, C, 5-Induced Growth Impact Analysis and Cumulative Impacts Analysis of this Attachment and included in the environmental document, and)*~~ *Omitted*

i. Response to public comments received on air quality issues.

7. Noise Analysis Technical Reporting

The Engineer shall prepare all necessary noise analyses and technical reporting.

a. Noise Analysis Technical Reporting Requirements. At the work authorization level, the noise analysis technical reporting might include:

(1) Computer modeling of existing and predicted noise levels;

(2) Field measurements of existing noise levels and validation of existing model;

(3) Determining predicted noise impact contours for undeveloped property;

(4) Barrier analysis for impacted receivers.

b. Noise Analysis General Requirements.

(1) The Engineer shall use TxDOT's .DGN file coordinate system for all traffic noise modeling, so that all design files and traffic noise modeling software coordinate systems are the same.

(2) The Engineer shall provide TxDOT with all .DXF files used for the traffic noise model.

(3) The Engineer shall review all proposed noise barrier locations as part of the traffic noise modeling process.

(4) The Engineer shall not begin identification of noise sensitive land uses unless TxDOT's Environmental Affairs Division's Historical Studies Branch (ENV-Historical Studies) has approved a Project Coordination Request (PCR).

8. Water Resources Analysis and Documentation

The Engineer shall provide environmental documentation, conduct field surveys, and provide analysis of water resources for compliance with state and federal regulations as described in the *Environmental Guide: Volume 2 Activity Instructions*, http://ftp.dot.state.tx.us/pub/txdot-info/env/toolkit/060-06-gui.pdf, and the associated forms, templates, and guidance found in the Water Resources section of the Natural Resources Toolkit, https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/natural-resources.html. The applicable water resource studies must be determined at the work authorization level. In the case

that field surveys are required, then the Engineer shall contact TxDOT's Environmental Affairs Division's Natural Resource Management Section (ENV-NRM) for clearance prior to starting fieldwork. ENV-NRM will verify that approved methods and appropriately permitted and experienced staff will be used.

At the request of the State, the Engineer shall provide the following water analysis:

a. Surface Water Analysis Form, including analysis of:
   (1) Section 404 of the Clean Water Act
   (2) Section 303(d) of the Clean Water Act
   (3) General Bridge Act/Section 9 of the Rivers and Harbors Act
   (4) Section 10 of the Rivers and Harbors Act
   (5) Section 401 of the Clean Water Act
   (6) Executive Order 11990, Protection of Wetlands

b. ~~*(TCEQ Edwards Aquifer Rules Analysis):*~~ Omitted

c. ~~*(International Boundary Water Commission (IBWC) approval*~~) Omitted

d. ~~*(Coastal Barrier Resources Act (CBRA) analysis*~~) Omitted

e. ~~*(National Wild and Scenic Rivers Act (NWSRA) analysis*~~) Omitted

f. ~~*(Texas Coastal Management Program (TCMP) analysis)*~~ Omitted

g. WOTUS Delineation report prepared in accordance with ENV's *Documentation Standard for Waters of the U.S. Delineation Report* using ENV's Template: Waters of the U.S. Delineation Report including all supporting forms and exhibits.

h. Section 404/10 Impacts Table prepared in accordance with TxDOT ENV's *Section 404/10 Impacts Table and Instructions – Preparing a Section 404/10 Impacts Table*

i. Section 404/10/9 Permitting Package, including:
   (1) USACE PCN Permitting Application prepared in accordance with TxDOT ENV's Documentation Standard for PCN

j. For all WOTUS surveys, the Engineer shall:
   (1) Provide the results of the land survey in electronic DGN file format to be incorporated into the schematic and plans. GIS and KMZ files of the land survey must also be provided.
   (2) Determine the acres of permanent and temporary impacts and linear feet of impacts at each WOTUS and provide figures of the WOTUS and associated impacts overlaying the schematic and plan sheets.

9. Biological/Natural Resources Management Analysis and Documentation

The Engineer shall provide environmental documentation, conduct field surveys, and provide analysis of biological natural resources for compliance with state and federal regulations as described in the TxDOT *Environmental Guide: Volume 2 Activity Instructions*, http://ftp.dot.state.tx.us/pub/txdot-info/env/toolkit/060-06-gui.pdf, and the associated forms, templates, and guidance found in the Natural Resources Toolkit, https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/natural-resources.html. The applicable natural resource studies must be determined at the work authorization level. In the case that field surveys are required, then the Engineer must

contact ENV-NRM for clearance prior to starting work. ENV-NRM will verify that approved methods and appropriately permitted and experienced staff will be used. At the request of the State, the Engineer shall provide the following biological/natural resource analysis:

a. Species Analysis Form, including:

   (1) Species Analysis Spreadsheet, which can include a habitat analysis for the entire project area, field surveys for protected species, and presence/absence surveys.

   (2) Documentation of Texas Parks and Wildlife Department Best Management Practices Form, , which can include early coordination or administrative coordination with TPWD.

   (3) Bald and Golden Eagle Protection Act (BGEPA) analysis and coordination assistance.

b. Farmland Protection Policy Act (FPPA) analysis

c. ~~*(Marine Mammal Protection Act (MPPA) analysis)*~~ Omitted

d. ~~*(Essential fish habitat (EFH) analysis)*~~ Omitted

e. Preparation of USFWS/National Marine Fisheries Service (NMFS) species consultation, including section 7 informal and formal consultation for USFWS/NMFS

f. *(~~For all projects within a USFWS Designated Karst Zone or Critical Habitat~~*) Omitted

10. Initial Site Assessment (ISA) with Hazardous Materials Project Impact Evaluation Report

    The Engineer shall provide an ISA with Hazardous Materials Project Impact Evaluation Report for the limits of the proposed project in accordance with Statement of Work for Hazardous Materials Processes related to NEPA in the TxDOT Hazardous Materials Management Toolkit (http://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/haz-mat.html).

11. Archeological Documentation Services

    The Engineer shall provide archeological studies and documentation. All archeological studies must be sufficient to satisfy the current TxDOT Archeological Sites and Cemeteries Toolkit. An archeological background study must be performed prior to field work. If the Engineer was provided with a background study by the State, a new background study is not required.

    The Engineer shall provide archeological resource identification, evaluation, and documentation services. In compliance with TxDOT's Environmental Compliance Toolkits, the Engineer shall provide the following archeological services/deliverables:

    a. Archeological background study

    b. Archeological permit acquisition

    c. Archeological intensive survey

    An archeological survey (reconnaissance or intensive) must be sufficient to satisfy state and federal regulations. The applicable archeological survey must be determined at the work authorization level. The Engineer shall contact TxDOT's Environmental Affairs

Division's Archeological Studies Branch (ENV-ARCH) for approval prior to starting field and survey work. ENV-ARCH will verify that approved methods and appropriately permitted and experienced staff will be used.

12. Historic Resource Identification, Evaluation, and Documentation Services

    The Engineer shall provide historic resource identification, evaluation, and documentation services. In compliance with TxDOT's Environmental Compliance Toolkits, the Engineer shall provide the following historic resource services/deliverables:

    a. Historic Resources PCR,

    b. Historic Resources Research Design, and

    c. Historic Resource Survey Report, including windshield, reconnaissance, or intensive level documentation.

    All services, except the historic resource PCR, must have prior approval by TxDOT's Environmental Affairs Division's Historical Studies Branch (ENV-HIST) to be performed. The historic resource PCR must be accepted by ENV-HIST prior to survey field work.

13. Floodplain Impacts

    The Engineer shall determine whether the transportation activity has the potential to affect floodplains. The Engineer shall document Trinity River Corridor Development Certificate Regulatory Zone requirements (Dallas and Fort Worth Districts), and IBWC requirements (transportation activity within the floodplain of the Rio Grande) if the project is within the area covered by these regulations. Studies for floodplain impacts must fulfill the requirements of Executive Order 11988 and 23 CFR 650, Subpart A. Documentation must:

    a. Briefly describe the watershed characteristics of the study area in terms of land uses and changes in land use that may affect stream discharge.

    b. Briefly describe the streams in the study area, including evidence of stream migration, down cutting, or aggradations.

    c. Identify the presence and nature (e.g., zone A, zone AE, zone AE with floodway) of any FEMA mapped floodplains; including the panel number.

    d. Indicate the existence of any significant development associated with the mapped area and identify the jurisdiction responsible for the floodplain.

    e. Identify the locations where an alternative might encroach on the base (100-year) floodplain (encroachments), where an alternative might support incompatible floodplain development, and the potential impacts of encroachments and floodplain development. This identification must be included in the text and on a map.

    f. Include a list of all jurisdictions having control over floodplains for each alternative.

    g. Where an encroachment or support of incompatible floodplain development results in impacts, provide more detailed information on the location, impacts, and appropriate mitigation measures. In addition, if any alternative (1) results in a floodplain encroachment or supports incompatible floodplain development having significant impacts, or (2) requires a commitment to a particular structure size or type, the report must include an evaluation and discussion of practicable alternatives to the structure or to the significant encroachment. The report must include exhibits that display the alternatives, the base floodplains and, where applicable, the regulatory floodplains.

h. For each alternative encroaching on a designated or regulatory floodplain, provide a preliminary indication of whether the encroachment is consistent with or requires a revision to the regulatory floodplain. If the preferred alternative encroaches on a regulatory floodplain, the report must discuss the consistency of the action with the regulatory floodplain. In addition, the report must document coordination with FEMA and local or state agencies with jurisdiction indicating that a revision is acceptable or that a revision is not required.

i. If the preferred alternative includes a floodplain encroachment having significant impacts, the report must include a finding that it is the only practicable alternative as required by 23 CFR 650, Subpart A. The finding must refer to Executive Order 11988 and 23 CFR 650, Subpart A. In such cases the report must document compliance with the Executive Order 11988 requirements and must be supported by the following information:

(1) The reasons why the proposed action must be located in the floodplain;

(2) The alternatives considered and why they were not practicable; and

(3) A statement indicating whether the action conforms to applicable state or local floodplain protection standards.

14. Stormwater Permits (Section 402 of the Clean Water Act)

The Engineer shall:

a. Describe the need to use the TPDES General Permit, TX 150000. The text must describe how the project will comply with the terms of the TPDES, including the Stormwater Pollution Prevention Plan; and

b. Describe the need for Municipal Separate Storm Sewer System (MS4) notification. List MS4 participating municipalities.

FUNCTION CODE 130 (130) – RIGHT-OF-WAY – SURVEY

RIGHT-OF-WAY SURVEY DATA

For Function Codes 130 and 150, the term Surveyor means the firm (prime provider or subprovider) that is providing the surveying services shown in this scope.

The Engineer shall ensure that the following general standards for survey work are followed for Function Codes 130 and 150:

Unless otherwise indicated, any reference in this attachment to a manual, specification, policy, rule or regulation, or law means the version in effect at the time the work is performed. TxDOT manuals are available at: http://onlinemanuals.txdot.gov/manuals/.

All surveys must meet or exceed all applicable requirements and standards provided by: (1) Professional Land Surveying Practices Act, (2) General Rules of Procedures and Practices promulgated by the Texas Board of Professional Engineers and Land Surveyors (TBPELS), and (3) *TxDOT Survey Manual*. The Surveyor shall perform all work in an organized and professional manner. All surveys are subject to the approval of the State/ County.

The Surveyor shall use the *TxDOT ROW Preliminary Procedures for Authority to Proceed Manual* and *TxDOT Survey Manual* as the basis for the format and preparation of all right of way (ROW) documents produced, including ROW maps, written parcel descriptions, parcel plats, and other ROW work products, unless otherwise specified by the State.

Unless otherwise directed by the State/County , the Surveyor shall use (1) 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, as the basis for all horizontal coordinates derived and (2) the datum adjustment currently in use by TxDOT.

Project or surface coordinates must be calculated by applying a combined adjustment factor (CAF) to State Plane Coordinate values. If provided by the State, the Surveyor shall use a project specific CAF.

Elevations must be based on the North American Vertical Datum 88 (NAVD88), unless otherwise specified by the State.

All work using the Global Positioning System (GPS), whether primary control surveys or other, must meet or exceed the requirements provided by the *TxDOT Survey Manual* 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 attachment or in a work authorization, the work must meet or exceed the order of accuracy specified in the publication listed in this paragraph.

All conventional horizontal and vertical control surveys must meet or exceed the order of accuracy specified in the *TxDOT Survey Manual* unless specified otherwise in the contract.

All boundary determination surveys, whether for ROW acquisition, ROW re-establishment, or other boundary needs, must meet or exceed the accuracy specified in the *TxDOT Survey Manual* unless specified otherwise in the contract.

The State/Countye may authorize the Surveyor to use an Unmanned Aircraft System (UAS) to perform services under this contract. The use of UAS is regulated by the Federal Aviation Administration (FAA). All UAS operators must comply with Federal Aviation Administration (FAA) regulations and the *TxDOT Unmanned Aircraft System (UAS) Flight Operations and User's Manual*.

The survey data must be fully compatible with the State/County's computer system and with programs in use by the State at the time of the submission, without further modification or conversion. The current programs used by TxDOT are: Microsoft Word, Bentley MicroStation, Bentley OpenRoads civil design system, Bentley GEOPAK Survey, Excel, and ESRI ArcGIS. Data collection programs must be compatible with the current import formats allowed by GEOPAK Survey and be attributed with current feature codes. These programs may be replaced at the discretion of the State/County

Drawing sizes are defined, based on American National Standards Institute (ANSI) standard paper sizes, as follows: A-size means 8.5 inches by 11.0 inches, B-size means 11.0 inches by 17.0 inches, C-size means 17.0 inches by 22.0 inches, and D-size means 22 inches by 34.0 inches.

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 State/County.

The Surveyor shall perform quality control/quality assurance on all procedures, field surveys, data, and products prior to delivery to the State/County. The State/County may also require the Surveyor to review the survey work performed by others. If, at any time, during the course of reviewing a submittal of any item it becomes apparent to the State/County that the submittal contains a substantial number of errors, omissions, and inconsistencies, the State/County may cease its review and return the submittal to the Surveyor immediately for appropriate corrective action. 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 construction specifications, design specifications, or as specified by the State/County:

130.1. Right-Of-Way Surveys (15.1.1).
This includes the performance of surveys to establish land boundaries, preparation of parcel descriptions and parcel plats, and the preparation of right-of-way (ROW) maps.

The Surveyor shall prepare:

A. boundary surveys and create Property Descriptions (metes and bounds plus plats);

B. create GIS files for ROWD/ Real Property Asset Map system; and

C. traditional ROW map as requested by a TxDOT district.

The standards and deliverables are detailed in Chapter 4, Section 8 of the *TxDOT ROW Preliminary Procedures for the Authority to Proceed Manual*, and the checklist provided by the State.

130.2. Right-Of-Way Mapping – Traditional ROW Map.
If requested in a work authorization, the Surveyor shall conduct traditional ROW mapping.

Traditional ROW mapping includes ground surveying and preparation of parcel maps, legal descriptions also known as metes and bounds descriptions, and ROW maps.

A. Purpose

The purpose of traditional ROW mapping is:

1. To prepare mapping documents suitable for use in the acquisition of real property and the issuance of a title policy.

2. To prepare a map of a resurvey of existing ROW where it is necessary to update or redefine ROW lines.

B. Definitions

In this attachment, the following definitions shall apply:

1. Abstract Map means a scale drawing prepared from record documents depicting proposed ROW lines, existing ROW lines, easement lines, and private property lines with relevant grantee names, recording data, and recording dates.

2. Closure/Area Calculation Sheet means a computer generated print-out of the area and the perimeter bearings, distances, curve data, and coordinates of an individual parcel of land to be acquired, including the degree of angular and distance mis-closure for each individual parcel.

3. Denial of Access Line means a line that indicates specific location where access to the roadway is denied.

4. Owner means the current title holder of record as determined by the Real Property Records.

5. Parent Tract means a unit or contiguous units of land under single ownership, comprising a single marketable tract of land consistent with the principle of highest and best use.

   A parent tract may be described by a single instrument or several instruments. A single parent tract cannot be severed by a public ROW easement, or separate ownership which destroys unity of use.

6. Parent Tract Inset means a small map to an appropriate scale, of the parent tract perimeter placed upon the ROW map in the proximity of the respective parcel. Parent tract insets are used in cases where the parent tract cannot be shown to the same scale

as the ROW map. Since parent tract insets are used to identify the limits and location of parent tracts, they must include public ROW, utility easements and fee strips, and identifiable water courses which bound the parent tract.

7. Point of Beginning or POB means a corner of the parcel of land to be acquired, located on the proposed ROW line and being the beginning terminus of the first course of the written property description or plat.

8. Point of Commencing or POC means a monumented property corner identifiable in the real property records that is located outside the proposed ROW corridor. For title purposes, the POC must be a monumented back corner of the parent tract. In the event a monumented back corner of the parent tract cannot be recovered, the nearest identifiable monumented property corner located outside the proposed ROW corridor may be used.

