

ENGINEERING SERVICES AGREEMENT

THIS AGREEMENT is made and entered into by and between the Fort Bend County Toll Road Authority, a Texas Local Government corporation organized and operating under the laws of the State of Texas, hereinafter called the “FBCTRA” and EHRA, hereinafter called “Engineer.”

WITNESSETH

WHEREAS, the FBCTRA proposes to contract for engineering services generally described as the preparation of plans, specifications, and estimates (PS&E) and related documents. These services shall include, but are not limited to, roadway and bridge design, hydrologic and hydraulic design, traffic signal design, utility adjustment coordination, utility engineering investigation, survey and geotechnical data collection, providing design support and testifying at Right of Way hearings if requested, necessary to support the design process along the Fort Bend Parkway Extension, Segment C from Sta. 1312+00 to Sta. 1414+00 in Fort Bend County, Texas, (the “Project”);

WHEREAS, the FBCTRA desires to enter into an agreement with Engineer for the performance of services during the Project, that are within the scope of services in Attachment A (“Scope of Services”);

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth below, the parties agree as follows:

AGREEMENT

1. General

The Engineer shall render professional services to FBCTRA related to the Project as defined in the Scope of Services in Attachment A.

The standard of care for all professional engineering and related services performed or furnished by Engineer under this Agreement will be the care and skill ordinarily used by members of Engineer’s profession practicing under similar conditions at the same time and in the same locality.

2. Compensation and Payment

- a. The Maximum Compensation under this Agreement is \$1,000,000.00. The amount paid under this Agreement may not exceed the Maximum Compensation without an approved supplemental agreement.

Compensation for the performance of services within the Scope of Services described in Attachment A shall be in accordance with the billing rates shown in Attachment B, with total compensation not to exceed \$1,000,000.00. Payments for work detailed in Attachment A will be made as such work is performed.

The Engineer shall furnish satisfactory documentation of such work (e.g. timesheets, billing rates, classifications, invoices, etc.) as may be required by FBCTRA.

- b. All performance of the Scope of Services and any services outside the Scope of Services (“Additional Services”), including changes in the contractual scope of work and revision of work satisfactorily performed, will be performed only when approved in advance and authorized by the FBCTRA, and Additional Services will be reimbursed based on the billing rates in effect at that time, to the extent that such labor costs and subcontracts are reasonable and necessary for the performance of such services. Out-of-pocket expense costs may be reimbursed only when approved in advance and authorized by the FBCTRA. Payment will be made (i) on the basis of project progress to be billed monthly and, for Additional Services, (ii) on the basis of time and expense records, and in accordance with those payment procedures set forth in subsection d. below. Billing rates will be inclusive of all direct labor, fringe benefits, general overhead, and profit.
- c. Where subcontractors are employed by the Engineer to perform pre-approved and pre-authorized Additional Services, the Engineer will be reimbursed for subcontractors’ actual salaries and hourly rates, including overtime rates. Reimbursement to the subcontractor for non-salary costs incurred by subcontractor will be on the same basis as if the cost was incurred by the Engineer. For subcontractors employed for the convenience of the FBCTRA, the Engineer will be paid a subcontract administrative fee equal to ten percent (10%) of all subcontractor invoiced amounts.
- d. It is understood and agreed that monthly payments will be made to the Engineer by the FBCTRA based on the following procedures: On or about the fifteenth day of each month during the performance of services hereunder and on or about the fifteenth day of the month following completion of all services hereunder, the Engineer shall submit to the FBCTRA two (2) copies of invoices showing the amounts due for services performed during the previous month, set forth separately for work under this Agreement and for any Additional Services (accompanied by supporting certified time and expense records of such charges in a form acceptable to the FBCTRA). It is specifically understood that any requests for travel reimbursements shall comply with those procedures for travel reimbursement to Fort Bend County (the “County”) employees established by the Fort Bend County Auditor (the “Auditor”). The FBCTRA shall review such invoices and approve them within 30 calendar days with such modifications as are consistent with this Agreement, and forward same to the Auditor. The County shall pay each such invoice as approved by the FBCTRA within thirty (30) calendar days after the FBCTRA’s approval of same.

3. Time of Performance

It is understood and agreed that the time for performance of the Engineer's services under this Agreement shall begin with receipt of the Notice to Proceed. The Engineer will maintain the delivery schedule to be provided by the FBCTRA.

This Agreement will terminate upon the Engineer's completion of the Scope of Services to the satisfaction of the FBCTRA.

4. The FBCTRA's Option to Terminate

- a. The FBCTRA has the right to terminate this Agreement at its sole option at any time, with or without cause, by providing 30 days written notice of such intentions to terminate and by stating in said notice the "Termination Date" which shall be less than 30 days later than the actual receipt of such written notice by the Engineer. Upon such termination, the FBCTRA shall compensate the Engineer in accordance with Section 2, above, for those services which were provided under this Agreement prior to its termination and which have not been previously invoiced to the FBCTRA. The Engineer's final invoice for said services will be presented to and paid by the FBCTRA in the same manner set forth in Section 2(d), above.
- b. Termination of this Agreement and payment as described in subsection (a) of this section shall extinguish all rights, duties, obligations, and liabilities of the FBCTRA and the Engineer under this Agreement, and this Agreement shall be of no further force and effect, provided, however, such termination shall not act to release the Engineer from liability for any previous default either under this Agreement or under any standard of conduct set by common law or statute. The obligations in Sections 5, 6, and 14 of this Agreement shall survive the termination of this Agreement.
- c. If the FBCTRA terminates this Agreement as provided in this section, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to the Engineer.
- d. The FBCTRA's rights and options to terminate this Agreement, as provided in any provision of this Agreement shall be in addition to, and not in lieu of, any and all rights, actions, and privileges otherwise available under law or equity to the FBCTRA by virtue of this Agreement or otherwise. Failure of the FBCTRA to exercise any of its said rights, actions, options, or privileges to terminate this Agreement as provided in any provision of this Agreement shall not be deemed a waiver of any rights, actions, or privileges otherwise available under the law or equity with respect to any continuing or subsequent breaches of this Agreement or of any other standard of conduct set by common law or statute.
- e. Copies of all completed and partially completed documents prepared under this Agreement shall be delivered to the FBCTRA within 30 days of the Termination Date or upon Engineer's receipt of fees due and payable at the Termination Date, whichever is sooner, when and if this Agreement is terminated.