9. Preliminary ROW Layout means a scaled drawing depicting proposed ROW lines, existing ROW lines, proposed pavement, access denial lines, the proposed centerline alignment, private property lines, easement lines, visible improvements, visible utilities, and the station and offset from the centerline alignment to each point of curvature (PC), point of tangency (PT), and angle point in the proposed ROW lines and to each PC, PT, and the angle point in the existing ROW lines in areas of no proposed acquisition.

10. Property Description means a document prepared as an exhibit for the conveyance of a property interest and issuance of a title policy, reflecting the results of a boundary survey, and signed and sealed by a registered professional land surveyor (RPLS), attached to an acquisition deed as Exhibit A, and consisting of the following two parts:

    a. Written metes and bounds description delineating the area and the boundary and describing the location of an individual parcel of land unique to all other parcels of land.

    b. Parcel plat, which is an A-size scaled drawing depicting the information recited in the metes and bounds description in 10 a. above, which represents the parcel(s) of land to be acquired.

11. ROW Maps means a series of D-size scaled drawings depicting the results of relevant elements of records research, field work, analysis, computation, and mapping required to determine title, delineate areas and boundaries, and locate and describe utilities and improvements to the extent necessary to appraise the value and negotiate the acquisition of individual parcels of private land for a proposed ROW project.

C. Procedure

All standards, procedures, and equipment used by the Surveyor must be such that, at a minimum, the results of the survey is in compliance with the precision and accuracy requirements set forth by the TBPELS rules.

1. Abstract Map

The Surveyor shall prepare an Abstract Map sufficient to determine the following:

a. All interests of public record held in the land to be acquired.

b. The total record holdings to be acquired from an owner contiguous to a land.

c. All interests in land held in common to be acquired (shopping mall parking lots, subdivision reserves, etc.)

d. All improvements proposed by other agencies that might have a bearing on project development.

e. All called monuments, bearings, and distances in recorded information.

2. ROW Map

The Surveyor shall field locate items such as: property corners, existing ROW markers, improvements, and visible utilities. The Surveyor shall verify and update the planimetric file as directed by the State/County.

Using the State's standard title, index, and plan sheets, the Surveyor shall prepare a ROW map for each proposed ROW project. A ROW map must include a title sheet, an index sheet, a survey control index sheet, a horizontal control data sheet, and sufficient plan sheets to cover the proposed project. If requested by the State/County , the Engineer shall prepare additional sheets.

By mutual agreement between the TBPELS and the State, ROW maps need not be signed and sealed by a RPLS.

Plan sheets must include the following:

a. Proposed ROW lines. Proposed ROW lines must be labeled with appropriate bearings, distances, and curve data. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.

b. Existing ROW lines. Existing ROW lines must be labeled with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.

c. Proposed project baseline alignment. The proposed project baseline alignment must be labeled with appropriate bearings, distances, and curve data. Curve data must include the station of the curve, point of intersection (PI), radius, delta angle, arc length, tangent length, long chord bearing and distance, and the northing (N) and easting (E) coordinates of the curve PI. All alignment PCs, PTs, and even 500 foot stations must be labeled with its station value.

d. Proposed paving lines. Proposed paving lines combined with relevant existing paving lines must be shown to the extent necessary to compile a complete picture of proposed traffic movements. Proposed paving on the final map submitted to the County/State must be shaded with a dot pattern or highlighted by some other means acceptable to the County/State.

e. Denial of Access lines. Denial of Access lines must be drawn to clearly indicate areas where access is to be denied and where access is to be permitted.

f. Private property lines. Private property lines must be delineated with appropriate bearings, distances, and curve data to the extent necessary to describe the individual parcels of land to be acquired. Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.

g. League lines and survey lines. League lines and survey lines must be shown and identified by name and abstract number.

h. County lines and city limit lines. County lines and city limit lines must be located and identified by name.

i. North arrow. A north arrow must be shown on each sheet, in the upper right corner of the sheet.

j. Monuments. Monumentation must be shown with a description of material and size and if the monument is found or set.

k. PC, PT, and angle points. Station and offset must be shown for each PC, PT, and angle point in the proposed ROW lines. Stations and offsets must be shown with respect to the proposed centerline alignment.

l. Intersecting and adjoining public ROW. Intersecting and adjoining public ROW must be shown and identified by name, ROW width, and recording data.

m. Railroads. Railroads must be shown and identified by name, ROW width, and recording data.

n. Utility corridors. Utility corridors must be identified as to easement or fee.

o. Easements and fee strips. Easements and fee strips must be shown and identified by width, owner, and recording data.

p. Set-back lines. Set-back lines (e.g., building lines) must be shown and identified.

q. Improvements. Visible improvements located within the proposed ROW corridor or within 50 feet of a proposed ROW line must be shown and identified.

r. Structures

(1) Structures must be identified as commercial or residential, by number of stories, and as to construction material type (e.g., brick, wood frame).

(2) Structures that are severed by a proposed ROW line must be dimensioned to the extent necessary to completely delineate the severed parts.

(3) Parking areas, billboards, and other on-premise signs that are severed by a proposed ROW line must be dimensioned to the extent necessary to delineate that portion of the parking area, billboard, or sign that is located within the proposed ROW corridor.

(4) For a structure outside of, but within ten feet of, the proposed ROW line, the distance of the structure to the proposed line must be shown. If the location of the structure is determined using a TxDOT supplied planimetric map, any structure within three feet of the proposed ROW line must be verified by field survey.

s. Utilities. Visible utilities located within the proposed ROW corridor or within 50 feet of a proposed ROW line must be shown and identified.

t. Underground fuel storage tanks. Visible location of vents and filler caps of underground fuel storage tanks situated within the proposed ROW corridor or within 50 feet of the corridor must be determined and shown.

u. Points of commencing and points of beginning. POCs and POBs must be shown and labeled. POBs must be shown with their respective N and E surface coordinates. As an exception, a POC will not be required in the case of a total taking without a remainder.

v. Parcels. Each parcel of land to be acquired must be identified by a parcel number, which must appear in the ownership tabulation and on the ROW map in the proximity of the respective parcel. If the Surveyor is unfamiliar with the criteria used by the County/State to assign parcel numbers, the Surveyor shall seek the assistance of the County/State at the time the Abstract Map is complete.

w. Ownership tabulation. An ownership tabulation must be shown that includes the parcel number, existing area of the parent tract, lots and blocks constituting the parent tract when applicable, owner’s name, type of conveyance, film code, county

clerk's file number, taking area, and remaining area of the parent tract located left or right of the centerline alignment or both. The Surveyor shall provide several blank lines in the tabulation block to facilitate future map additions.

x. Parent tract inset. A parent tract inset must be shown for each parent tract that cannot be shown to scale on the ROW map. When parent tract insets are used, the point of commencing with the appropriate bearing and distance to the point of beginning may be shown on the parent tract inset.

y. Data sources. A note must be included on the title sheet and each map sheet stating the source of bearings, coordinates, and datum used. The note must also include the National Geodetic Survey (NGS) or other basis monument(s) name or identification number, Texas Coordinate System Zone information, epoch information, grid or surface values and the combined adjustment factor or surface adjustment factor.

z. Notes. Appropriate notes must be included on the title sheet and each map sheet stating the following:

(1) Month (or months) and year of the abstracting upon which the map is based.

(2) Month (or months) and year the field surveys were conducted upon which the map is based.

(3) Month and year the map was completed by the Surveyor.

aa. ROW CSJ number. The ROW CSJ number, if available, must be shown on each ROW map sheet.

bb. Tick marks. The Surveyor shall place four tick marks, one in each quadrant of the map sheet, showing the latitude and longitude (Lat/Long) in decimal degrees and the surface coordinate of each mark. The tick marks may be placed on the match lines of each map sheet, if convenient. A foot note must also be placed on the sheet defining the tick marks as Lat/Long in decimal degrees.

3. Property Descriptions

The Surveyor shall prepare a Property Description for each parcel (or tract for surplus property) consisting of two parts: (1) a metes and bounds description of the property and (2) a parcel plat. Each part of a Property Description must be signed and sealed by a RPLS.

a. Metes and bounds description.

The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired. The Surveyor shall use the TxDOT standard format for metes and bounds descriptions. Metes and bounds descriptions must be submitted in Microsoft Word format and must include the following information:

(1) State, county, and original land grant survey within which the proposed parcel of land to be acquired is located.

(2) Reference to unrecorded and recorded subdivisions by name, lot, block, and recording data to the extent applicable.

(3) Reference by name to the grantor and grantee, date and recording data of the most current instrument(s) of conveyance describing the parent tract.

The Surveyor shall use the execution date when citing deed references. The Surveyor shall use the recording or filing dates, making clear which date is being used if the execution date is not explicit on the face of the document.

(4) A POC.

(5) A POB with the N and E surface coordinates.

(6) A series of courses, identified by number and proceeding in a clockwise direction, describing the perimeter of the parcel of land to be acquired, and labeled with appropriate bearings, distances, and curve data.

(7) Curve data must include the radius, delta angle, arc length, and long chord bearing and distance.

(8) Each course must be identified either as a proposed ROW line, an existing ROW line, or a property line of the parent tract. Each property line of the parent tract must be described with an appropriate ad joiner call.

(9) A description of all monumentation set or found, which must include size and material.

(10) A reference to the source of bearings, coordinates, and datum used.

b. Parcel plat

The Surveyor shall prepare a parcel plat for each parcel of land to be acquired using the State's standard format. Parcel plats must include each and every item of information 1) written in the metes and bounds description and 2) shown on the ROW map (if requested by the State) for the individual parcel.

D. Adherence to Standards

For purposes of clarity, consistency, and ease of understanding, the County/State, as an acquiring agency of private property for public use, has adopted standards and formats for a ROW map to facilitate the processes of negotiation, appraisal, relocation assistance, and condemnation. The Surveyor shall adhere to these standards and formats to every extent possible.

E. General Specifications

The following general specifications for 1) description, 2) plat, and 3) ROW mapping apply:

1. Completed ROW maps must be submitted to the County/State in both Bentley MicroStation Design File (DGN) and Adobe Portable Document Format (PDF) format. The maps must have a layout that will produce a D-size final print with a 0.5 inch border.
2. Parcel plats must be submitted to the County/State on A-size bond paper with a 0.5 inch border. Match lines must be used where more than one sheet is required.
3. ROW maps must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior approval by the County/State.
4. The minimum lettering size for ROW maps is 0.1 inches at print scale.
5. Parcel plats must be drawn to a scale of 1 inch = 50 feet. Scales other than 1 inch = 50 feet may be used with prior approval by the County/State. In the case of large parcels which are difficult to fit on a single A-size sheet, the Surveyor shall use multiple A-size sheets with match lines.

6. The minimum size lettering for a parcel plat is 0.3 inches at print scale.
7. Property Descriptions shall be submitted on A-size bond paper.

F. General Requirements

The Surveyor shall adhere to the following general requirements:

1. Copies of instruments of record submitted to the State must be indexed by parcel number.
2. Coordinates appearing on ROW maps, on parcel plats, and in written property descriptions must be surface coordinates based on the Texas State Plane Coordinate System. The appropriate combined adjustment factors (sea level factor multiplied by the scale factor) for each zone of the coordinate system, which have been developed by the State, must be noted.

   To obtain surface coordinates, the Surveyor shall multiply grid coordinates by the appropriate combined adjustment factor for each zone, as provided by the State.
3. Line and curve tables may be used when necessary.
4. The number of centerline alignment stations shown on a single plan sheet shall be limited to allow approximately four inches between match lines and sheet borders for future details and notes.
5. A minimum four-inch by four-inch space must be reserved at the bottom right corner of each map sheet for future revision notes.
6. If requested by the State, the Surveyor shall set a 5/8-inch rebar with a TxDOT aluminum ROW cap (or another appropriate monument) on the proposed ROW line. and replace the rebar at a later date with a TxDOT Type II ROW marker.

   When the 5/8” rebar with a TxDOT rod cap is set for PCs, PTs, PIs, and 1500 foot stations, the double asterisk symbol (**) must be shown on the map sheets and written into and shown in the Property Description and must be accompanied by the following note:

   **The monument described and set may be replaced with the State’s Type II ROW marker upon the completion of the construction project, under the supervision of a RPLS, either employed or retained by the State.

   When new ROW lines intersect boundary lines of properties creating new boundary corners in the new ROW line, the Surveyor shall place a 5/8-inch rebar with the State’s 2-inch aluminum property corner rod cap.

G. GIS Submission Requirements and Standards

All ROW mapping project work authorizations are subject to the standards and required ArcGIS deliverables detailed in Chapter 4, Section 8 of the *TxDOT ROW Preliminary Procedures for the Authority to Proceed Manual*.

H. Electronic ROW Map Standards

The primary purpose of this section is to provide instructions on the graphics standards, file management structure, and naming conventions, for ROW mapping electronic deliverables submitted to the TxDOT Right of Way Division by surveying services providers, as part of the ROW package.

The Surveyor shall adhere to the following requirements for electronic map submittals:

1. Bentley MicroStation

All graphic files for map sheets and parcel plats must be native Bentley MicroStation DGN files created using Bentley OpenRoads civil design system with TxDOT's current seed files, resource files, workspace environment, and settings.

2. Level Library Files

   The Surveyor shall use the TxDOT's current MicroStation level library files for ROW mapping. The files contain all the predefined levels that are typically needed for ROW mapping and include levels for existing utilities.

3. Separate DGN Files for Each Map Sheet

   The Surveyor shall provide one DGN file for each map sheet. Each file must be spatially registered to the project coordinate system.

   The sheet file naming convention is "ROW CSJ_Sheet Number.dgn((e.g., 212104065_S01.dgn).

   In the example above, the first nine numbers "212104065" is the ROW CSJ number for the project and "S01" is the sheet number, beginning with number 1 as the cover sheet.

4. Naming convention for the Master Design File or Master ROW Files and Map Sheet.

   The recommended naming prefix for design files is MDF (for master design file). Therefore, the prefix must be different for the ROW files because the location of the existing and proposed ROW in the design files from the schematic will change to some degree after an on-the-ground survey is made for a ROW map. Therefore, the prefix might be MRF for master ROW file.

   The Surveyor shall provide the corrected Master ROW Files to the design engineer to be used in the final plans, specifications, and estimate (PS&E) so that all features of construction and the relocation of utilities will be correctly placed in relation to the highway ROW and the ROW of cross streets or roadways.

   The master ROW file naming convention is: "MRF ROW CSJ_Logical Name.dgn", with examples as follows:

   MRF212104065_Schematic90.dgn (for schematic layout 90% submittal)

   MRF212104065_Schematic100.dgn (for schematic layout 100% submittal)

   MRF212104065_SchemApprov.dgn (for final approved [State & FHWA] schematic)

   MRF212104065_PSEDesign.dgn (for final PS&E design)

   MRF212104065_ExROW.dgn (for existing ROW determined by RPLS)

   MRF212104065_PropROW.dgn (for proposed ROW of final design)

   MRF212104065_DeedPlot.dgn (for deed record)

   MRF212104065_Planimetric.dgn (for aerial mapping topography)

   MRF212104065_ROWTopo.dgn (for improvements data collection)

   MRF212104065_DesignTopo.dgn (for design level data collection topography)

   MRF212104065_ExUtil.dgn (for existing utilities)

   All sheet files with a plan view must have the MRF referenced to allow more than one sheet file to be worked on at the same time.

5. File Structure of Master and Reference DGN Files

   If possible, the file structure should not contain subfolders.

6. Lines Weights, Line Styles, Colors, Text Size, Text Fonts, Scale, and Annotations

   Legibility is the primary concern when choosing the scale, line weights and text size. Sheets must be legible at full scale sheet size (i.e., D-size drawing) and when reduced to half scale sheet size (B-size drawing size). It is not sufficient that originals or first generation plots are legible, reproductions (copies) must retain legibility.

   The normal scales for a full-sized sheet (i.e., D-size) is 1 inch = 50 feet (urban) and 1 inch = 100 feet (rural). For a half-sized sheets (i.e., B-size) the scale is 1 inch = 100 feet (urban) and 1 inch = 200 feet (rural).

   The standard cell library is: TxdotSurv_04.cel or current State cell files; The standard font is Leroy. The standard State color table is: V256COLR.ctb or Txgpk.ctb.

   The Surveyor shall use the TxDOT's current GEOPAK Survey SMD file that sets up new feature codes in SMD file for alignment chains, parcel chains and survey chains that can be drawn by GEOPAK Survey from the GPK file with the correct line styles, colors and weights to the designated levels loaded into the DGN by the TxDOT's current level library files.

   The Surveyor shall use MicroStation Packager for the submission of electronic deliverables, which captures any non-State standard files (e.g., rsc, cel, text) that were used in the map that look and plot differently in the TxDOT's MicroStation workspace.

7. Text and Line Color considerations

   Text and line colors must be legible when using background imagery.

8. Required Data in the GEOPAK ROW GPK File

   Alignments, chains of proposed and existing ROW lines, parent tracts and taking parcels, and all other points collected in the field (start with schematic or design GPK file) are required.

   If the design GPK file is too detailed for ROW use, the Engineer shall create input files for the information needed for the design GPK file to load into the ROW GPK file.

9. Surface Coordinate and the ROW GIS Geo-Database

   Surface adjustment factors and basis of datum must be well documented in the electronic deliverables "file structure/deliverables read me" file.