5. Inspection of the Engineer's Books and Records

The Engineer will permit the FBCTRA, or any duly authorized agent of the FBCTRA, to inspect and examine the books and records of the Engineer for the purpose of verifying the amount of work performed on the Project. FBCTRA's right to inspect survives the termination of this Agreement for a period of four years.

6. Ownership and Reuse of Documents

All documents, including original drawings, estimates, specifications, field notes, and data created, produced, developed or prepared by Engineer or its approved outside advisory or support consultants (collectively, the "Documents") shall be the property of the FBCTRA, subject to all of the following terms and conditions; provided, however, FBCTRA shall not own and shall have no right to receive any documents not deemed "final" by the Engineer until completion or termination of this Agreement, as applicable. Engineer will deliver the Documents to FBCTRA within 30 days of the completion or termination of this Agreement and may retain a set of reproducible record copies of the Documents, provided that the Engineer has received full compensation due pursuant to the terms of this Agreement. It is mutually agreed that FBCTRA will use the Documents solely in connection with the Project and for no other purposes, except with the express written consent of the Engineer, which consent will not be unreasonably withheld. Any use of the Documents without the express written consent of the Engineer will be at FBCTRA's sole risk and without liability or legal exposure to Engineer.

FBCTRA shall also be the owner of all intellectual property rights of the services rendered hereunder, including all rights of copyright therein. It is the intention of Engineer and FBCTRA that the services provided are a "work for hire" as the term is used in the federal Copyright Act. Moreover, Engineer hereby agrees to assign, and by these presents, does assign to FBCTRA, all of Engineer's worldwide right, title, and interest in and to such work product and all rights of copyright therein.

Engineer agrees that all trademarks, trade names, service marks, logos, or copyrighted materials of FBCTRA that Engineer is permitted to use in connection with the services will not be used without FBCTRA's consent and shall remain the sole and exclusive properties of FBCTRA, and this Agreement does not confer upon Engineer any right or interest therein or in the use thereof.

7. Personnel, Equipment, and Material

- a. The Engineer represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for the timely performance of the Scope of Services required under this Agreement and that the Engineer shall furnish and maintain, at its own expense, adequate and sufficient personnel and equipment, in the opinion of the FBCTRA, to perform the Scope of Services when and as required and without delays. It is understood that the FBCTRA will approve assignment and release of all key Engineer personnel and that the Engineer shall submit written notification

of all key Engineer personnel changes for the FBCTRA's approval prior to the implementation of such changes. For the purpose of this Agreement, key Engineer personnel are defined as: Project Manager. Services described in this Agreement shall be performed under the direction of an engineer licensed to practice professional engineering in the State of Texas.

- b. All employees of the Engineer shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of the Engineer who, in the opinion of the FBCTRA, is incompetent, or, by his conduct, becomes detrimental to the Project, shall, upon request of the FBCTRA, immediately be removed from association with the Project.
- c. Except as otherwise specified, the Engineer shall furnish all equipment, transportation, supplies, and materials required for its operation under this Agreement.

8. Items to be furnished to Engineer by the FBCTRA

As applicable, the following items will be supplied to the Engineer:

- a. Copies of preliminary studies by others.
- b. Assistance in coordination with all utility companies.
- c. Assistance in coordination with all public and governmental entities.

9. Subletting

The Engineer shall not sublet, assign, or transfer any part of its rights or obligations in this Agreement without the prior written approval of the FBCTRA. Responsibility to the FBCTRA for sublet work shall remain with the Engineer.

10. Conference

At the request of the FBCTRA, the Engineer shall provide appropriate personnel for conferences at its offices, or attend conferences at the various offices of the FBCTRA, or at the site of the Project, and shall permit inspections of its offices by the FBCTRA, or others when requested by the FBCTRA.

11. Appearance as Witness

If requested by the FBCTRA, or on its behalf, the Engineer shall prepare such engineering exhibits and plans as may be requested for all hearings and trials related to the Project and, further, it shall prepare for and appear at conferences at the office of the FBCTRA and shall furnish competent expert engineering witnesses to provide such oral testimony and to introduce such demonstrative evidence as may be needed throughout all trials and hearings with reference to any litigation relating to the Project. Trial preparation and appearance by

the Engineer in courts regarding litigation matters are Additional Services and compensation will be paid in accordance with Section 2(b).

12. Compliance with Laws

The Engineer shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required, the Engineer shall furnish the FBCTRA with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

13. Insurance

The Engineer shall obtain and maintain, throughout the term of the Agreement, insurance of the types and in the minimum amounts set forth in Attachment C.

14. Indemnification

With respect to claims brought by third parties against either Engineer or the FBCTRA relating to the property or facilities with respect to which this Agreement pertains, Engineer and the FBCTRA agree as follows:

- a. **ENGINEER WILL INDEMNIFY AND HOLD HARMLESS THE FBCTRA, ITS DIRECTORS, OFFICERS, AND EMPLOYEES AGAINST ANY CLAIMS, DEMANDS OR CAUSES OF ACTION; AND COSTS, LOSSES, LIABILITIES, EXPENSES AND JUDGMENTS INCURRED IN CONNECTION THEREWITH, INCLUDING REASONABLE ATTORNEY'S FEES AND COURT COSTS, BROUGHT BY ANY OF ENGINEER'S EMPLOYEES OR REPRESENTATIVES, OR BY ANY OTHER THIRD PARTY, BASED UPON, IN CONNECTION WITH, RESULTING FROM OR ARISING OUT OF THE NEGLIGENT ACTS, ERRORS OR OMISSIONS OF ENGINEER; HOWEVER, ENGINEER'S CONTRACTUAL OBLIGATION OF INDEMNIFICATION SHALL NOT EXTEND TO THE NEGLIGENCE OR OTHER FAULT OF THE FBCTRA OR STRICT LIABILITY IMPOSED UPON THE FBCTRA AS A MATTER OF LAW (INCLUDING STRICT LIABILITY IMPOSED UPON THE FBCTRA AS A RESULT OF THE CONDITION OF THE PROPERTY OR FACILITIES WITH RESPECT TO WHICH THIS AGREEMENT PERTAINS).**
- b. In the event that both the FBCTRA and Engineer are adjudicated negligent or otherwise at fault or strictly liable without fault with respect to damage or injuries sustained by the claimant, each shall be responsible for its own costs of litigation and pro rata share of damages as determined by the proceedings.