10. Requirements for Electronic Deliverables

    a. Native MicroStation DGN files (reference files, sheets files, and parcel plats files);

    b. GEOPAK Survey GPK files;

    c. Separate comma delimited point files (ASCII file) in the following coordinate systems: Surface or Projected Coordinates, Grid Coordinates (Texas Coordinate System of 1983 in U.S. Survey feet) and Geographic Coordinates (WGS-84 in decimal degrees). The file will have the following format: point number, northing or latitude, easting or longitude, elevation, feature code, and point description. File naming convention is: ROWCSJ_Type of Coordinates.csv (e.g., 212101065_Surface.csv, 212101065_Grid.csv, and 212101065_WGS84.csv);

    d. PDF files created in MicroStation of map sheets (both D-size and B-size sheets), one set in black and white and another set in color if there is orthoimagery for the background;

e. PDF files and Microsoft Word documents of signed and sealed Property Descriptions and Surveyor's Reports;

f. Raw and processed GPS files including adjustment reports.

I. ROW Mapping Tasks to be Completed

The Surveyor shall perform the following tasks:

1. Abstracting

The Surveyor shall obtain copies of all existing ownership documents for the parent tracts along with all subdivision plats and recorded documents defining existing easements within, along or intersecting the existing ROW, and prepare an Abstract Map.

2. Field Surveys

The Surveyor shall locate and set additional horizontal and vertical control points, as necessary, at the maximum spacing distance of 1,500 feet; field locate property corners, existing ROW markers, improvements, and visible utilities; verify and update the planimetric file; and as directed by the County/State, perform the following:

a. Obtain right-of-entry to survey on private property and prepare a spreadsheet of the information.

b. Locate existing horizontal and vertical control and verify the control information, locate property corners, and update the planimetric information with any missing visible improvements or visible utilities.

The Surveyor shall base all field work and calculations on the current controls and datum provided by the State.

3. Property Description

a. The Surveyor shall prepare a Property Description(s) for each parcel or tract in the form of a preliminary and a final deliverable(s). Each part of a Property Description shall be signed and sealed by an RPLS. The Surveyor shall prepare preliminary Property Description(s)- for review by the County/State.

Metes and bounds descriptions

The Surveyor shall prepare a metes and bounds description for each parcel of land to be acquired. The Surveyor shall follow the standard formats for metes and bounds descriptions that TxDOT has developed. If requested by the Surveyor, the State will provide copies of the standard formats for metes and bounds descriptions for all purposes of the work authorizations.

Parcel plats

The Surveyor shall prepare a parcel plat for each parcel of land to be acquired. The Engineer shall follow the standard formats for parcel plats that the State has developed. If requested by the Engineer, the State will provide copies of the standard formats. Parcel plats must include all items of information shown on the ROW map that concerns the individual parcel.

b. The Surveyor shall prepare final deliverables.

The Surveyor shall set appropriate monuments on the proposed ROW lines at intersecting property lines, and at all points of curvature (PC), points of tangency

(PT), angle points, intersecting ROW lines of side streets, and at 1,500 foot stations.

The Surveyor shall set appropriate monuments on the existing ROW lines in areas of no acquisition at all PCs, PTs, angle points, and 1,500 foot stations, and as directed by the County/State.

The Surveyor shall set appropriate monuments at intersecting property lines with the new ROW lines.

The Surveyor shall prepare the final ROW (ArcGIS) database template “ROW Parcels Edits” populated with the final parcels, final alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by the State.

The Surveyor shall prepare final, signed, sealed, and dated Property Descriptions.

4. Traditional ROW Map

   The Surveyor shall prepare a traditional ROW map for the specific work location consisting of the existing and proposed ROW lines.

   The Surveyor shall work closely with adjoining surveyors to incorporate all relevant information.

   The Surveyor shall provide the following:

   a. The Surveyor shall prepare a preliminary ROW map for review purposes.

   b. The Surveyor shall prepare an initial ROW map for review purposes.

   c. The Surveyor shall prepare a final ROW map.

5. The Surveyor shall prepare a ROW project cover sheet using the Microsoft Word document template. The ROW project cover sheet must contain the highway, project limits, county, RCSJ, CCSJ, length of project, equations and exceptions, begin and end project information, datum statement, utility table, and signature lines for acquisition.

6. Quality Assurance and Quality Control (QA/QC)

   The Surveyor shall conduct a QA/QC review and prepare a check list for each task performed.

   The Surveyor shall prepare a surveyor’s report regarding their survey procedures, findings, and decisions made.

J. ROW Mapping Deliverables

The Surveyor shall provide the following:

1. Scanned copies of the ownership documents and one D-size paper copy of the Abstract Map and the associated MicroStation graphics files for review purposes.

2. Field Survey Data

   a. A spreadsheet of the property owners and right-of-entry information.

   b. Scanned copies of the field notes, control data sheets, and a graphics file of all field survey data.

3. Property Description Submittals

   a. Preliminary Property Description Submittals

One paper copy of the preliminary Property Description(s) for review purposes marked “Preliminary – Not to be used for recording purposes”, and an electronic copy of each Property Description in PDF format.

The ROW (ArcGIS) database template “ROW Parcels Edits” populated with the preliminary parcels, alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by TxDOT.

b. Final Property Description Submittals

Two paper sets of the final Property Description(s) showing the metes and bounds descriptions and parcel plats, signed and sealed by a RPLS, and the associated electronic files in PDF and Word formats.

Bentley MicroStation parcel plat graphics files and master reference files (MRF).

The ROW (ArcGIS) database template “ROW Parcels Edits” populated with the final parcels, final alignment, and project control points in ArcGIS 10.6.1 format or the current version in use by the State.

4. ROW Map Submittals

a. Preliminary ROW Map Submittals

Two D-size paper copies and one B-size half-scale paper copy of the preliminary ROW map with the note “Preliminary – Not to be used for recording purposes”, and the associated MicroStation graphics files.

b. Initial ROW Map Submittals

One D-size paper copy of the initial ROW map with the note “Preliminary – Not to be used for recording purposes”, and the associated Bentley MicroStation and GIS graphics files.

c. Final R.O.W. Map Submittals

Two D-size paper copies and one B-size half-scale paper copy of the final ROW map, and the associated Bentley MicroStation and GIS graphics files.

PDFs of the final ROW map.

5. Two A-size paper copies of the ROW project cover sheet and the associated Word document file.

6. QA/QC

Documentation stating that the appropriate monuments were set on the proposed ROW lines at intersecting property lines, PC’s, PT’s, angle points, ROW lines of side streets and at 1,500 foot stations.

Documentation stating that the appropriate monuments were set on the existing ROW lines in areas of no acquisition at intersecting property lines, PC’s, PT’s, angle points, ROW lines of side streets and at 1,500 foot stations.

A copy of TxDOT’s ROW map checklist signed by the surveyor, if required.

A copy of the surveyor’s report signed by the surveyor.

130.3. State Land Surveying (15.5.1) - Omitted

130.4. ROW Acquisition Services. (Identified as Additional Services and not authorized under the initial Agreement. Services may be initiated only upon the Client's written request and execution of a contract amendment, at the currently agreed-upon rates.)

A. Title Commitments

The Engineer shall coordinate with a local title company (TBD) to provide all title commitments and conduct a closing for each impacted property via easement or by deed. Title commitments to be billed at rates specified in Attachment B directly to the County. The cost of each title policy to be billed directly to the County.

The Engineer shall have direct contact with the title company to obtain original and updated Title Commitments along with other forms and certified copies of the instrument(s) of conveyance necessary when requesting the parcel payment through the County. The Engineer shall secure acceptable title insurance for parcels acquired. Any exceptions identified to be approved by the County/State. .

B. Initial Appraisal Services

The appraisal team shall provide completed appraisal reports for up to 70 parcels, easements and associated temporary construction easements (TCE's) along FM 917 impacted by the roadway improvement project. The appraiser to follow all necessary protocols and regulations required under the URA and USPAP rules to ensure all deliverables meet the appropriate standard of care. For an initial appraisal assignment, the appraiser must prepare an appraisal report for each parcel and easement to be acquired utilizing a County/State approved report format. If none is selected, the appraiser will default to applicable TxDOT forms. If directed by the County/State, the appraiser shall provide appraisal updates as required for condemnation proceedings.

- Appraisal services to comply with the Uniform Standards of Professional Appraisal Practice ("USPAP") and Texas Law.
- Appraisals to be provided by a qualified MAI appraiser approved by the client.
- One appraisal to be submitted per property owner.
- The appraisals to be submitted within 45 days of notice to proceed.

C. Appraisal Review Services

The appraisal review team to provide appraisal review services for up to 70 parcels, easements and associated temporary construction easements (TCE's) along FM 917 impacted by the infrastructure and roadway improvement project. The review appraiser to review all appraisal reports for each parcel to determine consistency of values, supporting documentation related to the conclusion reached, compliance with TxDOT policies and procedures and the USPAP.

- Appraisal reviews to be provided by a qualified MAI appraiser approved by the client. Other certifications may be acceptable based on experience.
- The appraisal reviews to be completed with 72 hours of receiving the initial appraisal.

D. Prep & Testimony (Appraisal Services)

When necessary, the appraisers may be called upon to provide preparation and testimony for a Special Commissioners Hearing. This task includes preparing for and testifying as expert witnesses. This scope may include an appraisal update.

The appraisal review team shall provide appraisal review services for up to 70 parcels, easements and associated temporary construction easements (TCE's) along FM 917 impacted by the infrastructure and roadway improvement project.

- To be provided in support of a special commissioners hearing upon request.

E. ROW Acquisition Support

The Engineer shall engage property owners on behalf of the County/State during negotiations of the subject parcels in support of the infrastructure and roadway improvement project along 70 parcels, easements and associated temporary construction easements (TCE's) along FM 917. Our agents will attempt to meet with all the property owners face-to-face whenever possible. Additional communications to be completed via telephone, email or other form of electronic communication. The Engineer shall draft all conveyance documents necessary with the approval of the County/State, and if requested the County/State's legal counsel. Each Initial Offer Letter packet (IOL) to include a formal offer letter, Landowner's Bill of Rights per Senate Bill 18, title commitment, appraisal, legal survey (if available), memorandum of agreement, and draft conveyance document (deed, easement, possession and use agreement, other instruments of conveyance as appropriate). All mailings to be sent by Certified Mail-Return Receipt Requested (CMRRR).

The Engineer shall offer the opportunity for all parcel owners to execute a Possession and Use Agreement (PUA) for Transportation Purposes. We recommend that the property owner receive up to 90% of the approved appraisal value in exchange for this conveyance document. The PUA to be explained in detail including the benefit of moving the project forward without compromising their right to submit a counteroffer. The property owner will be provided an opportunity to submit a counteroffer into the administrative settlement process. If approved, the parcel will be acquired by Deed or Easement.

- Review and analyze preliminary title commitments for potential title problems and propose methods to cure title deficiencies. This includes analysis of access easements and other exclusive and non-exclusive easements.
- Review final appraisals for accuracy prior to making offers for each parcel.
- Property owners to be provided 30 days to review the County's offer
- After 30 days, the property owner will receive a second and Final Offer Letter packet (with same attachments), after 14 days and with the County's approval, The Engineer will move forward with condemnation.
- Communications to be documented for each parcel and per contact.
- Documentation to be approved by the Client and the County/State prior to use.
- Copies of all original documentation to be provided to the County/State as generated. All close out files to be provided to the County/State in electronic format once the parcel has been acquired (legal conveyance of property interests).
- Participate in closing services in conjunction with the title company. When practical a The Engineer agent will attend closings in person. In the event of closing by mail, title work will be reviewed prior to the closing by mail.

Lastly, The Engineer shall utilize a SharePoint site that is customized to this project, tracking the details of the acquisition process; including Negotiations, Relocation, Property Disposal and when necessary, Condemnation.

Components of the SharePoint site include but are not limited to:

- Project summary information (dashboard), including project status and updates
- Parcel information, including data points assigned to each parcel, such as owner information and parcel timeline information (such as IOL and FOL delivery, offer acceptance, closing, etc.)
- Reporting features for every service provided, including title, appraisal, negotiation, relocation, condemnation, and disposal of property status (including comments sections for each)
- Record of communication (journal entries) feature

FUNCTION CODE 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES

RIGHT-OF-WAY UTILITY ACTIVITIES

135.1. Utility Engineering Investigation.

Utility engineering investigation includes utility investigations subsurface and above ground prepared in accordance with ASCE/CI Standard 38-02

[(http://www.fhwa.dot.gov/programadmin/asce.cfm)] and Utility Quality Levels.

SUE scope includes an initial Quality Level D (QLD) SUE investigation through the corridor identifying and mapping existing utilities shown on available record drawings. Deliverable will include a composite MicroStation drawing. After a review of the initial SUE deliverable, a Quality Level B (QLB) SUE investigation will be completed within specific limits as directed by the client. QLB deliverable will include an updated MicroStation drawing within the QLB limits. Quality Level A SUE test hole locations will be provided after review of the QLB deliverable. Scope includes two test holes per pipeline and water transmission line crossing for a total of up to 40 test holes.

A. Utility Quality Levels (QL)

Utility Quality Levels are defined in cumulative order (least to greatest) as follows:

1. Quality Level D - Quality level value assigned to a utility segment or utility feature after a review and compilation of data sources such as existing records, oral recollections, locations marked by DIGTESS, and data repositories.
2. Quality Level C - Quality level value assigned to a utility segment or utility feature after surveying aboveground (i.e., visible) utility features and using professional judgement to correlate the surveyed locations of these features with those from existing utility records.
3. Quality Level B - Designate: Quality level value assigned to a utility segment or subsurface utility feature whose existence and position is based upon appropriate surface geophysical methods combined with professional judgment and whose location is tied to the project survey datum. Horizontal accuracy of Designated Utilities is 18” (including survey tolerances) unless otherwise indicated for a specific segment of the deliverable. Quality Level B incorporates quality levels C and D information. A composite plot is created.
4. Quality Level A – Quality level value assigned to a portion (x, y, and z geometry) of a point of a subsurface utility feature that is directly exposed, measured, and whose location and dimensions are tied to the project survey datum. Other measurable, observable, and judged utility attributes are also recorded (per District Best Practices). The utility location must be tied to the project survey datum with an accuracy of 0.1 feet (30-mm) vertical and to 0.2 feet (60-mm) horizontal. As test holes may be requested up

front or during the project, test holes done prior to completion of QL D, C, or B deliverables must be symbolized on the QL B deliverable with a call out indicating test holes number. This is in addition to and not in lieu of the test hole.

B. Utility Investigations Methodology

1. Utility Investigation Quality Level D

The Engineer shall:

a. Perform records research from all available resources. Sources include: Texas811, Railroad Commission of Texas (Texas RRC), verbal recollection, as-built information from plans, plats, permits and any other applicable information provided by the utility owners or other stakeholders.

b. Document utility owners and contact information.

c. Create a utility drawing of information gathered.

2. Utility Investigation Quality Level C

The Engineer shall:

a. In combination with existing Quality Level D information, utilize surveyed above-ground utility features and professional judgement to upgrade Quality Level D information to Quality Level C. For those utilities unable to be upgraded, retain as Quality Level D.

b. Overhead utilities information must be gathered and depicted. Sag elevations of lowest utility must be documented at road crossings, per best practices document.

c. Storm and sanitary sewer information must be gathered from Level D and upgraded to Level C as possible, unless otherwise directed by the state.

d. Mapping of underground vaults may be requested by the state.

e. Create composite utility drawing of information gathered.

3. Designate (Quality Level B)

Designate means to indicate the horizontal location of underground utilities by the application and interpretation of appropriate non-destructive surface geophysical techniques and reference to established survey control. Designating (Quality Level B) services are inclusive of Quality Levels C and D.

The Engineer must:

a. As requested by the County/State, compile "as-built" information from plans, plats and other location data as provided by the utility owners.

b. Coordinate with utility owner when utility owner's policy is to designate their own facilities at no cost for preliminary survey purposes. The Engineer shall examine utility owner's work to ensure accuracy and completeness.

c. Designate, record, and mark the horizontal location of the existing utility facilities using non-destructive surface geophysical techniques.

d. Using both active and passive scans to attempt to locate any additional utilities, including unrecorded and abandoned storm and sanitary sewer facilities, at the direction of the state, may be investigated using additional methods such as rodding that would then classify them as Quality Level B. A non-water based pink

paint or pink pin flags must be used on all surface markings of underground utilities.

e. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. The Engineer must prepare and deliver to County/State a color-coded composite utility facility plan with utility owner names, quality levels, line sizes and subsurface utility locate (test hole) locations. The Engineer and County/State acknowledge that the line sizes of designated utility facilities detailed on the deliverable will be from the best available records and that an actual line size is normally determined from a test hole vacuum excavation. A note must be placed on the designate deliverable only that states "lines sizes are from best available records". All above-ground utility feature locations must be included in the deliverable to the County/State. This information must be provided in the latest version of OpenRoads civil design system used by the County/State. The Engineer shall deliver the electronic file on USB flash drive, as requested by the County/State. A hard copy is required and must be signed, sealed, and dated by the registered engineer overseeing the utility engineering investigation. When requested by the County/State, the designated utility information must be over laid on the County/State's design plans.

f. Determine and inform the County/State of the approximate electronic utility depths at critical locations as determined by the County/State. The limits of this additional information should be determined prior to the commencement of work. This depth indication is understood by both the Engineer and the County/State to be approximate only and is not intended to be used preparing the ROW and construction plans.

g. Provide a monthly summary, with weekly updates, of work completed and in process with adequate detail to verify compliance with agreed work schedule.

h. Close-out permits as required.

i. Clearly identify all utilities that were discovered from Quality Levels C and D investigation but cannot be depicted in Quality Level B standards. These utilities must have a unique line style and symbology in the designate (Quality Level B) deliverable.

j. Comply with all applicable TxDOT policy and procedural manuals.