It is a condition precedent to the indemnitor's contractual obligation of indemnification under this Agreement that the party seeking indemnity shall provide written notice of a third party claim, demand, or cause of action within 30 days after such third party claim, demand, or cause of action is received by the party seeking indemnity. It is a further condition precedent to the indemnitor's contractual obligation of indemnification under this Agreement that the indemnitor shall thereafter have the right to participate in the investigation, defense, and resolution of such third party claim.

15. Dispute Resolution

Except as expressly provided in Section 4. Option to Terminate, if a dispute arises out of, or relates to, the breach thereof, and if the dispute cannot be settled through negotiation, then the FBCTRA and the Engineer agree to submit the dispute to mediation. In the event the FBCTRA or the Engineer desires to mediate any dispute, that party shall notify the other party in writing of the dispute desired to be mediated. If the parties are unable to resolve their differences within 10 days of the receipt of such notice, such dispute shall be submitted for mediation in accordance with the procedures and rules of the American Arbitration Association (or any successor organization) then in effect. The deadline for submitting the dispute to mediation can be changed if the parties mutually agree in writing to extend the time between receipt of notice and submission to mediation. The expenses of the mediator shall be shared 50 percent by the FBCTRA and 50 percent by the Engineer. This requirement to seek mediation shall be a condition required before filing an action at law or in equity.

16. Delivery of Notices, Etc.

- a. All written notices, demands, and other papers or documents to be delivered to the FBCTRA under this Agreement, shall be delivered to the Fort Bend County Toll Road Authority, 245 Commerce Green Blvd., Suite 165, Sugar Land, Texas 77478, Attention: Executive Director, or at such other place or places as it may from time to time designate by written notice delivered to the Engineer. For purposes of notice under this Agreement, a copy of any notice or communication hereunder shall also be forwarded to the following address: Fort Bend County Clerk, 301 Jackson Street, Richmond, Texas 77469, Attention: County Judge.
- b. All written notices, demands, and other papers or documents to be delivered to the Engineer under this Agreement shall be delivered to EHRA, 10011 Meadowglen Lane, Houston, Texas, 77042, Attention: Hasan Syed, or such other place or places as the Engineer may designate by written notice delivered to the FBCTRA.

17. Reports of Accidents, Etc.

Within 24 hours after the occurrence of any accident or other event which results in, or might result in, injury to the person or property of any third person (other than an employee of the Engineer), whether or not it results from or involves any action or failure to act by the Engineer or any employee or agent of the Engineer and which arises in any manner from the performance of this Agreement, the Engineer shall send a written report of such

accident or other event to the FBCTRA, setting forth a full and concise statement of the facts pertaining thereto. The Engineer shall also immediately send the FBCTRA a copy of any summons, subpoena, notice, other documents served upon the Engineer, its agents, employees, or representatives, or received by it or them, in connection with any matter before any court arising in any manner from the Engineer's performance of work under this Agreement.

18. The FBCTRA's Acts

Anything to be done under this Agreement by the FBCTRA may be done by such persons, corporations, or firms as the FBCTRA may designate.

19. Limitations

Notwithstanding anything herein to the contrary, all covenants and obligations of the FBCTRA under this Agreement shall be deemed to be valid covenants and obligations only to extent authorized by the Act creating the FBCTRA and permitted by the laws and the Constitution of the State of Texas. This Agreement shall be governed by the laws of the State of Texas, and no officer, director, or employee of the FBCTRA shall have any personal obligation hereunder.

20. Captions Not a Part Hereof

The captions of subtitle of the several sections and divisions of this Agreement constitute no part of the content hereof, but are only labels to assist in locating and reading the provisions hereof.

21. Controlling Law, Venue

This Agreement shall be governed and construed in accordance with the laws of the State of Texas. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all disputes arising hereunder and waive the right to sue or be sued elsewhere.

22. Successors and Assigns

The FBCTRA and the Engineer bind themselves and their successors, executors, administrators, and assigns to the other party of this Agreement and to the successors, executors, administrators, and assigns of the other party, in respect to all covenants of this Agreement.

23. Statutory Terms Applicable To State Political Subdivisions

Contractor certifies and agrees that it (i) does not, nor will not, so long as the Agreement remains in effect, boycott Israel, as such term is defined in Chapter 808, Texas Government Code, (ii) does not engage in business with Iran, Sudan, or any foreign terrorist organization pursuant to Subchapter F of Chapter 2252 of the Texas Government Code; (iii) is not identified on a list prepared and maintained under Sections 806.051, 807.051, or 2252.153, Texas Government Code; (iv) does not, nor will not, so long as the Agreement

remains in effect, boycott energy companies, as such term is defined in Chapter 809, Texas Government Code; (v) does not, nor will not, so long as the Agreement remains in effect, have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association, as such term is defined in 2274.001(3), Texas Government Code; and (vi) is not (a) owned or controlled by (1) individuals who are citizens of China, Iran, North Korea, Russia or any designated country (as such term is defined in 113.003, Texas Business & Commerce Code); or (2) a company or other entity, including a governmental entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, of any designated country; or (b) headquartered in China, Iran, North Korea, Russia or a designated country.

- a. Prior to execution of this Agreement by FBCTRA, the Engineer will be required to submit a Texas Ethics Commission Form 1295. Please see this website for details related to this disclosure: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm
- b. Engineer certifies and agrees that it is not identified on a list prepared and maintained under Sections 806.051, 807.051 or 2252.153, Texas Government Code.