4. Subsurface Utility Locate (Test Hole) Service (Quality Level A)

Locate is the process used to obtain precise horizontal and vertical position, material type, condition, size, and other data that may be obtainable about the utility facility and its surrounding environment through exposure by non-destructive excavation techniques that ensures the integrity of the utility facility. Subsurface Utility Locate (Test Hole) Services (Quality Level A) are inclusive of Quality Levels B, C, and D.

The Engineer must:

a. Review requested test hole locations and advise the County/State in the development of an appropriate locate (test hole) work plan relative to the existing utility infrastructure and proposed highway design elements.

b. Coordinate with utility owner inspectors as may be required by law or utility owner policy.

c. Place Texas 811 ticket 48 hours prior to excavation.

d. Neatly cut and remove existing pavement material, such that the cut does not exceed 0.10 square meters (1.076 square feet) unless unusual circumstances exist.

e. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Engineer:

   (1) Elevation of top of utility tied to the datum of the furnished plan.

   (2) Minimum of two benchmarks utilized. Elevations must be within an accuracy of 15mm (.591 inches) of utilized benchmarks.

   (3) Elevation of existing grade over utility at test hole location.

   (4) Horizontal location referenced to project coordinate datum.

   (5) Outside diameter of pipe or width of duct banks and configuration of non-encased multi-conduit systems.

   (6) Utility facility materials.

   (7) Utility facility condition.

   (8) Pavement thickness and type.

   (9) Coating/wrapping information and condition.

   (10) Unusual circumstances or field conditions.

f. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection, and other protective coverings and features. Water excavation can only be utilized with written approval from the appropriate TxDOT district office.

g. Be responsible for any damage to the utility during the locating process. In the event of damage, the Engineer must stop work, notify the appropriate utility facility owner, the County/State, and appropriate regulatory agencies. The regulatory agencies include: the Railroad Commission of Texas and the Texas Commission on Environmental Quality. The Engineer shall not resume work until the utility facility owner has determined the corrective action to be taken. The Engineer is liable for all costs involved in the repair or replacement of the utility facility.

h. Back fill all excavations with appropriate material, compact backfill by appropriate mechanical means, and restore pavement and surface material. The Engineer is responsible for the integrity of the backfill and surface restoration for a period of three years.

i. Furnish and install a permanent above-ground marker (as specified by the State, directly above center line of the utility facility.

j. Provide complete restoration of work site and landscape to equal or better condition than before excavation. If a work site and landscape is not appropriately restored, the Engineer shall return to correct the condition at no extra charge to the County/State.

k. Plot utility location position information to scale and provide a comprehensive utility plan signed and sealed by the responsible professional engineer. This information must be provided in the latest version of MicroStation and be fully compatible with the OpenRoads civil design system used by the State. The electronic file will be delivered on USB flash drive as requested. When requested by the County/State, the locate information must be over laid on the County/State's design plans.

l. Return plans, profiles, and test hole data sheets to the County/State. If requested, conduct a review of the findings with the County/State.

m. Close-out permits as required.

FUNCTION CODE 145 (145, 164) – MANAGING CONTRACTED/DONATED PE

PROJECT MANAGEMENT AND ADMINISTRATION

145.1. Contract Management and Administration.

The Engineer shall:

A. Act as an agent for the County when specified in a work authorization.

B. Produce a complete and acceptable deliverable for each environmental service performed for environmental documentation.

C. Incorporate environmental data into identification of alternatives.

D. Notify the County of its schedule, in advance, for all field activities.

E. Notify the County/State as soon as practical, by phone and in writing, if performance of environmental services discloses the presence or likely presence of significant impacts (in accordance with 40 Code of Federal Regulations (CFR) 1500-1508). Inform the County/State of the basis for concluding there are significant impacts and the basis for concluding that the impacts might require mitigation.

F. Notify the County/State as soon as practical, by phone and in writing, if performance of environmental services results in identification of impacts or a level of controversy that might elevate the transportation activity's status from a categorical exclusion or environmental assessment. The County/State will reassess the appropriate level of documentation.

FUNCTION CODE 160 (150) – ROADWAY DESIGN

DESIGN SURVEYS AND CONSTRUCTION SURVEYS

150.1. Design And Construction Survey.

A. Definitions

1. Design Survey (15.2.1)

   A design survey gathers data in support of transportation systems design. A design survey includes the research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3-dimensional) mapping of a project site (e.g. locating existing ROW, surveying cross-sections or developing data to create cross-sections and digital terrain models, horizontal and vertical location of utilities and improvements, collecting details of bridges and other structures, review of ROW maps, establishing control points).

2. Construction Survey (15.2.2) – Omit

B. Technical Requirements for Design and Construction Surveys

1. Design surveys and construction surveys must be performed under the supervision of a RPLS currently registered with the TBPELS.

2. All control must meet the of accuracy requirements of the County/State.

   The Surveyor shall comply with the standards of accuracy for control traverses provided in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.

3. Short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:

   a. Short traverses must begin and end on horizontal and vertical ground control as described above.

   b. Required horizontal accuracy (unless otherwise stated):

      (1) Bridges and other roadway structures: less than 0.1 feet.

      (2) Utilities and improvements: less than 0.2 feet.

      (3) Cross-sections and profiles: less than 1 foot.

      (4) Bore holes: less than 3 feet.

   c. Required vertical accuracy:

      (1) Bridges and other roadway structures: less than 0.02 feet.

      (2) Utilities and improvements: less than 0.1 feet.

      (3) Cross-sections and profiles: less than 0.2 feet.

      (4) Bore holes: less than 0.5 feet.

C. Data Requirements for Design and Construction Surveys

1. Planimetric DGN files must be fully compatible with the version of the MicroStation graphics program currently used by TxDOT without further modification or conversion.

2. Electronically collected and processed field survey data files must be fully compatible with TxDOT's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by TxDOT.

3. Digital terrain models (DTMs) must be fully compatible with the version of the Bentley OpenRoads civil design system currently used by TxDOT without further modification or conversion. All DTM must be fully edited to provide a complete digital terrain model with all necessary break lines.

150.2. Design Survey (15.2.1).

A. Tasks to be Completed – Design Surveys

If requested by the County, the Surveyor shall perform one or more Design Surveys. Design Survey tasks include the following:

1. *(Collect data to create cross sections and DTMs)* Omit

2. Locate existing utilities.

3. Locate existing improvements.

4. Provide details of existing bridge structures, including bridge limits, bents, columns, retaining walls, and natural ground elevations.

5. Locate details of existing drainage features including culverts, manholes, retention and detention ponds, flowlines, and associated features.

6. Omit

7. Review existing ROW maps and locate the existing ROW.

    a. Review existing ROW maps

    The Surveyor shall review ROW maps prepared by others for completeness using the current schematic and the checklist provided by the TxDOT district.

    b. Locate existing ROW

    The Surveyor shall resurvey the existing ROW where it is necessary to update or redefine ROW lines. All standard surveying procedures must be adhered to including record research, recovering existing monuments, and replacing monuments as appropriate. The Surveyor shall prepare an abstract map, preliminary map, final map, GIS graphics file, and a Surveyor's report. The final map must also include a monument table showing the property monuments that were found and set, and certified by the Surveyor. The Surveyor shall prepare maps either in standard map sheets format or roll map format as requested by the TxDOT district.

8. Locate boreholes.

9. Perform hydrographic surveys, according to details requested by the TxDOT district.

10. Verify the condition and usefulness of existing control points including verification of the values. Establish additional control as needed. Tie to other control points in the project vicinity including points established by the National Geodetic Survey (NGS), the Federal Emergency Management Agency (FEMA), and any other local entities as directed by the County/State.

11. Update existing control information and prepare new survey control data sheets, as directed by the County/State to be included in the construction plan set as described below:

    a. The Surveyor shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheet(s) to be inserted into the plan set.

    b. The survey control index sheet provides an overview of the primary project control and must include:

        (1) An unscaled vicinity map showing the general location of the project in relation to nearby towns or other significant cultural features.

        (2) A scaled project map showing the extents of the project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant cultural features necessary to provide a general location of the primary control.

        (3) A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.

        (4) Map annotation including a graphic scale bar, north arrow, and standard TxDOT title block. The title block shall contain a section for the district name, county, highway, and CSJ number. The title block shall also contain a section for a Texas registered engineer to sign, seal and date the sheet to include the following statement, "The survey control information has been accepted and incorporated into this PS&E." The required format of the survey control index sheet can be downloaded from the TxDOT website.

(5) In the title block under the heading “Notes”, identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The Surveyor shall include a note stating that the coordinates are State Plane and a notation specifying either grid or surface adjusted coordinates.

c. Omit

150.3. Construction Survey (15.2.2) Omit

150.4. Deliverables for Design and Construction Surveys.

The Surveyor shall prepare and submit the deliverables as specified in individual work authorizations for design surveys and construction surveys. The deliverables might be any combination of the following:

A. Digital terrain models (DTM) and the triangular irregular network (TIN) files in a format acceptable by the County/State.

B. Maps, plans, or sketches prepared by the Surveyor showing the results of field surveys.

C. Computer printouts or other tabulations summarizing the results of field surveys.

D. Digital files or media acceptable by the County/State containing field survey data (ASCII data files).

E. Maps, plats, plans, sketches, or other documents acquired from utility companies, private corporations, or other public agencies, the contents of which are relevant to the survey.

F. Field survey notes, as electronic and hard copies.

G. TxDOT Form 2462 for each primary and secondary control point. This form must be submitted in printed format on letter (i.e., A-size) and submitted electronically in PDF format.

H. A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.

I. All GEOPAK files and OpenRoad files.

J. Survey reports in a format requested by the County/State.

150.5. Mapping (15.3).

Mapping includes the geospatial data collection and mapping by means of aerial photogrammetry, terrestrial (close range) photogrammetry, terrestrial LiDAR, mobile LiDAR, and other remote sensing technologies.

A. Purpose

The purpose of mapping is to provide map and related data to support transportation projects including project design and other uses.

B. Definitions

1. Aerial Photogrammetry (15.3.1) – Aerial Photogrammetry means the collection and processing of photography acquired from an airborne platform to develop DGN and DTM files.

2. Terrestrial Photogrammetry (15.1.2) – Terrestrial Photogrammetry means the collection and processing of photography acquired at or near ground level to develop DGN and DTM files.

3. Airborne LiDAR (15.3.4) – Airborne LiDAR means laser scanning equipment mounted on a helicopter or other airborne platform to collect data to process for DGN and DTM files.
4. Terrestrial LiDAR (15.3.3) – Terrestrial LiDAR means laser scanning equipment operated from a stationary base on the earth's surface to collect data to process for DGN and DTM files.
5. Mobile LiDAR (15.3.4) – Mobile LiDAR means laser scanning equipment mounted on a moving vehicle operating on the earth's surface to collect data to process for DGN and DTM files.
6. UAS means Unmanned Aircraft Systems (e.g., drones).
7. UAS LiDAR means laser scanning equipment on an unmanned aerial vehicle (e.g., drones) to collect data to process for DGN and DTM files.

150.6. Aerial Mapping Using a Metric Camera and Manned Aircraft. Omit

150.7. Aerial Mapping Using a Non-Metric Camera and Unmanned Aircraft System (UAS). Omit

150.8. Field Check Survey for Aerial Mapping Using Manned Aircraft or UAS.

Field checking of aerial mapping projects involves surveying a statistical sampling of discreet features shown on the map. It is a collaborative effort between the Photogrammetrist or Mapping Scientist-UAS and the Surveyor to validate that the map derived photogrammetrically meets the required accuracy standard. Because not all features shown on the map are good candidates for checking, it is necessary for the Photogrammetrist or Mapping Scientist to select discreet and unambiguous points that can then be surveyed and effectively evaluated between both the photogrammetric and field survey data sets.

The Photogrammetrist or Mapping scientist-UAS will provide a minimum of twenty 20 check point locations randomly distributed throughout the mapping area. The descriptions of the points must be sufficient to eliminate any ambiguity of the exact point to be surveyed.

A. Purpose

The purpose of a field check for aerial mapping is to validate that map accuracy requirements have been met.

B. Definitions

In 150.8, the following definition applies:

Check Point – A randomly distributed point captured in the DGN mapping file selected by the Photogrammetrist or Mapping Scientist and provided to the Surveyor to be used to verify that the mapping accuracy requirement has been met.

C. Procedure to Field Check Survey for Aerial Mapping Using Manned Aircraft or UAS

1. The Photogrammetrist or Mapping Scientist-UAS must prepare and provide the Surveyor a listing of points to be validated in the field. Sufficient detail and description of the point is required to eliminate the possibility of a misidentification of the point during the field survey. A minimum of 20 horizontal and 20 vertical check points are required. Any single point can be used for both horizontal and vertical data as appropriate. A check point must not be part of the analytical triangulation least-squares adjustment.
2. The Surveyor shall locate and measure the provided validation points on the ground using equipment and methodologies with a higher level of accuracy than the map being checked.

3. Using the results from the field survey, the Surveyor shall prepare a map accuracy assessment report detailing the results of the field check. The report must include the number of check points used, the field surveying technique used for validation, and the results of the root mean square error (RMSE) and 95% confidence computations.
4. Using the validation data provided by the Surveyor, the Photogrammetrist or Mapping Scientist must prepare a final report detailing the results of the map check. The report must include both the following Statements of Accuracy, if applicable:
    a. “This map was compiled to meet the ASPRS Standard for Class 1 map accuracy.”
    b. “This map was checked and found to conform to the ASPRS Standard for Class 1 map accuracy.”

D. Technical Requirements

The Surveyor shall:

1. Determine the northing, easting, and elevations of the check points provided by the Photogrammetrist or Mapping Scientist using a surveying method of greater accuracy than that used to produce the map being checked.
2. Perform RMSE and 95% confidence computations on the check points using the following methodology:

    For each horizontal coordinate, the Surveyor shall subtract the Northing value of the map coordinate from the Northing value derived from the field survey and square the resulting value. The Surveyor shall perform the same operation for the Easting coordinate and then add the two squared values. The Surveyor shall repeat the procedure for each check point. The Surveyor shall add up all of the resulting squared values and divide the sum by the number of check points used (i.e., average the squares). Finally, the Surveyor shall calculate the square root of the average. The Surveyor shall report the resulting value as the RMSE value for the horizontal check point analysis. The Surveyor shall multiply the final RMSE value by 1.7308 and shall report the resulting value as the 95% confidence value for the horizontal check point analysis.

    For each vertical coordinate, the Surveyor shall subtract the elevation value of the map coordinate from the elevation value derived from the field survey and square the resulting value. The Surveyor shall repeat the procedure for each check point. The Surveyor shall add up all of the resulting squared values and divide the sum by the number of check point used (i.e., average the squares). Finally, the Surveyor shall calculate the square root of the average. The Surveyor shall report the resulting value as the RMSE value for the vertical check point analysis. The Surveyor shall multiply the final RMSE value by 1.96 and shall report the resulting values as the 95% confidence for the vertical check point analysis.
3. Provide the results of the RMSE and 95% confidence computations to the Photogrammetrist.

E. Data Requirement

The Surveyor shall deliver the result of the field check as a report in PDF format.

F. Deliverables

The Photogrammetrist or Mapping Scientist must provide a map accuracy assessment report detailing the methodology used and results of the map accuracy assessment.

150.9. Horizontal and Vertical Control for Aerial Mapping.

Placement and survey of horizontal and vertical control for aerial mapping establishes ground control for aerial mapping projects.

A. Purpose

The purpose of an aerial photography control survey is to provide ground control for aerial mapping projects.

B. Definitions

In 150.9, Aerial Photography Control Survey means reconnaissance, field work, analysis, computation, and documentation necessary to provide horizontal and vertical position of specific ground points. The ground control points are used in photogrammetric processing.

C. Procedure for Horizontal and Vertical Control for Aerial Mapping

The Surveyor shall:

1. Prepare and submit for approval an aerial ground control layout in DGN and KML format based on the target positions selected by the Certified Photogrammetrist. The layout must show the location of the proposed primary project control and aerial ground control points.
2. Establish and determine the horizontal and vertical coordinates of the primary project control points and aerial ground control points.
3. Place aerial ground control targets at the point location and maintain the targets until the aerial flight has been completed.

D. Technical Requirements

1. Aerial photography control surveys must be performed under the direct supervision of a RPLS currently registered with the TBPELS.
2. The horizontal and vertical coordinates of the aerial control points must be based on acceptable methods, conducted by the Surveyor, and must meet the standards of accuracy as set forth below:

   Survey Level 3 accuracy, as described in the *TxDOT Survey Manual*, latest edition, or the equivalent level of accuracy described in the *TSPS Manual of Practice for Land Surveying in the State of Texas*.

E. Data Requirement

The Surveyor shall perform post processing of field data, which will be reviewed by the County/State. Data processed by standard calculators, computers, and other business hardware and software normally maintained and used by the Surveyor will be considered acceptable.

F. Deliverables

The Surveyor shall submit the following:

1. A final aerial control point layout in DGN and KML format showing the location of the primary control and target points labeled with their respective alpha-numeric designation.
2. A plot and computer graphics of an B-size index map showing an overall view of the project and the relationship of primary monumentation and control used in the

preparation of the project, signed and sealed by a RPLS, and as directed by the County/State.

3. A plot and computer graphics of a B-size horizontal and vertical control sheet showing the primary survey control monumentation used in the preparation of the project, signed and sealed by a RPLS, and as directed by the County/State.
4. An A-size data sheet for each aerial ground control point, which must include a location sketch, a physical description of the point, surface coordinates, elevation, and datums used.
5. A USB flash drive containing the graphics files and scanned images of the control data sheets.
6. A written statement describing the datum used along with copies of all relevant NGS and data sheets.
7. A written tabulation of all aerial control points with their respective alpha-numeric designations and horizontal and vertical coordinates.

150.10. Mapping Services to be Provided.

The Surveyor shall provide the following mapping services as requested by the County/State:

A. Aerial Photogrammetry

The Surveyor shall prepare planimetric design (DGN), digital terrain model (DTM), and triangulated irregular network (TIN) MicroStation graphics files and orthophotography files covering the specific work location, meeting standards and specifications as required.

B. Terrestrial Photogrammetry – Omit

C. Terrestrial Lidar – Omit

D. Aerial Lidar

The Surveyor shall prepare planimetric design (DGN), digital terrain model (DTM), and triangulated irregular network (TIN) MicroStation graphics files covering the specific work location, meeting standards and specifications as required.

E. Mapping Tasks to be Completed

The Surveyor shall perform the following tasks as requested for each mapping service.

1. Horizontal and Vertical Control for Aerial Mapping
    a. The Surveyor shall prepare and submit an aerial ground control layout showing the proposed aerial ground control points, for approval by the County/State.
    b. The Surveyor shall establish and determine the coordinates of the aerial ground control points.
    c. The Surveyor shall establish and determine the elevations of the aerial control points.
    d. The Surveyor shall place aerial ground control target material at the established points and maintain until the photographs from the flight are approved.
    e. The Surveyor shall prepare, to scale, a survey control index sheet for the aerial control points.
    f. The Surveyor shall be prepared to locate additional points, as determined by the American Society for Photogrammetry and Remote Sensing (ASPRS) certified Photogrammetrist, if any panel points are not visible from the air.

2. Deliverables for Horizontal and Vertical Control for Aerial Mapping

   The Surveyor shall provide the following deliverables:

   a. A final aerial control point layout showing the location of the points and labeled with their respective alpha-numeric designations.

   b. A plot and computer graphics of an B-size index map showing an overall view of the project and the relationship of primary monumentation and control used in the preparation of the project, signed and sealed by a RPLS, and as directed by the County/State.

   c. An A-size data sheet for each aerial ground control point, which must include a location sketch, a physical description of the point, surface coordinates, the elevation, and datums used.

   d. A USB flash drive containing the graphics files and scanned images of the control data sheets.

   e. A written statement describing the datum used along with copies of all relevant NGS and data sheets.

   f. A written tabulation of all aerial control points with their respective alpha-numeric designations, surface coordinates (for center panel points only), and elevations.

3. Prepare Planimetric and DTM Data

   The Surveyor shall perform the following tasks for each requested mapping service:

   a. The Surveyor shall provide low altitude aerial mapping to cover an area 1,200 feet wide centered on the roadway unless otherwise specified, with cross flights as directed by the County/State.

      The Surveyor shall follow all standards and specifications in accordance with established guidelines and recommended or approved by the County/State.

   b. The Surveyor shall prepare planimetric design (DGN), digital terrain model (DTM), and triangulated irregular network (TIN) Bentley MicroStation graphics files and orthophotography files covering the specific work location, meeting standards and specifications as required.

      (1) The Surveyor shall collect supplemental planimetric and DTM survey data.

      (2) The Surveyor shall update aerial 2D and 3D mapping with ground surveys.

      (3) The Surveyor shall maintain the current DGN level structure and legend used by TxDOT.

      (4) The Surveyor shall maintain the current DTM level structure and legend used by TxDOT.

      (5) The Surveyor shall use file features and level structures in compliance with TxDOT's current photogrammetry mapping legend.

      (6) The Surveyor shall locate, and field check random points.

   c. The Surveyor shall conduct quality assurance and quality control (QA/QC) for each task performed and prepare a Surveyor's Report.

4. Deliverables for Planimetric and DTMs

   The Surveyor shall provide the following:

a. Certification that the photographs or LiDAR imagery were taken on the date indicated, signed by the airplane pilot or aerial photographer.

b. The DGN, DTM, and TIN files on a medium and in a format acceptable to the County/State, delivered on USB flash-drive or hard-drive.

(1) Orthophotography (created using the DTM) delivered on USB flash drive, or hard-drive in tiff format (3 banded) with world files.

(2) TxDOT's photogrammetry mapping legend and supplements.

c. A tabulation showing the field-check points.

d. Quality Assurance and Quality Control (QA/QC) and Statement of Map Accuracy.

(1) Statement of map accuracy.

(2) A surveyor's report signed and sealed by an RPLS.

150.11. Horizontal And Vertical Control (15.3.5).

This includes the establishment of horizontal and vertical control for survey projects.

A. Overview of Horizontal and Vertical Control

A horizontal control survey is performed for the purpose of placing geographic coordinates of latitude and longitude on permanent monuments for referencing lower levels of surveys. A projection is used to place the coordinates on a plane of northing and easting values for simplified measurements. Scale and elevation factors are applied to make the distance measurements applicable to the exact location on the working surface and the type of projection chosen is an "equal angle" type.

A vertical control survey is performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as bench marks for lower quality leveling. Spirit leveling is the usual method of carrying elevations across country from "sea level" tidal gauges. However, Global Positioning System (GPS) can be used indirectly but with less accuracy. Height measurements from the ellipsoid (as opposed to the "sea level" geoid) can be determined very accurately with GPS and only GPS. Trigonometric leveling, with a total station, is not acceptable for vertical control work.

B. Definitions

1. BM means bench mark, which is a relatively permanent object whose elevation above or below an adopted datum is known.

2. CORS means continuously operating reference station, which is a network of the highest quality horizontal stations, forming the National Spatial Reference System (NSRS).

3. Control Survey means a survey providing positions (horizontal or vertical) of points to which supplemental surveys are adjusted.

4. Datum means a mathematical model of the earth designed to fit part or all of the geoid.

5. Datum Point Rod or Deep Rod Monument means a monument driven to refusal by a power driver, used for major project control.

6. GPS means the Global Positioning System, which is based on a constellation of 24 satellites orbiting the earth at a very high altitude.

7. Horizontal Control Survey means placing geographic coordinates of latitude and longitude on permanent monuments.

8. Level 1 survey means RRP, CORS or major control densification.
9. Level 2 Survey means primary project control.
10. Level 3 Survey means secondary project control.
11. NGS means National Geodetic Survey
12. RRP means Regional Reference Point, which is a TxDOT Continuously Operating Reference Point.
13. Type II Monument means a disk driven onto a length of 5/8-inch rebar with the hole filled flush with concrete.
14. Vertical Control Surveys means a survey performed for accurately determining the orthometric height (elevation) of permanent monuments to be used as bench marks for lower quality leveling.

C. Procedure for Horizontal and Vertical Control

1. The Surveyor shall establish horizontal and vertical control points, including offsite points. The Surveyor shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, and as directed by the County/State.
2. The Surveyor shall update existing control information and prepare new survey control data sheets, as directed by the County/State, to be included in the construction plan set as described in Item 150.11, D.

D. Technical Requirements for Horizontal and Vertical Control

The Surveyor shall adhere to the following technical requirements.

1. Horizontal and vertical controls must be performed under the supervision of a RPLS currently registered with the TBPELS.
2. Horizontal ground control used for design surveys and construction surveys, furnished to the Surveyor by the State or based on acceptable methods conducted by the Surveyor, must meet the standards of accuracy required by the State.

   The Surveyor shall comply with the standards of accuracy for horizontal control traverses, as described in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.
3. Vertical ground control used for design surveys and construction surveys, furnished to the Surveyor by the State or based on acceptable methods conducted by the Surveyor, must meet the standards of accuracy required by the State.

   The Surveyor shall comply with the standards of accuracy for vertical control traverses, as described in the *TxDOT Survey Manual* or the *TSPS Manual of Practice for Land Surveying in the State of Texas*, as may be applicable.
4. Monuments

   The Surveyor shall install survey monuments for a horizontal and vertical control survey that are reasonably permanent and substantial. The monuments shall be easily identified and afforded reasonable protection against damage and or destruction.

   a. Offsite primary control points whether set by GPS or conventional survey methods must be set in pairs approximately 2000 feet apart outside of the project on side roads. Offsite points must be constructed approximately every 2 miles and set

approximately 6 inches below natural ground and must be inter-visible between each pair of points.

b. Secondary control points must be set approximately 6 inches below ground at a maximum distance of 1,500 feet apart.

5. Side shots or short traverse procedures for total stations used to determine horizontal and vertical locations must meet the following criteria:

   a. Short traverses and instrument setups for side shots must begin and end on horizontal and vertical ground control as described above.

   b. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that horizontal locations relative to the control can be reported within the specification to allow the engineer to accurately create the design to the following limits:

      (1) Bridges and other roadway structures: less than 0.02 feet.

      (2) Utilities and improvements: less than 0.2 feet.

      (3) Cross-sections and profiles: less than 0.2 feet.

      (4) Bore holes: less than 0.5 feet.

   c. Standards, procedures, and equipment (e.g., GPS Equipment, LiDAR, Total Stations) used must be such that vertical locations relative to the control may be reported to within 0.02 feet.

6. The Surveyor shall update existing control information and prepare new survey control data sheets, as directed by the State, to be included in the construction plan set as described below:

   a. The Surveyor shall prepare, sign, seal, and date a survey control index sheet and horizontal and vertical control sheets to be inserted into the plan set.

   b. The Surveyor shall prepare a survey control index sheet that provides an overview of the primary project control and must include:

      (1) An unscaled vicinity map showing the general location of the project in relation to nearby towns or other significant cultural features.

      (2) A scaled project map showing the extents of the project and the location of the primary control points. The map must show street networks, selected street names, control point identification, and significant culture features necessary to provide a general location of the primary control.

      (3) A table containing the primary control point values including the point number, northing, easting, elevation, stationing, and stationing offset values.

      (4) Map annotation including a graphic scale bar, north arrow, and standard TxDOT title block. The title block must contain a section for the district name, county, highway, and CSJ number. The title block must also contain a section for a Texas registered engineer to sign, seal, and date the sheet to include the following statement, “The survey control information has been accepted and incorporated into this PS&E”.

      The Surveyor shall download the required format of the survey control index sheet from the TxDOT website.

(5) In the title block under the heading “Notes”, identification of the horizontal and vertical datum on which the primary control is based with the date of the current adjustment, the surface adjustment factor used, and unit of measure. The surveyor shall include a note stating that the coordinates are State Plane and a notation specifying either grid or surface adjusted coordinates.

E. Data Requirement

The Surveyor shall perform post processing of field data, which will be reviewed by the County/State. Data processed by standard calculators, computers, and other business hardware and software normally maintained and used by the Surveyor will be considered acceptable.

F. Tasks to be Completed

The Surveyor shall perform the following tasks:

1. The Surveyor shall establish horizontal and vertical control points, including offsite points. The Surveyor shall prepare signed survey control data sheets, a survey control index sheet, and a composite layout of the horizontal and vertical controls, and as directed by the County/State.
2. The Surveyor shall set primary offsite control points in pairs, approximately 2 miles apart outside of the project area.
3. The Surveyor shall set secondary control points approximately 6 inches below ground at a maximum distance of 1,500 feet apart.
4. The Surveyor shall establish horizontal and vertical control from the TxDOT Virtual Reference Station (VRS) Network, and as directed by the State.
5. The Surveyor shall tie and tabulate horizontal and vertical control to other control points and datums in the vicinity established by other sources such as the National Geodetic Survey (NGS), the Federal Emergency Management Agency (FEMA), TxDOT VRS Network, and as directed by the State.

G. Deliverables

The Surveyor shall provide the following:

1. A B-size plot and MicroStation graphics files of the index map showing an overall view of the project and the relationship of the primary monuments and control points established for the project, signed and sealed by a registered professional land surveyor (RPLS), and as directed by the County/State.
2. One A-size data sheet for each control point which shall include, but need not be limited to, a location sketch, a physical description of the point, surface coordinates, the elevation, and the datum used.
3. A USB flash-drive containing the graphics files and scanned images of the control data sheets.
4. A written statement describing the datum used, signed and sealed by a RPLS, along with copies of all relevant NGS and TxDOT data sheets.

FUNCTION CODE 160 (163) – ROADWAY DESIGN

MISCELLANEOUS ROADWAY

163.1. Utility Coordination.

A. Utility Base Map

The Engineer shall obtain information on existing utilities from utility owners and shall conduct investigations to identify and evaluate all known existing and proposed public and private utilities. The Engineer shall identify potential conflicts and attempt to minimize the potential adverse utility impacts in the preparation of the schematic design. The Engineer shall prepare a base map depicting the utility locations. The Engineer shall create and maintain a utility conflict matrix along with a utility conflict exhibit through the duration of the contract identifying potential known conflicts. The format of the matrix and exhibit must be consistent with the latest version of the Fort Worth District Utility Conflict Matrix and Utility Conflict Exhibit or other examples provided by the State.

B. Utility Coordination

The Engineer shall assist the County in conducting utility coordination meetings with utility companies, as required, to facilitate utility conflict identification and resolution.

1. The Engineer shall establish contact with all existing utilities within and adjacent to the project limits and set up utility coordination meetings to discuss concepts and options for design and construction. This process must also be extended to utilities that approach the County/State, regarding plans to install facilities within the project limits after the project has been initiated.
2. The Engineer shall establish and conduct workshop meetings, both individually with each utility and with all utilities that incorporate the County/State's project team to review and resolve conflicts.
3. The Engineer shall create agenda and exhibits for all coordination meetings as directed by the County/State.
4. The Engineer shall establish and promote the desired agenda and methodologies for utility construction within the project limits. This shall consist primarily of promoting the construction of utilities as a part of the highway contract.
5. The Engineer shall schedule and conduct a utility kick-off meeting to obtain more information on existing facilities within the project limits. Major utility facilities must be discussed and analyzed to avoid relocation, if possible.
6. The Engineer shall schedule and conduct milestone meetings (or as-needed meetings) with the County/State to coordinate the work effort and resolve problems. The Engineer shall prepare a written report of these meetings. The meetings must include review of the following:
    a. Existing facilities including major facilities to be avoided with the project, if possible
    b. Utility Conflict Matrix
    c. Utility Conflict Exhibit
    d. Long lead items that could potentially impact the schedule during PS&E.

C. Deliverables

1. Utility Conflict Matrix along with Utility Conflict Exhibit. The Utility Conflict Exhibit must be on 11x17 sheets and include callouts to indicate the conflict ID#, utility owner, type of line (water, sewer, high pressure gas, etc.), material (if it is an AC pipe line), and size (if known).
2. Utility Contacts list in excel and pdf format.
3. Utility Summary to indicate major utility facilities or time sensitive items pertaining to utilities that need to be addressed in PS&E.

163.2. Geotechnical Borings and Investigations

A. The Engineer shall determine the location of proposed soil borings for bridge design, embankment settlement analysis, retaining walls, slope stability and along storm drain alignment in accordance with the latest edition of the *TxDOT Geotechnical Manual*. The County/State will review and provide comments for a boring layout submitted by the Engineer showing the general location and depths of the proposed borings. Once the Engineer receives the County/State's review comments, the Engineer shall perform soil borings (field work), soil testing, and prepare the boring logs in accordance with the latest edition of the *TxDOT Geotechnical Manual* and the local TxDOT district's procedures and design guidelines.

B. All geotechnical work must be performed in accordance with the latest version of the *TxDOT Geotechnical Manual*. All testing must be performed in accordance with TxDOT's Test Procedures, which are available at https://www.txdot.gov/business/resources/testing.html. American Society for Testing Materials (ASTM) test procedures may be used only in the absence of the TxDOT procedures. All soil classification must be done in accordance with the Unified Soil Classification System.

C. If applicable, the Engineer shall perform any retaining wall analyses including the settlement analysis. This analysis must include the computation of the factor of safety for bearing capacity, global stability, overturning, and sliding. In addition, the Engineer shall include allowable bearing pressure, passive earth pressure, friction factor, settlement analysis (consolidation report), and lateral earth pressure for the retaining walls.