In accordance with Section 176.0065, Texas Local Government Code, a list of local government officers of FBCTRA may be obtained by contacting the FBCTRA's records administrator at (713) 374-3500.

24. Appendices

The Appendices attached to this Agreement, which consists of:

- | | |
|--------------|------------------------------------|
| Attachment A | Scope of Services |
| Attachment B | Compensation for Scope of Services |
| Attachment C | Insurance Requirements |

[Signatures Follow]

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts made and entered into as of 16 day of December, 2024, but effective as of date following approval by Fort Bend County Commissioners Court.

FORT BEND COUNTY TOLL ROAD
AUTHORITY, a Texas local government
corporation

By: James D. Rice
Name: James D. Rice
Title: Chairman

EHRA
ENGINEER

By: A. Hasan Syed
Name: A. HASAN SYED, P.E.
Title: EVP

EFFECTIVE DATE

THIS AGREEMENT IS EFFECTIVE ON THE DATE IT IS APPROVED BY THE FORT BEND COUNTY COMMISSIONERS COURT, AND IF NOT SO APPROVED SHALL BE NULL AND VOID.

DATE OF COMMISSIONERS COURT APPROVAL: _____

AGENDA ITEM NO.: _____

ATTACHMENT A SCOPE OF SERVICES (PLANS, SPECIFICATIONS AND ESTIMATE)

SERVICES TO BE PROVIDED BY THE ENGINEER

The Engineer shall provide engineering services required for the preparation of plans, specifications, and estimates (PS&E) and related documents, for constructing the Fort Bend Parkway Toll Road (Segment C)(Project No. 101-1050) from Sta. 1312+00 to Sta. 1414+00. These engineering services may include, but are not limited to, project management and coordination with all team member consultants to provide a complete PS&E. Specific design effort will include: preparing roadway and bridge designs, drainage design, construction sequence and traffic control plan, storm water pollution prevention plan, signing and pavement marking design and traffic signal design (if required). The Engineer will provide Subsurface Utility Engineering and Utility Coordination.

GENERAL REQUIREMENTS

1.1 Design Criteria. The Engineer shall prepare all work in accordance with the latest version of applicable TxDOT procedures, specifications, manuals, guidelines, standard drawings, and standard specifications or previously approved special provisions and special specifications, which include: the *PS&E Preparation Manual*, *Roadway Design Manual*, *Hydraulic Design Manual*, the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, *Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (latest Edition)*, and other Fort Bend Parkway Toll Road Authority (FBPTRA) approved manuals. When design criteria are not identified in TxDOT manuals, the Engineer shall notify the FBPTRA and refer to the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Street*, (latest Edition). In addition, the Engineer shall follow TxDOT's guidelines in developing the Plan, Specification, and Estimate (PS&E) package. The Engineer shall prepare the PS&E package in a form suitable for letting through the FBPTRA's contract bidding and awarding process.

The Engineer shall identify, prepare exhibits and complete all necessary forms for each Design Exception and Waiver required within project limits prior to the 30% project completion submittal. The Engineer shall submit each exception and waiver to the FBPTRA for coordination and processing of approvals. If subsequent changes require additional exceptions, the Engineer shall notify the FBPTRA in writing as soon as possible after identification of each condition that may warrant a design exception or waiver.

1.2 Right-of-Entry and Coordination. The Engineer shall notify the FBPTRA and secure permission to enter private property for any team member needing to perform any surveying, environmental, engineering or geotechnical activities needed off TxDOT right-of-way. The Engineer shall not commit acts which would result in damages to private property, and the Engineer shall make every effort to comply with the wishes and address

the concerns of affected private property owners. The Engineer or representative team member shall contact each property owner prior to any entry onto the owner's property and shall request concurrence from the FBPTRA prior to each entry.

The Engineer shall notify the FBPTRA and coordinate with adjacent engineers on all controls at project interfaces. The Engineer shall document the coordination effort, and each engineer shall 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 and each adjacent engineer shall meet jointly with the FBPTRA for resolution. The FBPTRA will have authority over the Engineer's disagreements and the FBPTRA's decision will be final.

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

1.3 Progress Reporting and Invoicing. The Engineer shall invoice according to Function Code breakdowns shown in the Contract for Engineering Services. The Engineer shall submit each invoice in a format acceptable to the FBPTRA.

The Engineer shall submit a monthly written progress report to the FBPTRA's Project Manager regardless of whether the Engineer is invoicing for that month. The Engineer's written progress report shall describe activities during the reporting period; activities planned for the following period; problems encountered and actions taken to remedy them; list of meetings attended; and overall status, including a per cent complete by task.

The Engineer shall prepare a design time schedule and an estimated construction contract time schedule, using the latest version of Primavera software or any FBPTRA approved programs. 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 Engineer shall provide assistance to FBPTRA personnel in interpreting the schedules. The Engineer shall schedule milestone submittals at 30%, 60%, 90% and final project completion phases. The Engineer shall advise the FBPTRA in writing if the Engineer is not able to meet the scheduled milestone review date.

Once the project goes to letting, all electronic files shall be delivered within 30 days of written request.

Final payment is contingent upon the FBPTRA's receipt and confirmation by the FBPTRA's Project Manager that the electronic files run and are formatted in accordance with FBPTRA requirements and all review comments are addressed.

The Engineer shall prepare a letter of transmittal to accompany each document submittal to the FBPTRA. At a minimum, the letter of transmittal must include the FBPTRA project number, the highway number, County, and project limits.

1.4 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 required services under each Work Authorization. The Engineer shall comply with the requirements of the most recent edition of the TMUTCD. The Engineer shall submit a copy of each TCP to the FBPTRA for approval prior commencing any work on any FBPTRA, TxDOT or County roadway. The Engineer shall provide all signs, flags, and safety equipment needed to execute the approved TCP. The Engineer shall notify the FBPTRA in writing twenty-four (24) hours in advance of executing each TCP requiring a lane closure and shall have received written concurrence from the FBPTRA or appropriate agency prior to beginning the lane closure. The Engineer's field crew shall always possess a copy of the approved TCP on the job site and shall make the TCP available to the FBPTRA or other agency personnel for inspection upon request. The Engineer shall assign charges for any required traffic control to the applicable function code.

1.5. State-Controlled Waters. The placement of a new structure or modification of an existing structure(s) within State-Controlled waters will require confirmation that said structure(s) lie within the General Land Office (GLO) state owned land and whether the crossing is tidally influenced or not. Consequently, the Engineer shall request, as early in the design process as possible, that the State determine whether the proposed improvements are found within the tidal GLO, is a submerged GLO property or a non-tidal GLO property. The State may request assistance from the Engineer to prepare an exhibit demonstrating the location of the proposed improvements on the GLO State Owned Map for the project location of an assigned State's District.

1.6. Coordination. The Engineer shall coordinate issues and communications with TxDOT and other agencies through the FBPTRA's Project Manager. The FBPTRA will communicate the resolution of issues and provide the Engineer direction through the FBPTRA's Project Manager.

1.7. Level of Effort. For each work authorization, the Engineer shall base the level of effort for the agreed project scope based on the level of effort spreadsheet. at each phase on the prior work developed in earlier phases without unnecessary repetition or re-study. As directed by the FBPTRA, 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.

1.8. Quality Assurance (QA) and Quality Control (QC). The Engineer shall provide peer review at all levels. For each deliverable, the Engineer shall have some 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 red-line mark-ups are submitted. The FBPTRA's Project

Manager may require the Engineer to submit the Engineer's internal mark-up (red lines) or comments developed as part the Engineer's quality control step. When internal mark-ups are requested by the FBPTRA in advance, the FBPTRA, at its sole discretion, may reject the actual deliverable should the Engineer fail to provide the 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 FBPTRA. . If, at any time, during the course of reviewing a survey submittal it becomes apparent to the FBPTRA that the submittal contains errors, omissions, or inconsistencies, the FBPTRA 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.

1.9. Use of the TxDOT's Standards. The Engineer shall identify and insert as frequently as is feasible the applicable, current TxDOT's Standard Details, TxDOT Houston District Standard Details, or miscellaneous details that have been approved for use in the plan. The Engineer shall sign, seal, and date each Standard and miscellaneous detail if the Standard selected has not been adopted for use by TxDOT or if it has been modified. The Engineer shall obtain approval for use of these details during the early stages of design from the FBPTRA Project Manager. In addition, these details shall be accompanied by the appropriate general notes, special specifications, special provisions, and method of payment. The Engineer shall retain the responsibility for the appropriate selection of each Standard identified for use within their design.

1.10. Organization of Plan Sheets. The PS&E shall be complete and organized in accordance with the latest edition of the TxDOT's PS&E Preparation Manual. The PS&E package shall be suitable for the bidding and awarding of a construction contract, and in accordance with the FBPTRA's policies and procedures, and the TxDOT's PS&E Checklist.

1.11. Organization of Design Project Folder and Files (Electronic Project Files). The Engineer shall organize the electronic project files in accordance with the FBPTRA's format requirements.

1.12. Personal Protective Equipment (PPE). 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. The PPE must meet all (1) current standards set by the Occupational Safety and Health Administration (OSHA) and (2) TxDOT requirements (e.g., safety glasses, Type 3 (TY 3) pants for night work). 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.

1.13. Training Requirements. Each member of the Engineer's project team that is performing design or plan review tasks must complete the following Environmental Management System (EMS) e-Learning courses prior to working on the project:

- 1) Storm Water Compliance Requirements in Construction (ENV433)
- 2) EMS Awareness Training (ENV414)
- 3) AP&D Stage Gate Checklist (DES435)
- 4) Design Erosion & Sediment Control (EL4030)
- 5) EPIC Sheet (DES908)
- 6) PS&E Stage Gate Checklist (DES907)
- 7) How to Comply With Section 404 Permits (ENV457)
- 8) CGP Compliance and Enforcement (ENV432)

Information about these online courses may be accessed at: <http://www.txdot.gov/inside-txdot/division/environmental/ems-courses.html>

The Engineer shall ensure that each member of the Engineer's project team that will be performing design or plan review tasks has completed the required training listed above prior to working on the project. In addition, the Engineer shall ensure that the required training is repeated by each member of the project team based on the repeat requirements stated in the EMS training matrix that may be accessed at: <http://www.txdot.gov/inside-txdot/division/environmental/ems-courses.html>

Deliverable:

The Engineer shall provide a list, signed by the Engineer's Project Manager that includes the following:

- 1) the names and titles of all personnel performing design or plan review tasks
- 2) the names of the training courses completed by each person on the list
- 3) the completion dates for the training courses completed by each person on the list

The Engineer shall update and resubmit this list when new personnel are assigned to the project team.

1.14. Data Classification. Unless otherwise clearly labeled or otherwise specifically excepted through a provision of this contract or its attachments, all data provided to or generated by the Engineer under this contract is considered public data.

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

110.1. Data Collection and Field Reconnaissance. The Engineer shall collect, review and evaluate data described below. The Engineer shall notify the FBPTRA in writing whenever the Engineer finds disagreement with the information or documents:

1. Data, if available, from the FBPTRA or TxDOT, including “as-built plans”, existing schematics, right-of-way maps, Subsurface Utility Engineering (SUE) mapping, existing cross sections, existing planimetric mapping, environmental documents, existing channel and drainage easement data, Bridge Inspection records, current unit bid price information, current special provisions, special specifications, and standard drawings.
2. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.
3. Utility plans and documents from appropriate municipalities and agencies.
4. Flood plain information and studies from the Federal Emergency Management Agency (FEMA), the United States Army Corps of Engineers (USACE), local municipalities, and other governmental agencies.
5. Conduct field reconnaissance and collect data including a photographic record of notable existing features.

110.2. Design Criteria. The Engineer shall develop the roadway design criteria based on the controlling factors specified by TxDOT (*i.e.* 4R, 3R, 2R, or special facilities), by use of the funding categories, design speed, functional classification, roadway class and any other set criteria as set forth in *PS&E Preparation Manual, Roadway Design Manual, Bridge Design Manual, Hydraulic Design Manual*, and other deemed necessary TxDOT approved manuals. In addition, the Engineer shall prepare the Design Summary Report (DSR) and submit it electronically. The Engineer shall obtain written concurrence from the FBPTRA prior to proceeding with a design if any questions arise during the design process regarding the applicability of TxDOT’s design criteria.