D. If applicable, the Engineer shall perform soil borings, coring for pavement removal items, piezometric readings, testing and analysis to include slope stability analysis, settlement analysis, and foundation design recommendations along storm drain alignment, retaining walls, overhead sign structures, bridges, embankments, and any temporary soil retaining systems.

E. The Engineer shall provide a signed, sealed, and dated geotechnical report that contains soil boring locations, boring logs, laboratory test results, generalized subsurface conditions, ground water conditions, piezometer data, analyses and recommendations for settlement and slope stability of the earthen embankments, skin friction tables, and design capacity curves including skin friction and point bearing. The skin friction tables and design capacity curves must be present for piling and drilled shaft foundation.

F. If applicable, the Engineer shall perform scour analysis to include grain size distribution curves with D50 value for each soil layer and a D50 grain size for a sample in the stream bed at the upstream face of the bridge in the upper 1-foot of the stream bed.

In addition, the Engineer shall provide a subsurface profile including the following information for each layer:

1. Particle Size Analysis (Tex-110-E) including:
    a. Median Grain Size (D50) and percent clay (percent passing No. 200 sieve)
    b. Soil type based on grain dimensions of cohesionless materials.
2. Liquid Limit (Tex-104-E) as required for clayey soils.
3. Plastic Limit (Tex-105-E) as required for clayey soils.
4. Plasticity Index (Tex-106-E) as required for clayey soils.
5. USCS Soil Classification (Tex-142-E) as required for clayey soils.

G. The Engineer shall sign, seal, and date soil boring sheets to be used in the PS&E package. The preparation of soil boring sheets must be in accordance with a State's District standards.

H. Foundation Studies: The Engineer shall coordinate with the County/State to determine the location of soil borings to be drilled along the retaining wall alignments. The soil borings must extend a minimum of 35 feet below the footing elevation or deeper as soil conditions warrant. Spacing of soil borings shall not exceed 500 feet. The Engineer shall provide a boring layout for the County/State's review and comment.

I. The Engineer shall incorporate soil boring data sheets prepared, signed, sealed, and dated by the geotechnical engineer overseeing the work. The soil boring sheets shall be in accordance with the State's WINCORE software, which is available on the Texas Department of Transportation (TxDOT) website.

J. Pavement Design: If applicable, the Engineer shall incorporate the pavement design developed by the County/State. If the pavement design is not available, the County/State may request the Engineer perform pavement design and submit to County/State for review and approval.

K. Deliverables

1. Preliminary Pavement Design Report
2. Geotechnical Report
3. DGN flies containing drilling log data from Geotechnical analysis.

PSA Contract

Attachment B
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC FM 917 (Seg. 3)- Thomas St. to Egan RR Function Code: Description:			SUBTOTALS	Pape-Dawson (LUMP SUM)	Pape-Dawson UNIT COST SURVEY	Pape-Dawson UNIT COST TRAFFIC	Pape-Dawson UNIT COST ROW	GTX	GTX UNIT COST GEOTECH	GTX UNIT COST MATERIALS	TRG	TRG UNIT COST UTILITY	VRX
FC 102 (110)	FEASIBILITY STUDIES AND SCHEMATIC DESIGN	Total Labor Cost	$3,025,657.68	$3,004,100.00				$12,958.80					$8,598.88
		Other Direct Expenses	$13,700.00	$13,700.00									
		Total Unit Cost	$10,460.00			$10,460.00							
FC 120 (120)	SOCIAL/ECON/ENV STUDIES	Total Labor Cost	$563,772.48	$137,920.00									$425,852.48
		Other Direct Expenses	$91,618.92	$6,885.50									$84,733.42
		Total Unit Cost											
FC 130 (130)	RIGHT-OF-WAY - SURVEY	Total Labor Cost	$406,168.60	$406,168.60									
		Other Direct Expenses	$68,437.60	$68,437.60									
		Total Unit Cost	$100,300.00		$100,300.00								
FC 135 (135)	RIGHT-OF-WAY - UTILITY ACTIVITIES	Total Labor Cost	$6,674.48								$6,674.48		
		Other Direct Expenses	$16,790.00								$16,790.00		
		Total Unit Cost	$485,650.00									$485,650.00	
FC 145 (145, 164)	MANAGING CONTRACTED/DONATED PE	Total Labor Cost	$146,734.68	$131,270.00							$15,464.68		
		Other Direct Expenses											
		Total Unit Cost											
FC 160 (150)	DESIGN SURVEYS AND CONSTRUCTION SURVEYS	Total Labor Cost	$157,480.00	$157,480.00									
		Other Direct Expenses											
		Total Unit Cost	$73,100.00		$73,100.00								
FC 160 (163)	MISCELLANEOUS ROADWAY DESIGN (UTILITY COORDINATION & GEOTECHNICAL INVESTIGATIONS)	Total Labor Cost	$107,570.46	$89,940.00				$17,630.46					
		Other Direct Expenses	$30,500.60					$30,500.60					
		Total Unit Cost	$45,162.10						$27,466.66	$17,695.44			
Work Authorization No. 01 - Grand Totals			**$5,349,777.60**	$4,015,901.70	$173,400.00	$10,460.00		$61,089.86	$27,466.66	$17,695.44	$38,929.16	$485,650.00	$519,184.78
(Firm Totals)				**$4,199,761.70**				**$106,251.96**			**$524,579.16**		**$519,184.78**

Future Work Authorization No. 02 - Grand Totals			
	UC ROW- Prime PD (FC 130.4)	Total Unit Cost	$1,418,200.00

COMPANY	FEE
TOTAL LABOR COST	$4,414,058.38
OTHER DIRECT EXPENSES	$221,047.12
TOTAL UNIT COST	$714,672.10
TOTAL	**$5,349,777.60**

Prime Provider: Pape-Dawson Consulting Engineers, LLC

TASK DESCRIPTION	Project Manager Schein/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) - Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL LABOR HRS & COSTS
	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$160.00	$120.00	$100.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$150.00	$160.00	$120.00	
FC_102 (110) - FEASIBILITY STUDIES																																		
FEASIBILITY STUDIES																																		
110.1. Schematic Design Work Outline.																																		
A. Develop Base Maps	10			20			40			80	40																						190
B. Photometrics and Aerial Mapping	4			8			16			32	16																						76
C. Analyze Existing Conditions	12	6		24		48	24			24																							138
F. Project Management and Coordination																																		
Manage and Coordinate Schematic Design and EA	180		40	80		40																										40	380
G. Data Collection/Field Visit	54			54		108	18																									9	243
H. Roadway Design Criteria	6			6		24	12																										48
I. Preliminary Design Conference	8	2		16		8	8																									4	46
110.2. Schematic Design – General Tasks.																																		
A. ROW Property Base Map	3			6			12			24	12																						57
B. Typical Sections	2	2		8		8				16	16																						52
C. Environmental Constraints (Coordinate with VROA)	6			12		12	12																										42
D. Drainage																																		
Data Collection	1			7			16			6	6	2																				2	46
Develop Drainage Area Maps for Culverts (18)	1			48			58			28	28	10										25											198
Develop Hydrology for Crossing Culvert (18)	1			96			110			48	48	18										48											369
Analyze Existing Conditions using HEC-RAS for Crossing Culverts (18)	1			60			90			60	30	10										30											281
Analyze Proposed Conditions using HEC-RAS for Crossing Culverts (18)	1			60			90			60	30	10										30											281
Hydraulic Impact Analysis for Each Outfall	1			60			80			52	42	20										48											303
Develop interior drainage area maps/flows (18)	1			54			72			25	25	9										30											216
Analyze Proposed Ditches	1			84			80			52	52	19										60											344
Analyze Proposed Storm Drain	1			80			80			52	52	19										60											344
Evaluate Compensatory Excavation	1			5			14			8	8	2										4											42
Preliminary Culvert Layouts (18)	1			108			146			52	52	19										60											432
Prepare Drainage Schematic Layout (Roll Plot)	1			36			48			27	27	9										12											160
Prepare Draft Schematic Drainage Report	1			24			24			24	36	12										9										8	138
Prepare Final Schematic Drainage Report	1			24			24			24	36	12										9										8	138
Preliminary Cost Estimate	1			10			30			6	12																						59
Coordinate with Local Flood Plain Admin and TxDOT	1			10			10			6	6	2										6											41
Individual Drainage Meetings (5)	1			12			18			16												12											59
QC/QA	1		64	16																												3	84
E. ROW Requirements	12			24		24				48	48																						156
F. Construction Sequence	12			48		48																											108
G. Design Exceptions	8			16		48																											72
H. Traffic Data and Projections																																		
Develop Methodology	1				2			2	12	40	5																						62
Develop Maps and Exhibits									5	30	5																						40
Review Historic Data and Planning Map Volumes	1				2			2	5	30																							40
Develop Projections and Volume Diagrams (Interim and Ultimate)	2							4	36	60																							82
Coordinate with Client and Address Comments	2				4			5	10	10																							31
Traffic Projections Methodology Memo	2				4			7	10	30																						3	56
J. Traffic and Operational Analysis																																		
Data Collection					2	2			6	6																							16
Traffic Field Observations and Report					2	2			5	10																							19
Develop Existing Conditions					5	5			20	10																							40
Preliminary Alternatives Screening	1				2	5			5	5																							18
Synchro Analysis - Existing (2025) - (AM & PM)					2	5			16	16																							39
Synchro Analysis - No Build + 2 Alternatives (Base Year) - (AM & PM)					3	6			30	30																							69
Synchro Analysis - No Build + 2 Alternatives (Interim Year) - (AM & PM)					3	6			30	30																							69
Synchro Analysis - No Build + 2 Alternatives (20 Year) - (AM & PM)					3	6			30	30																							69
ICE - Capacity Analysis for Planning of Junctions (CAP-X) - 2 Intersections	1				2	5			8	8																							24
ICE - Safety Performance for Intersection Control Evaluation (SPICE) - 2 Intersections	1				2	5			8	8																							24
ICE Procedure Memo - 2 Intersections	1				2	5			16	16																						2	42
Draft Traffic Operational Analysis Report	2				4	10			20	40		20																				3	99
Final Traffic Operational Analysis Report	2				4	10			10	20		10																				1	57
K. Safety Analysis																																		
Obtain Crash Data for 5 years and Review					1	5			5	10																							21
Safety Evaluation Analysis – Existing Conditions					2	5			12	12																							31
Safety Evaluation Analysis - No Build					1	10			8	16																							35
Safety Evaluation Analysis - Future Conditions - Build (1 Alternative)					2	15			8	16																							41
Draft Safety Analysis Report					2	10			10	20																						3	45
Coordinate with Client and Address Comments					1	2				1																							8
Final Safety Analysis Report					2	5			5	10																						1	25
L. Bicycle and Pedestrian Accommodations	15	5		20		40				40	80																						200
110.3. Conceptual Design Schematics.																																		
Alternative Route Concepts (max 10 concepts)	16		8	32		64	80			160	160																						520
30% Submittal - Conceptual Design Schematic (max 3 alternatives)	32		16	64		128	160			320	320																						1040
110.4. Geometric Design Schematics.																																		
60% Submittal	72		12	144		192	120			180	180																						900
90% Submittal	48		12	96		144	120			240	240																						900
Final Submittal	24		24	60		84	120			240	240																						792
110.5. Cross-Sections	5	5	10	40			200			300	400																						960
110.6. Retaining Walls.																																		
Determine Wall Location and Length	4	4		16		24				48	48																						144
Compute and Tabulate Quantities	2	2		8		8				16	16																						52
110.7. Renderings and Traffic Simulation.																																		
Traffic Simulation	12	6	6	6		24				48																							102
3D Rendering for Public Meetings	8	8		64		128	80			160	160																						608
110.8. Preliminary Construction Sequence.																																		
Sequencing Layouts (60% submittal)	18	4	18	36		36	72			160	108																						472
Sequencing Layouts (90% submittal)	6		24	48							144																						222
Sequencing Layouts (Final submittal)	6		24	48							144																						222
110.9. Preliminary Cost Estimate.																																		
30% Submittal	3		6	3		6	12			87																						3	120
60% Submittal	2		4	2		4	8			58																						2	80
90% Submittal	2		4	2		4	8			58																						2	80
Final Submittal	2		4	2		4	8			58																						2	80
110.10. Engineering Summary Report.	8	4	8	16		40	40			80																						8	204
110.12. Agency Coordination and Public Involvement.																																		
Agency Coordination Meetings (up to 2)	16			16																												4	36
Stakeholder Meetings (up to 2)																																		
Prepare Stakeholder Meeting Exhibits	2			4		16				40	40																						102
Prepare Stakeholder Meeting Presentation	8			20		40																										4	72
Attend Stakeholder Meeting (3 staff)	24			48																												4	76
Affected Property Owner Meetings (up to 70)																																		
Prepare Affected Property Owner Meeting Exhibits	16		8	16		80				80	80																						280
Attend Affected Property Owner Meetings (2 staff)	80			80																												60	260
Public Meeting																																		
Prepare Exhibit Boards (up to 5)	4		1	4		8				20																							37
Prepare Schematic Exhibits	12		6	24		48				75	75																						240
Participate in One Dry Run Meeting (6 staff)	4			8																													12
Attend One Public Meeting (6 staff)	12			24																													36
110.13. Schematic Design Project Deliverables.																																		
110.14. Monthly Progress Meetings with the County (24 meetings)	48			48		48	24																									24	192
HOURS SUB-TOTALS	804	48	398	2177	92	1719	2178	20	311	3877	3142	203										442									80	15545
CONTRACT RATE PER HOUR	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$160.00	$120.00	$100.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$150.00	$160.00	$120.00	
TOTAL LABOR COSTS	$254,790.00	$18,480.00	$82,620.00	$586,170.00	$12,685.00	$343,800.00	$370,260.00	$5,400.00	$62,200.00	$580,650.00	$518,430.00	$27,405.00										$119,610.00										$21,600.00	$3,004,100.00
% DISTRIBUTION OF STAFFING	6%	0%	2%	14%	0%	11%	14%	0%	2%	25%	20%	1%										3%										1%	100%
SUBTOTAL - FC_102 (110) - FEASIBILITY STUDIES																																	**$3,004,100.00**	

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

TASK DESCRIPTION	Project Manager - Schem/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL LABOR HRS. & COSTS
	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
FC 120 (120) - SOCIAL/ECON/ENV STUDIES																																	
SOCIAL, ECONOMIC, AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT																																	
120.5. Environmental Technical Analyses and Documentation.																																	
120.5.11 Archeological Documentation Services																																	
120.5.11.a Archeological Background Study													5	10	20	20	40														2		97
120.5.11.b Archeological Permit Acquisition													5	10	20	20	40														2		97
120.5.11.c Archeological Intensive Survey													5	10	20	40	117	117	117														426
120.5.12 Historic Resource Identification, Evaluation, and Documentation Services																																	
120.5.12.a Historic Resrouces PCR													5	10						20	40										2		77
120.5.12.b Historic Resources Research Design													5							20	40										2		87
120.5.12.c Historic Resources Survey Report													5							60	80												145
HOURS SUB-TOTALS													30	40	80	80	197	117	117	160	160										8		909
CONTRACT RATE PER HOUR	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
TOTAL LABOR COSTS													$7,500.00	$6,400.00	$7,200.00	$8,000.00	$31,520.00	$14,040.00	$11,700.00	$25,600.00	$25,600.00												$986.00	$137,920.00
% DISTRIBUTION OF STAFFING													3%	4%	7%	9%	22%	13%	13%	11%	18%												1%	100%
SUBTOTAL - FC 120 (120) - SOCIAL/ECON/ENV STUDIES																																	**$137,920.00**

TASK DESCRIPTION	Project Manager - Schem/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL LABOR HRS. & COSTS
	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
FC 130 (130) RIGHT-OF-WAY - SURVEY																																	
RIGHT-OF-WAY SURVEY DATA																																	
150.1. Right-Of-Way Surveys (15.1.1).																																30	
Ownership Spreadsheet/ROE Letters (Est. 120 Properties)																							10	12	20	40							112
Record Research and Abstract Map																							20	30	60	120							230
Existing Mapping of ROW lines and Property Boundaries (Existing 60-foot ROW)																							70	30	30	30							160
Parcel Plat and Descriptions (Assume 70 Parcels for 100' ROW) (Assume 2 Plat Sets of each)																							70	300	375	375							1120
150.2. Right-Of-Way Mapping – Traditional ROW Map.																																	
ROW Mapping (Est. 25 Sheets)																							40	60	150	150							400
GIS Geodatabase																							8		10	20							78
Final QA/QC																							55		20	20							95
Final Deliverables																							10		20	20							50
HOURS SUB-TOTALS																							278	432	685	775						30	2240
CONTRACT RATE PER HOUR	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
TOTAL LABOR COSTS																							$72,280.00	$97,200.00	$113,025.00	$116,250.00						$3,600.00	$496,188.00
% DISTRIBUTION OF STAFFING																							12%	16%	31%	36%						1%	100%
SUBTOTAL - FC 130 (130) - RIGHT-OF-WAY - SURVEY																																	**$496,188.00**