110.3. Preliminary Cost Estimates. The Engineer shall develop a preliminary cost estimate using the TxDOT’s Average Low Bid Unit Price. The Engineer shall estimate the total project cost including preliminary engineering, final engineering, right-of-way (ROW) acquisition, environmental compliance and mitigation, construction, utility relocation, and construction engineering inspection (CEI).

110.4. Design Concept Conference. The Engineer shall plan, attend and document the Design Concept Conference (DCC) to be held prior to the 30 percent milestone submittal. In preparation for the DCC, the Engineer shall complete a TxDOT’s Design Summary Report to serve as a checklist for the minimum required design considerations. The conference will provide for a brainstorming session in which decision makers, stakeholders and technical personnel may discuss and agree on:

1. Roadway and drainage design parameters

2. Engineering and environmental constraints
3. Project development schedule
4. Other issues as identified by the FBPTRA
5. Identify any Design Exceptions and Waivers
6. Preliminary Construction Cost Estimate

110.4. Geotechnical Borings and Investigations: 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's Geotechnical Manual. The FBPTRA 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 FBPTRA's review comments they shall perform soil borings (field work), soil testing and prepare the boring logs in accordance with the latest edition of the TxDOT's Geotechnical Manual and TxDOT's District's procedures and design guidelines

1. All geotechnical work should be performed in accordance with the latest version of the TxDOT's Geotechnical Manual. All testing shall be performed in accordance with the latest version of the TxDOT's Manual of Test Procedures. American Society for Testing Materials (ASTM) test procedures can be used only in the absence of the TxDOT's procedures. All soil classification should be done in accordance with the Unified Soil Classification System.

2. If applicable, the Engineer shall perform any retaining wall analyses to include 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.

3. 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.

4. The Engineer shall provide a signed, sealed and dated geotechnical report provided by the Geotechnical Engineer which contains, but is not limited to, 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.

5. If applicable, the Engineer shall perform scour analysis to include Grain Size distribution curves with D50 value.

6. 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 TxDOT's District standards.

7. Foundation Studies: The Engineer shall coordinate with the Geotechnical Engineer. to determine the location of soil borings to be drilled along the retaining wall alignments. The soil borings shall 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 FBPTRA's review and comment.

8. The Engineer shall incorporate soil boring data sheets prepared, signed, sealed, and dated by the Geotechnical Engineer. The soil boring sheets shall be in accordance with the TxDOT's WINCORE software as can be found on the Texas Department of Transportation (TxDOT) website.

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

SOCIAL, ECONOMIC AND ENVIRONMENTAL STUDIES AND PUBLIC INVOLVEMENT

120.1. Informal Meetings. The Engineer shall provide technical assistance, preparation of exhibits for, and minutes of informal meetings requested by the public to discuss the pending impacts to neighborhoods and businesses due to roadway shutdowns, detours and access restrictions or as deemed necessary. This is not to be confused with the formal public meetings held during the National Environmental Policy Act (NEPA) process during schematic approval for Public Involvement. It is not anticipated that the Engineer's participation will be needed for the NEPA process. Assistance (exhibits, attendance, etc.) may be required for a formal public meeting/hearing associated with schematic approval work.

120.2. Environmental Permits Issues and Commitments (EPIC) Sheets. The Engineer shall complete the latest version of the EPIC sheets per information provided by the FBPTRA. These sheets must be signed, sealed and dated by the Engineer as indicated in signature block.

120.3. Environmental Study Review. The FBPTRA shall provide the draft and final environmental document to the Engineer for review and implementation into the PS&E package. The Engineer shall consider the constructability issues as it relates to the environmental impacts.

120.4. Environmental Exhibits. The Engineer shall prepare the necessary exhibits for the environmental study to be performed by others. The Engineer shall coordinate with the FBPTRA's Environmental Project Manager for the preparation of these exhibits.

120.5. Cut and Fill Exhibits. If the information is available, the Engineer shall prepare cut and fill exhibits for delineated wetland.

FUNCTION CODE 130(130) – RIGHT-OF-WAY (ROW) DATA

All standards, procedures and equipment used by the Engineer's Surveyor shall be such that the results of the survey will be in accordance with Board Rule 663.15, as promulgated by the Texas Board of Professional Land Surveyors.

The Engineer shall locate the existing ROW within the project limits from the current project control monuments. The Engineer's Surveyor shall prepare parcel sketches for additional ROW needed as determined by design for acquisition by FBPTRA. The Engineer's Surveyor shall prepare metes and bounds descriptions in accordance with Fort Bend County guidelines for property acquisition and add parcels to the existing right-of-way maps for new parcels to be acquired.

130.1. Right-of-Way Map. The Engineer shall review and evaluate the proposed or existing right-of-way map to verify that all construction staging, and alignment considerations have been taken into account. The Engineer shall make every effort to prevent detours and utility relocations from extending beyond the proposed right-of-way lines. The Engineer shall notify the FBPTRA in writing if it is necessary to obtain additional construction easements or rights-of-entry and shall provide justification for such action. The Engineer shall be responsible for identifying and delineating any temporary construction easements in areas outside the Right of Way. The FBPTRA shall secure the necessary legal instruments.

130.2. Utility Locations and Layouts. The Engineer shall coordinate with the FBPTRA to determine the location of each existing and proposed utility and attend meetings with the various utility companies to discuss potential conflicts. The Engineer shall identify and coordinate with each utility company for relocations required within each construction easement or right-of entry. The existing and proposed utility layout shall be represented in a 3D MicroStation subsurface utility design and analysis (SUDA) model.

130.3. Access Management. The Engineer shall coordinate and evaluate access management within the project limits in accordance with the latest TxDOT Access Management Manual or as directed by the FBPTRA.

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

PROJECT MANAGEMENT AND ADMINISTRATION

The Engineer, in association with the FBPTRA's Project Manager shall be responsible for directing and coordinating all activities associated with the project to comply with FBPTRA policies and procedures, and to deliver that work on time.

Project Management and Coordination. The Engineer shall coordinate all subconsultant activity to include quality of and consistency of plans and administration of the invoices and monthly progress reports. The Engineer shall coordinate with necessary local entities.

The Engineer shall:

- Prepare monthly written progress report.
- Develop and maintain a detailed project schedule to track project conformance.
- Meet on a scheduled basis with the FBPTRA to review project progress.
- Prepare, distribute, and file both written and electronic correspondence.
- Prepare and distribute meeting minutes.
- Document phone calls and conference calls as required during the project to coordinate the work for various team members.

FUNCTION CODE 160(150) – ROADWAY DESIGN

Design Surveys and Construction Surveys

Design Surveys and Construction Surveys include performance of surveys associated with the gathering of survey data for topography, cross-sections, all easements, utilities and other related work in order to design a project, or during layout and staking of projects for construction.

1. PURPOSE

The purpose of a design survey is to provide field data in support of transportation systems design.

The purpose of a construction survey is to provide field data in support of highway construction.

2. DEFINITIONS

A design survey is defined as the combined performance of research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3-dimensional) mapping of a project site. A design survey may include, but need not be limited to locating existing right-of-way, cross-sections or data to create cross-sections and Digital Terrain Models (DTM), horizontal and vertical location of utilities and improvements,

detailing of bridges and other structures, review of right-of-way maps, establishing control points, etc.

A construction survey is defined as the combined performance of reconnaissance, field work, analysis, computation, and documentation necessary to provide the horizontal and vertical position of specific ground points to be used by the construction contractor for determining lines and grades.

3. TASKS TO BE COMPLETED

3.1. Design Surveys

The FBPTRA will request design surveys on an as needed basis. The Engineer's Surveyors shall perform tasks including, but not limited to the following:

- i. Obtain or collect data to create cross-sections and digital terrain models.
- ii. Locate existing utilities and easements.
- iii. Locate topographical features and existing improvements.
- iv. Provide details of existing bridge structures.
- v. Provide details of existing drainage features, (e.g., culverts, manholes, etc.).
- vi. Locate wetlands.
- vii. Establish additional and verify existing control points. Horizontal and Vertical control ties must be made and tabulated, to other control points in the vicinity, which were established by other sources such as, the National Geodetic Survey (NGS), and the Federal Emergency Management Agency (FEMA), and any other local entities as directed by the FBTRA.
- viii. Locate existing right-of-ways and easements.
- ix. Review right-of-way maps.
- x. Locate boreholes.
- xi. Perform hydrographic surveys.
- xii. Update existing control data and prepare survey control data sheets for inclusion into a construction plan set.

The Engineer's Surveyors shall also prepare a *Survey Control Index Sheet* and a *Horizontal and Vertical Control Sheet(s)*, signed, sealed and dated by the professional engineer in direct responsible charge of the surveying and the responsible RPLS for insertion into the plan set. The *Survey Control Index Sheet* shows an overall view of the project control and the relationship or primary monumentation and control used in the preparation of the project; whereas, the *Horizontal and Vertical Control sheet(s)* identifies the primary survey control and the survey control monumentation used in the preparation of the project. Both the *Survey Control Index Sheet* and the *Horizontal and Vertical Control Sheet(s)* must be used in conjunction with each other as a set. The State's forms for these sheets can be downloaded from the TxDOT's website.

The following information shall be shown on the *Survey Control Index Sheet*:

- Overall view of the project and primary control monuments set for control of the project
- Identification of the control points
- Baseline or centerline
- Graphic (Bar) Scale
- North Arrow
- Placement of note "*The survey control information has been accepted and incorporated into this PS&E*" which shall be signed, sealed and dated by a Texas Professional Engineer
- RPLS signature, seal, and date

The following information shall be shown on all *Horizontal and Vertical Control Sheets*:

- Location for each control point, showing baseline or centerline alignment and North arrow.
- Station and offset (with respect to the baseline or centerline alignments) of each identified control point.
- Basis of Datum for horizontal control (base control monument/benchmark name, number, datum).
- Basis of Datum for the vertical control (base control monument, benchmark name, number, datum).
- Date of current adjustment of the datum.
- Monumentation set for Control (Description, District name/number and Location ties).
- Surface Adjustment Factor and unit of measurement.
- Coordinates (State Plan Coordinates [SPC] Zone and surface or grid).
- Relevant metadata.

- Graphic (Bar) Scale.
- Placement of note *“The survey control information has been accepted and incorporated into this PS&E”* which shall be signed, sealed and dated by a Texas Professional Engineer
- RPLS signature, seal and date.

3.2. Construction Surveys

The FBPTRA will request construction surveys on an as needed basis. The Engineer’s Surveyors shall perform tasks including, but not limited to the following:

- i. Stake existing or proposed right-of-ways.
- ii. Stake existing or proposed baseline/centerline.
- iii. Stake proposed bridge structures.
- iv. Stake proposed drainage structures (e.g., manholes, culverts, etc.).
- v. Set grade stakes.
- vi. Recover and check existing control points.
- vii. Establish additional control points.
- viii. Check elevations and locations of structures.
- ix. Determine and resolve conflicts associated with survey data.

4. TECHNICAL REQUIREMENTS

- 4.1. Design surveys and construction surveys must be performed under the supervision of a RPLS currently registered with the TBPLS.
- 4.2. Horizontal ground control used for design surveys and construction surveys, furnished to the Engineer’s Surveyor based on acceptable methods conducted by the Engineer’s Surveyor, must meet the standards of accuracy required by TxDOT.

Reference may be made to standards of accuracy for horizontal control traverses, as described in the TxDOT Survey Manual, latest edition, or the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

- 4.3. Vertical ground control used for design surveys and construction surveys, furnished to the Engineer's Surveyor by TxDOT or based on acceptable methods conducted by the Engineer's Surveyor, must meet the standards of accuracy required by TxDOT.