TASK DESCRIPTION	Project Manager - Schem/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) - Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL & COSTS
	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
FC 145 (145, 156) MANAGING CONTRACTED/DONATED PE																																	
PROJECT MANAGEMENT AND ADMINISTRATION																																	
145.1. Contract Management and Administration.																																	
Prepare and Update Schedule	8			24																													32
Monthly Progress Reports	18			36																												18	72
Perform QA/QC	80	20	120	40																													260
Perform Contract Management and Administration	40			40																												80	160
HOURS SUB-TOTALS	146	20	120	140																												98	524
CONTRACT RATE PER HOUR	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
TOTAL LABOR COSTS	$41,610.00	$7,700.00	$32,400.00	$37,800.00																												$11,760.00	$131,270.00
% DISTRIBUTION OF STAFFING	28%	4%	23%	27%																												19%	100%
SUBTOTAL - FC 145 (145, 156) MANAGING CONTRACTED/DONATED PE																																	**$131,270.00**

TASK DESCRIPTION	Project Manager Schem/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) - Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL & COSTS
	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
FC 160 (150) – ROADWAY DESIGN																																	
DESIGN SURVEYS AND CONSTRUCTION SURVEYS																																	
150.2. Design Survey (15.2.1)																																	
Drainage Structures (11 Crossing, 120 Driveways)																							8	10	40	80							138
Utilities (visible and aboveground)																							8	10	60	100							178
Signage																							8	10	20	40							78
150.8. Field Check Survey for Aerial Mapping Using Manned Aircraft or UAS.																												5					5
150.9. Horizontal and Vertical Control for Aerial Mapping.																																	
150.10. Mapping Services to be Provided.																							12			30							42
Flight Prep and Planning																												20			16		36
Aerial Acquisition																												30					30
Pre-Processing – Point Cloud Fusion																													34				34
Calibration																													155				155
Post-Processing DTM/Surface																													108				108
Planimetric- Feature Extraction																												40	5				45
QC Aerial Data																														10			10
Orthophoto Production - the collection and processing of photography acquired from an airborne platform to develop DGN and DTM files.																													33				33
Deliverables																							5					15					20
150.11. Horizontal And Vertical Control (15.3.5).																							16			40							56
HOURS SUB-TOTALS																							57	30	120	290		60	302	135	10	16	968
CONTRACT RATE PER HOUR	$285.00	$365.00	$270.00	$270.00	$215.00	$200.00	$170.00	$270.00	$200.00	$150.00	$165.00	$135.00	$250.00	$180.00	$120.00	$105.00	$160.00	$120.00	$100.00	$250.00	$180.00	$270.00	$260.00	$225.00	$165.00	$150.00	$180.00	$150.00	$150.00	$150.00	$160.00	$120.00	
TOTAL LABOR COSTS																							$14,820.00	$6,750.00	$19,800.00	$43,500.00	$10,800.00	$9,000.00	$45,300.00	$20,250.00	$1,500.00	$2,560.00	$157,480.00
% DISTRIBUTION OF STAFFING																							6%	3%	12%	30%	6%	5%	35%	1%	2%		100%
SUBTOTAL - FC 160 (150) – ROADWAY DESIGN																																	**$157,480.00**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

TASK DESCRIPTION	Project Manager - Schem/ENV_ID	Technical Advisor - Senior	Quality Manager	Engineer (Senior)	Engineer (Project) - Senior	Engineer (Project)	Engineer (Design)	Engineer (Traffic) - Senior	Engineer (Traffic)	Engineer-In-Training	Engineer Technician - Senior	Engineer Technician	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Field Technician (Environmental, Biological, Archeological) - Senior	Field Technician (Environmental, Biological, Archeological)	Field Technician (Environmental, Biological, Archeological) - Junior	Architectural Historian - Senior	Architectural Historian	Hydrologist - Senior	Surveyor (RPLS) - Senior	Surveyor (RPLS)	Survey Technician (Surveyor-In-Training) - SIT	Survey Technician	Certified Photogrammetrist	LiDAR Mapping Technician (Aerial)	LiDAR Processing Technician (Helicopter, Fixed Wing, Mobile, UAS, Terrestrial)	Orthophoto Specialist	Survey Field Crew Coordinator	Administrative/ Clerical	TOTAL & COSTS
	$285.00	**$385.00**	**$270.00**	**$270.00**	**$215.00**	**$200.00**	**$170.00**	**$270.00**	**$200.00**	**$150.00**	**$165.00**	**$135.00**	**$250.00**	**$160.00**	**$120.00**	**$100.00**	**$160.00**	**$120.00**	**$100.00**	**$250.00**	**$160.00**	**$270.00**	**$260.00**	**$225.00**	**$165.00**	**$155.00**	**$180.00**	**$150.00**	**$150.00**	**$150.00**	**$150.00**	**$160.00**	**$120.00**	
FC 160 (163) ROADWAY DESIGN																																	
MISCELLANEOUS ROADWAY																																	
163.1. Utility Coordination.																																	
b. Coordination (meetings, utility summary)	24			120						32	48	88																					312
c. Utility Conflict Matrix and Exhibits	4			20						20	20	40																					104
163.2. Geotechnical Borings and Investigations	4			16						16																							36
																																	-
																																	-
HOURS SUB-TOTALS	32			156						68	68	128																					452
CONTRACT RATE PER HOUR	**$285.00**	**$385.00**	**$270.00**	**$270.00**	**$215.00**	**$200.00**	**$170.00**	**$270.00**	**$200.00**	**$150.00**	**$165.00**	**$135.00**	**$250.00**	**$160.00**	**$120.00**	**$100.00**	**$160.00**	**$120.00**	**$100.00**	**$250.00**	**$160.00**	**$270.00**	**$260.00**	**$225.00**	**$165.00**	**$155.00**	**$180.00**	**$150.00**	**$150.00**	**$150.00**	**$150.00**	**$160.00**	**$120.00**	
TOTAL LABOR COSTS	$9,120.00			$42,120.00						$10,200.00	$11,220.00	$17,280.00																						$89,940.00
% DISTRIBUTION OF STAFFING	7%			32%						5%	15%	28%																						100%
SUBTOTAL - FC 160 (163) ROADWAY DESIGN																																	**$89,940.00**

DESCRIPTION	
FC 102 (1 10) - FEASIBILITY STUDIES	$3,004,100.00
FC 120 (120) - SOCIAL/ECON/ENV STUDIES	$137,920.00
FC 130 (130) RIGHT-OF-WAY - SURVEY	$456,168.60
FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES	
FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE	$131,270.00
FC 160 (150) – ROADWAY DESIGN	$157,480.00
FC 160 (163) ROADWAY DESIGN	$89,940.00
SUBTOTAL LABOR EXPENSES	**$3,926,878.60**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

UNIT COST PAYMENT BASIS					
SERVICES TO BE PROVIDED	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
2 - Person Survey Crew (1-GPS or Robotic Total Station included. Mileage not included.)	hour	$215.00	420	FC 130 (130)	$90,300.00
2 - Person Survey Crew (1-GPS or Robotic Total Station included. Mileage not included.)	hour	$215.00	340	FC 160 (150)	$73,100.00
Helicopter Flight Crew (Includes Pilot and Sensor Operator)	hour	$250.00	40	FC 130 (130)	$10,000.00
SUBTOTAL					**$173,400.00**

Unit Cost Payment Basis: If unit costs by year are included, unit costs billed should correspond to the fiscal or calendar year, if applicable, in which the work was done.

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

UNIT COST PAYMENT BASIS					
SERVICES TO BE PROVIDED	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
Acquisition (Agent)	Parcel	$6,000.00	70	FC 130 (130.4)	$420,000.00
Appraisal	Parcel	$5,000.00	70	FC 130 (130.4)	$350,000.00
Appraisal Review	Parcel	$1,500.00	70	FC 130 (130.4)	$105,000.00
Title	Parcel	$2,000.00	70	FC 130 (130.4)	$140,000.00
Appraisal Update for Prep&Test	Parcel	$4,000.00	21	FC 130 (130.4)	$84,000.00
Appraisal Review Update for Prep&Test	Parcel	$1,200.00	21	FC 130 (130.4)	$25,200.00
Condemnation Support	Parcel	$4,000.00	21	FC 130 (130.4)	$84,000.00
Legal Services (Condemnation)	Parcel	$10,000.00	21	FC 130 (130.4)	$210,000.00
SUBTOTAL					**$1,418,200.00**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

UNIT COST PAYMENT BASIS					
SERVICES TO BE PROVIDED	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
Turning Movement Counts					
2-hour Turning Movement Count, Minor Intersection, Weekday	per intersection	$310.00	14	FC 102 (110)	$4,340.00
13-hour Turning Movement Count Major Intersection	per intersection	$1,600.00	3	FC 102 (110)	$4,800.00
24-Hour Counts					
24-Hour Automated Tube Counts - Speed or Class	per direction/per counter/day	$330.00	4	FC 102 (110)	$1,320.00
SUBTOTAL					**$10,460.00**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

SERVICES TO BE PROVIDED	FUNCTION CODE	UNIT	UNIT COST	QUANTITY	COST
Mileage	FC 102 (110)	mile	$0.725	1000	$725.00
Mileage	FC 120 (120)	mile	$0.725	1500	$1,087.50
Mileage	FC 130 (130)	mile	$0.725	2000	$1,450.00
Lodging/Hotel - Taxes and Fees	FC 102 (110)	day/person	$45.00	12	$540.00
Lodging/Hotel - Taxes and Fees	FC 120 (120)	day/person	$45.00	26	$1,170.00
Lodging/Hotel (Taxes/fees not included)	FC 102 (110)	day/person	$110.00	12	$1,320.00
Lodging/Hotel (Taxes/fees not included)	FC 120 (120)	day/person	$110.00	26	$2,860.00
Meals (Excluding alcohol & tips) (Overnight stay required)	FC 102 (110)	day/person	$68.00	12	$816.00
Meals (Excluding alcohol & tips) (Overnight stay required)	FC 120 (120)	day/person	$68.00	26	$1,768.00
Air Travel - In State - 2+ Wks Notice (Coach)	FC 102 (110)	Rd Trip/person	$530.00	6	$3,180.00
Parking	FC 102 (110)	day	$30.00	12	$360.00
Rental Car (Includes taxes and fees; Insurance costs will not be reimbursed)	FC 102 (110)	day	$100.00	6	$600.00
Rental Car Fuel	FC 102 (110)	gallon	$5.00	20	$100.00
Taxi/Cab fare (Includes Rideshare)	FC 102 (110)	each/person	$40.00	4	$160.00
Toll Charges	FC 102 (110)	day	$50.00	4	$200.00
USB Flashdrive (up to 32 GB)	FC 102 (110)	each	$10.00	2	$20.00
External Hard Drive	FC 102 (110)	each	$150.00	1	$150.00
Standard Postage	FC 102 (110)	letter	$0.78	300	$234.00
Plots (B/W on Bond)	FC 130 (130)	per sq. ft.	$1.00	1200	$1,200.00
Report Binding and tabbing	FC 102 (110)	each	$10.00	5	$50.00
Certified Letter Return Receipt	FC 130 (130)	each	$10.48	120	$1,257.60
Courier Services	FC 102 (110)	each	$45.00	1	$45.00
Report Printing	FC 102 (110)	each	$80.00	5	$400.00
Color Graphics on Foam Board	FC 102 (110)	square foot	$20.00	240	$4,800.00
Map/Plat Records	FC 130 (130)	sheet	$7.50	20	$150.00
Title Report	FC 130 (130)	each	$800.00	70	$56,000.00
GPS Receiver Rate	FC 130 (130)	hour	$30.00	100	$3,000.00
Type II ROW/Control Monument - Poured 2-3 Feet (includes equipment, materials, & rentals). Marker supplied by TxDOT	FC 130 (130)	each	$300.00	12	$3,600.00
Ground Target (includes paint and panel material)	FC 130 (130)	each	$30.00	26	$780.00
Deed Copies	FC 130 (130)	sheet	$2.00	500	$1,000.00
TOTAL					**$89,023.10**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: Geotex Engineering, LLC

TASK DESCRIPTION	Support Manager - SCHEM/ENV	Engineer (Project)	Engineer (Design)	Engineer Technician	Geologist - Senior	Administrative/Clerical	**TOTAL LABOR HRS. & COSTS**
	$371.09	**$307.49**	**$243.88**	**$142.08**	**$205.86**	**$105.86**	
FC 102 (110) - FEASIBILITY STUDIES							
FEASIBILITY STUDIES							
110.1. Schematic Design Work Outline.							
F. Project Management and Coordination							
Project Planning and Meetings	2	2	4	8	8		24
Project Administration and Invoicing	1	1	2	8	8	4	24
Post-Report Pavement Design (Includes Report Revision)	1	1	4	4	4	4	18
HOURS SUB-TOTALS	4	4	10	20	20	8	66
CONTRACT RATE PER HOUR	**$371.09**	**$307.49**	**$243.88**	**$142.08**	**$205.86**	**$105.86**	
TOTAL LABOR COSTS	$1,484.36	$1,229.96	$2,438.80	$2,841.60	$4,117.20	$846.88	$12,958.80
% DISTRIBUTION OF STAFFING	6%	6%	15%	30%	30%	12%	100%
SUBTOTAL - FC 102 (110) - FEASIBILITY STUDIES							**$12,958.80**

TASK DESCRIPTION	Support Manager - SCHEM/ENV	Engineer (Project)	Engineer (Design)	Engineer Technician	Geologist - Senior	Administrative/Clerical	**TOTAL & COSTS**
	$371.09	**$307.49**	**$243.88**	**$142.08**	**$205.86**	**$105.86**	
FC 160 (163) ROADWAY DESIGN							
MISCELLANEOUS ROADWAY							
163.2. Geotechnical Borings and Investigations							
Preparing Boring Location and Field Investigation Plan				4	2		6
Field Coodination, Utility Checks				4	2		6
Stake Boreholes				16			16
Drilling/Logging/Coring Geotechnical Borings and Pavement Cores				48			48
Prepare Soil Boring Logs and Report Figures				12			12
Perform engineering analysis			1	4	4		9
Preparation of Geotechnical Report / QC	1	1	2		8	4	16
HOURS SUB-TOTALS	1	1	3	88	16	4	113
CONTRACT RATE PER HOUR	**$371.09**	**$307.49**	**$243.88**	**$142.08**	**$205.86**	**$105.86**	
TOTAL LABOR COSTS	$371.09	$307.49	$731.64	$12,503.04	$3,293.76	$423.44	$17,630.46
% DISTRIBUTION OF STAFFING	1%	1%	3%	78%	14%	4%	100%
SUBTOTAL - FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE							**$17,630.46**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: Geotex Engineering, LLC

DESCRIPTION	
FC 102 (110) - FEASIBILITY STUDIES	$12,958.80
FC 120 (120) - SOCIAL/ECON/ENV STUDIES	
FC 130 (130) RIGHT-OF-WAY - SURVEY	
FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES	
FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE	
FC 160 (150) – ROADWAY DESIGN	
FC 160 (163) ROADWAY DESIGN	$17,630.46
SUBTOTAL LABOR EXPENSES	**$30,589.26**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Subprovider: Geotex Engineering, LLC

UNIT COST PAYMENT BASIS						
SERVICES TO BE PROVIDED	**TEST CODE**	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
Unconfined Compressive Strength (Soil)	ASTM D2166	each	$75.00	9	FC 160 (163)	$675.00
One Dimensional Swell or Collapse of Soils, Methods A & B	ASTM D4546	each	$248.64	42	FC 160 (163)	$10,442.88
Soil Boring/Rock Coring with TCP (< 60 ft.)	Tex-132-E	LF	$41.44	280	FC 160 (163)	$11,603.20
Borehole Grouting - Bentonite Chips	N/A	LF	$15.54	126	FC 160 (163)	$1,958.04
Concrete/AC Patch	N/A	per patch	$82.88	18	FC 160 (163)	$1,491.84
Core/drill operator/technician and coring equipment used to drill flexible and rigid pavement (2-man crew):	N/A	day	$240.00	4	FC 160 (163)	$960.00
(b) 6-in. diameter cores	N/A	inch	$18.65	18	FC 160 (163)	$335.70
SUBTOTAL						**$27,466.66**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Subprovider: Geotex Engineering, LLC

UNIT COST PAYMENT BASIS						
SERVICES TO BE PROVIDED	**TEST CODE**	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
Determining Moisture Content in Soil Materials	Tex-103-E	each	$16.58	140	FC 160 (163)	$2,321.20
Determining Liquid Limits of Soils	Tex-104-E	each	$46.62	56	FC 160 (163)	$2,610.72
Determining Plastic Soil Limits	Tex-105-E	each	$36.26	56	FC 160 (163)	$2,030.56
Calculating the Plasticity Index of Soils	Tex-106-E	each	$15.54	56	FC 160 (163)	$870.24
Particle Size Analysis of Soils	Tex-110-E	each	$82.88	28	FC 160 (163)	$2,320.64
Determining the Amount of Material in Soils Finer than the 75 micrometer (No. 200) Sieve	Tex-111-E	each	$51.80	28	FC 160 (163)	$1,450.40
Potential Vertical Rise of Natural Subgrade Soils	Tex-124-E	each	$103.60	28	FC 160 (163)	$2,900.80
Determining Sulfate Content in Soils - Colorimetric Method	Tex-145-E	each	$113.96	28	FC 160 (163)	$3,190.88
SUBTOTAL						**$17,695.44**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: Geotex Engineering, LLC

SERVICES TO BE PROVIDED	FUNCTION CODE	UNIT	UNIT COST	QUANTITY	COST
Mileage	FC 160 (163)	mile	$0.725	1656	$1,200.60
Mobilization and Demobilization of Drilling Rig (Trips within 100 miles from office to site)	FC 160 (163)	trip	$600.00	6	$3,600.00
Mobilization of coring equipment used to drill flexible and rigid pavement (2-man crew minimum, Labor paid separately)(less than 100 miles from office to site)	FC 160 (163)	trip	$600.00	4	$2,400.00
Portable Message Board	FC 160 (163)	day	$500.00	1	$500.00
Flashing Arrow Board	FC 160 (163)	day	$600.00	1	$600.00
Attenuator trucks - (Lane/Shoulder Closure) (Includes labor, equipment and fuel)	FC 160 (163)	day	$1,600.00	1	$1,600.00
Traffic Control Services, Arrow Boards and Attenuator trucks - (Includes labor, equipment and fuel)	FC 160 (163)	day	$5,150.00	4	$20,600.00
TOTAL					**$30,500.60**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: The Rios Group, Inc.

TASK DESCRIPTION	Engineer (Senior)	SUE Manager	Administrative/Clerical	TOTAL & COSTS
	$261.31	**$143.25**	**$100.75**	
FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES				
RIGHT-OF-WAY UTILITY ACTIVITIES				
135.1. Utility Engineering Investigation.				
Securing permits and coordinating with traffic control sub	8	32		40
HOURS SUB-TOTALS	8	32	0	40
CONTRACT RATE PER HOUR	**$261.31**	**$143.25**	**$100.75**	
TOTAL LABOR COSTS	$2,090.48	$4,584.00	$0.00	$6,674.48
% DISTRIBUTION OF STAFFING	20%	80%	0%	100%
SUBTOTAL - FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES				**$6,674.48**

TASK DESCRIPTION	Engineer (Senior)	SUE Manager	Administrative/Clerical	TOTAL & COSTS
	$261.31	**$143.25**	**$100.75**	
FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE				
PROJECT MANAGEMENT AND ADMINISTRATION				
145.1. Contract Management and Administration.				
Meetings	16	16		32
Invoicing	12	24	24	60
HOURS SUB-TOTALS	28	40	24	92
CONTRACT RATE PER HOUR	**$261.31**	**$143.25**	**$100.75**	
TOTAL LABOR COSTS	$7,316.68	$5,730.00	$2,418.00	$15,464.68
% DISTRIBUTION OF STAFFING	30%	43%	26%	100%
SUBTOTAL - FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE				**$15,464.68**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: The Rios Group, Inc.

DESCRIPTION	
FC 102 (110) - FEASIBILITY STUDIES	$0.00
FC 120 (120) - SOCIAL/ECON/ENV STUDIES	$0.00
FC 130 (130) RIGHT-OF-WAY - SURVEY	$0.00
FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES	$6,674.48
FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE	$15,464.68
FC 160 (150) – ROADWAY DESIGN	$0.00
FC 160 (163) ROADWAY DESIGN	$0.00
SUBTOTAL LABOR EXPENSES	**$22,139.16**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Subprovider: The Rios Group, Inc.

UNIT COST PAYMENT BASIS					
SERVICES TO BE PROVIDED	**UNIT**	**COST**	**Quantity**	**FC**	**Total**
SUE Mobilization/Demobilization	mile	$5.00	1000	FC 135 (135)	$5,000.00
SUE (Quality Level D)	LF	$0.57	250000	FC 135 (135)	$142,500.00
SUE (Quality Level C)	LF	$0.75	55000	FC 135 (135)	$41,250.00
SUE (Quality Level B - Utility Designation)	LF	$1.80	125000	FC 135 (135)	$225,000.00
SUE (Quality Level A - Utility Locate, Test Holes) (0-5 ft)	each	$1,350.00	10	FC 135 (135)	$13,500.00
SUE (Quality Level A - Utility Locate, Test Holes) (> 5 to 8 ft)	each	$1,600.00	24	FC 135 (135)	$38,400.00
SUE (Quality Level A - Utility Locate, Test Holes) (> 8 to 13 ft)	each	$2,000.00	6	FC 135 (135)	$12,000.00
Subsurface Utility Engineering (SUE) Field Services					
One (1) Designating Person with equipment	hour	$150.00	40	FC 135 (135)	$6,000.00
Coring and repairing the pavement includes labor, equipment, and materials	each	$400.00	5	FC 135 (135)	$2,000.00
SUBTOTAL					**$485,650.00**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: The Rios Group, Inc.

SERVICES TO BE PROVIDED	FUNCTION CODE	UNIT	UNIT COST	QUANTITY	COST
Mileage	FC 135 (135)	mile	$0.67	2000	$1,340.00
Traffic Control Services, Arrow Boards and Attenuator trucks - (Includes labor, equipment and fuel)	FC 135 (135)	day	$5,150.00	3	$15,450.00
TOTAL:					**$16,790.00**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: VRX, Inc.

TASK DESCRIPTION	Support Manager - SCHEM/ENV	Environmental Planner - Senior	Environmental Planner IV	Environmental Planner III	Environmental Planner I/II	Public Involvement Officer - Senior	Public Involvement Officer	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Environmental Specialist - Senior	Environmental Specialist	TOTAL & COSTS
	$255.44	**$237.64**	**$159.65**	**$127.72**	**$96.77**	**$184.77**	**$151.53**	**$207.54**	**$148.82**	**$114.41**	**$93.13**	**$231.49**	**$141.02**	
FC 102 (110) - FEASIBILITY STUDIES														
FEASIBILITY STUDIES														
110.2. Schematic Design – General Tasks.														
C. Environmental Constraints	2	12								36	12			62
HOURS SUB-TOTALS	2	12								36	12			62
CONTRACT RATE PER HOUR	**$255.44**	**$237.64**	**$159.65**	**$127.72**	**$96.77**	**$184.77**	**$151.53**	**$207.54**	**$148.82**	**$114.41**	**$93.13**	**$231.49**	**$141.02**	
TOTAL LABOR COSTS	$510.88	$2,851.68								$4,118.76	$1,117.56			$8,598.88
% DISTRIBUTION OF STAFFING	3%	19%								58%	19%			100%
SUBTOTAL - FC 102 (110) - FEASIBILITY STUDIES														**$8,598.88**

TASK DESCRIPTION	Support Manager - SCHEM/ENV	Environmental Planner - Senior	Environmental Planner IV	Environmental Planner III	Environmental Planner I/II	Public Involvement Officer - Senior	Public Involvement Officer	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Environmental Specialist - Senior	Environmental Specialist	TOTAL LABOR HRS. & COSTS
	$255.44	**$237.64**	**$159.65**	**$127.72**	**$96.77**	**$184.77**	**$151.53**	**$207.54**	**$148.82**	**$114.41**	**$93.13**	**$231.49**	**$141.02**	
FC 120 (120) - SOCIAL/ECON/ENV STUDIES														
SOCIAL, ECONOMIC, AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT														
120.1. Environmental Documentation Standards														
A. Quality Assurance/Quality Control Review	24	80	1	1	1	1	1	1	80	1	1	4	1	197
120.2. Environmental Assessment (EA) Content and Format														
B.1. Draft EA (up to 3 alternatives: No build + 2 build alternatives)	2	115							145	16	72			350
B.2. Revised Draft EA for Public Hearing	4	48							64	8	24			148
B. 3. Draft EA with FONSI	2	64							88	16	64			234
B. 4. Final EA/FONSI	4	48							48	20	24			144
120.5. Environmental Technical Analyses and Documentation.														
C.1. Section 4(f) Evaluation Review (Draft & Final)		4							8					12
C. 2. Section 6(f) Evaluation Review (Draft & Final)		4							8					12
C. 3. Public Involvement Activities (per TxDOT Guidance)	3													3
Develop Public Involvement Plan (PIP)		6					16				2			24
PI Roles & Responsibilities Meeting Coordination and Attendance w/TxDOT Fort Worth District		8					8				2			18
Prepare & maintain project stakeholder database for notifications and communications by mail and email. List of property owners with addresses to be provided by Engineer.		8					8				28			44
Public Meeting														
Public Meeting: Coordinate one (1) public meeting to include sending mail/email notifications of meeting, staffing meeting, completing meeting minutes, TxDOT PI summary report, & compiling & responding to public comments.		36					36			8	48			128
Public Hearing														
Public Hearing: Coordinate one (1) public hearing to include sending mail/email notifications of meeting, staffing meeting, completing meeting minutes, TxDOT PI summary report, & compiling & responding to public comments.		36					36			8	48			128
Develop materials for meeting/hearing - includes fact sheets, handouts, boards, emails, press releases. Create two (2) PowerPoint presentations: one (1) for public meeting and one (1) for public hearing.		12					48				84			144
Stakeholder Meetings (attend meetings with stakeholders/property owners up to 10		80												80
C. 4. Community Impacts Analysis (Draft & Final)	1	12							36	8	24			81
C. 6. Air Quality Studies Review (Draft & Final)	1	12							44	16	24			97
C. 7. Traffic Noise Analysis Technical Report Review (Draft & Final) *Excludes Workshop	1													1
Prepare Existing Noise Model		1							56		32			89
Document Noise Receivers / Perform Onsite Noise Measurements		4							16		8			28
Prepare Traffic Noise Validation Report		4							8		24			36
Prepare Design Year Noise Model		1							42		21			64
Determine Traffic Noise Impacts, Noise Barriers, and Noise Contours		1							32		16			49
Prepare Draft Traffic Noise Technical Report		4							16		32			52
Prepare Final Traffic Noise Technical Report		4							10		8			22
Traffic Noise Workshop - to be peformed as additional services, if necessary														

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: VRX, Inc.

TASK DESCRIPTION	Support Manager - SCHEM/ENV	Environmental Planner - Senior	Environmental Planner IV	Environmental Planner III	Environmental Planner I/II	Public Involvement Officer - Senior	Public Involvement Officer	Environmental Scientist - Senior	Environmental Scientist IV	Environmental Scientist III	Environmental Scientist I/II	Environmental Specialist - Senior	Environmental Specialist	TOTAL & COSTS
	$255.44	**$237.64**	**$159.65**	**$127.72**	**$96.77**	**$184.77**	**$151.53**	**$207.54**	**$148.82**	**$114.41**	**$93.13**	**$231.49**	**$141.02**	
C. 8. Water Resources Analysis	3													3
Surface Water Analysis Form (Draft & Final)		1							4	4	2			11
WOTUS Delineation Report (with site visit) (Draft & Final)		8						12	4	64	48			136
Section 404/10 Impacts Table (Draft & Final)		5						4	4	16	16			45
Section 404/10/9 Permitting Package (Draft & Final)		8						4	4	42	40			98
C. 9. Biological/Natural Resources Management Analysis & Documentation	3													3
Species Analysis Form (Draft & Final)		4							4		5			13
Species Analysis Spreadsheet (Draft & Final)		6							24		36			66
TPWD Best Management Practices Form (Draft & Final)		5							8		12			25
FPPA Analysis (Draft & Final)		4							8		2			14
C. 10. Hazardous Materials Evaluation	1													1
C. 10. Initial Site Assessment (Draft & Final)		4						40	16		24			84
C. 11. Archeological Documentation 'Review Only' (Draft & Final)	1	8							8					17
C. 12. Historic Resources Documentation 'Review Only' (Draft & Final)	1	8							8					17
C. 13. Floodplain Impacts (Draft & Final)	1	1							12	1	1			16
C. 14. Stormwater Permits (Section 402) (Draft & Final)	1	1							8	1	1			12
HOURS SUB-TOTALS	53	655	1	1	1	1	153	61	813	229	773	4	1	2746
CONTRACT RATE PER HOUR	**$255.44**	**$237.64**	**$159.65**	**$127.72**	**$96.77**	**$184.77**	**$151.53**	**$207.54**	**$148.82**	**$114.41**	**$93.13**	**$231.49**	**$141.02**	
TOTAL LABOR COSTS	$13,538.32	$155,654.20	$159.65	$127.72	$96.77	$184.77	$23,184.09	$12,659.94	$120,990.66	$26,199.89	$71,989.49	$925.96	$141.02	$425,852.48
% DISTRIBUTION OF STAFFING	2%	24%	0%	0%	0%	0%	6%	2%	30%	8%	28%	0%	0%	100%
SUBTOTAL - FC 120 (120) - SOCIAL/ECON/ENV STUDIES														**$425,852.48**

DESCRIPTION	
FC 102 (110) - FEASIBILITY STUDIES	$8,598.88
FC 120 (120) - SOCIAL/ECON/ENV STUDIES	$425,852.48
FC 130 (130) RIGHT-OF-WAY - SURVEY	
FC 135 (135) – RIGHT-OF-WAY – UTILITY ACTIVITIES	
FC 145 (145, 164) MANAGING CONTRACTED/DONATED PE	
FC 160 (150) – ROADWAY DESIGN	
FC 160 (163) ROADWAY DESIGN	
SUBTOTAL LABOR EXPENSES	**$434,451.36**

Exhibit D
Fee Schedule
Method of Payment:
Lump Sum & Unit Cost

Prime Provider: Pape-Dawson Consulting Engineers, LLC

Subprovider: VRX, Inc.

SERVICES TO BE PROVIDED	FUNCTION CODE	UNIT	UNIT COST	QUANTITY	COST
Mileage	FC 120 (120)	mile	$0.725	4400	$3,190.00
Lodging/Hotel - Taxes and Fees	FC 120 (120)	day/person	$45.00	4	$180.00
Lodging/Hotel (Taxes/fees not included)	FC 120 (120)	day/person	$110.00	4	$440.00
Meals (Excluding alcohol & tips) (Overnight stay required)	FC 120 (120)	day/person	$68.00	4	$272.00
Toll Charges	FC 120 (120)	day	$50.00	23	$1,150.00
USB Flashdrive (up to 32 GB)	FC 120 (120)	each	$10.00	5	$50.00
Standard Postage	FC 120 (120)	letter	$0.78	2100	$1,638.00
Photocopies B/W (11" X 17")	FC 120 (120)	each	$0.25	250	$62.50
Photocopies B/W (8 1/2" X 11")	FC 120 (120)	each	$0.15	6300	$945.00
Photocopies Color (11" X 17")	FC 120 (120)	each	$1.25	500	$625.00
Photocopies Color (8 1/2" X 11")	FC 120 (120)	each	$1.00	3150	$3,150.00
Report Binding and tabbing	FC 120 (120)	each	$10.00	10	$100.00
Certified Letter Return Receipt	FC 120 (120)	each	$10.48	554	$5,805.92
Flyer Printing (various sizes BW or color)	FC 120 (120)	each	$1.00	500	$500.00
Postcard Printing	FC 120 (120)	each	$0.75	2100	$1,575.00
Color Graphics on Foam Board	FC 120 (120)	square foot	$20.00	25	$500.00
Presentation Boards 30" X 40" Color Mounted	FC 120 (120)	each	$100.00	20	$2,000.00
Noise Meter Rental Unit - includes noise meter, camera, tripods, calibrator	FC 120 (120)	per project	$500.00	1	$500.00
3rd Party Data	FC 120 (120)	each package	$30,000.00	1	$30,000.00
Environmental Field Supplies (lathes, stakes, flagging, spray paint, etc.)	FC 120 (120)	day	$35.00	10	$350.00
Court Reporter	FC 120 (120)	page	$20.00	120	$2,400.00
Court Reporter (Public Meetings, Hearings & Transcription)	FC 120 (120)	day	$1,000.00	1	$1,000.00
Newspaper Advertisement - Community Newspaper (assume print English + one additional language for 2 meetings, Cleburne Times)	FC 120 (120)	per publication	$3,000.00	4	$12,000.00
Public Involvement Facility Rental	FC 120 (120)	4 hours	$1,000.00	4	$4,000.00
Public Involvement Meeting Supplies	FC 120 (120)	per meeting	$200.00	2	$400.00
Public Notices - Mass Mailing (500 pieces)	FC 120 (120)	per mailing	$800.00	4	$3,200.00
Public Notices - Mass Mailing/with Self Addressed Return Envelope (500 pieces)	FC 120 (120)	per mailing	$1,100.00	4	$4,400.00
Audio - Equipment Rental	FC 120 (120)	each	$500.00	2	$1,000.00
Audio - Visual Equipment Rental	FC 120 (120)	event	$600.00	2	$1,200.00
Translator (English to Spanish, other language as appropriate, or Sign Language)	FC 120 (120)	event	$600.00	2	$1,200.00
Law Enforcement/Uniform Officer (including vehicle)	FC 120 (120)	hour	$150.00	6	$900.00
TOTAL					**$84,733.42**