Reference may be made to standards of accuracy for vertical control traverses, as described in the TxDOT Survey Manual, latest edition, or the TSPS Manual of Practice for Land Surveying in the State of Texas, as may be applicable.

- 4.4. Side shots or short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:

i. Side shots or short traverses must begin and end on horizontal and vertical ground control as described above.

ii. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that horizontal locations relative to the control may be reported within the following limits:

- Bridges and other roadway structures: less than 0.1 of one foot.
- Utilities and improvements: less than 0.2 of one foot.
- Cross-sections and profiles: less than 1 foot.
- Bore holes: less than 3 feet.

iii. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that vertical locations relative to the control may be reported within the following limits:

- Bridges and other roadway structures: less than 0.02 of one foot.
- Utilities and improvements: less than 0.1 of one foot.
- Cross-sections and profiles: less than 0.2 of one foot.
- Bore holes: less than 0.5 of one foot.

5. AUTOMATION REQUIREMENTS

- a. Planimetric design files (DGN) must be fully compatible with the *MicroStation* graphics program without further modification or conversion.

- b. Electronically collected and processed field survey data files must be fully compatible with the FBPTRA's computer systems without further modification or conversion.
- c. DTM must be fully compatible with the *OpenRoads civil design* system without further modification or conversion. All DTM must be fully edited and rectified to provide a complete digital terrain model with all necessary break lines.

DELIVERABLES

The deliverables to be specified in individual work authorizations for design surveys and construction surveys shall be any combination of the following:

- Digital Terrain Models (DTM) and the Triangular Irregular Network (TIN) files in a format acceptable by the FBPTRA.
- Maps, plans, or sketches prepared by the Engineer's Surveyor showing the results of field surveys.
- Computer printouts or other tabulations summarizing the results of field surveys.
- Digital files or media acceptable by the FBPTRA containing field survey data (ASCII Data files).
- 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.
- Field survey notes, as electronic and hard copies.
- An 8 ½ inch by 11-inch survey control data sheet for each control point which must include, but need not be limited to, a location sketch, a physical description of the point including a minimum of two reference ties, surface coordinates, a surface adjustment factor, elevation, and the horizontal and vertical datums used.
- A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.
- All GEOPAK GPK files and OpenRoads files.

FUNCTION CODE 160(160) - ROADWAY DESIGN

ROADWAY DESIGN CONTROLS

The Engineer shall inform the FBPTRA of changes made from previous initial meetings regarding each exception, waiver, and variance that may affect the design. The Engineer shall cease all work under this task until the exceptions, waivers, and variances have been resolved between the Engineer and the FBPTRA unless otherwise directed to proceed. The Engineer shall identify, prepare exhibits, and complete all necessary forms for Design Exceptions and Waivers within project limits prior to the 30% Submittal. These exceptions shall be provided to the FBPTRA for coordination and processing of approvals.

160.1. Geometric Design. The Engineer shall:

- A. Refine Schematic (This task may be deleted if the schematic is not available and replaced with Preliminary Geometric layout). The Engineer shall review the schematic provided by FBPTRA to confirm their understanding of the project and to verify completeness and accuracy of the information. The Engineer shall refine the horizontal and vertical alignment of the design schematic in English units for main lanes, ramps, direct connectors, frontage roads, cross streets, including grade separation structures. The Engineer shall determine vertical clearances at grade separations and overpasses, taking into account the appropriate percent grade and super-elevation rate. Minor modifications in the alignment must be considered to provide optimal design. Modifications must be coordinated with the FBPTRA and adjacent Engineers. The FBPTRA must approve the refined schematic prior to the Engineer proceeding to the 30% milestone submittal, and prior to starting on the bridge layouts.
- B. Preliminary Geometric Project Layout. The Engineer shall develop a preliminary geometric project layout (Layout) for the full length of the project to be reviewed and approved by the FBPTRA prior to the Engineer proceeding with the 30% milestone submittal package.

The Layout must consist of a planimetric file of existing features and the proposed improvements within the existing and any proposed ROW. The Layout must also include the following features: existing and proposed ROW, existing and proposed horizontal and vertical alignment and profile grade line, cross culverts, lane widths, cross slopes, ditch slopes, pavement structure, clear zone, dedicated right turn lanes, corner clips, retaining walls (if applicable) guard rail (if applicable), and water surface elevations for various rainfall frequencies, etc. Existing major subsurface and surface utilities must be shown on the Layout.

The Engineer shall develop the proposed alignment to avoid the relocation of existing utilities as much as possible. The Engineer shall consider Americans with Disabilities Act (ADA) requirements when developing the Layout. The Layout must be prepared in accordance with the current TxDOT Roadway Design Manual. The Engineer shall provide horizontal and vertical alignment of the project layout in English units for main lanes and cross streets. Minor alignment alternatives must be considered to provide for an optimal design. The project layout must be

coordinated with the FBPTRA and adjacent Engineers, if any. The Engineer shall also provide proposed and existing typical sections with the profile grade line (PGL), lane widths, cross slopes, ROW lines, ditch shapes, pavement structures and clear zones depicted, etc.

The 3D corridor model must be created using Bentley's OpenRoads GEOPAK tools. The 3D corridor model must include enough details to verify the feasibility of the proposed design.

Prior to proceeding with the final preliminary geometric layout, the Engineer shall also present to the FBPTRA for review and approval, alternatives for the design (e.g. flush or raised curb median) with recommendations and cost estimates for each alternative. The Engineer shall also attend all necessary meetings to discuss the outcome of the evaluations of the study.

160.2. Roadway Design.

The Engineer shall use Bentley's OpenRoads 3D Design technology or GEOPAK in the design and preparation of the roadway plan sheets. The Engineer shall use the versions of MicroStation and GEOPAK that are implemented at TxDOT at the time the work authorization is executed. However, FBPTRA may approve the use of other versions.

The Engineer shall provide roadway plan and profile drawings using CADD standards followed by TxDOT. The drawings must consist of a planimetric file of existing features and files of the proposed improvements. The roadway base map must contain line work that depicts existing surface features obtained from the schematic drawing. Existing major subsurface and surface utilities must be shown. Existing and proposed right-of-way lines must be shown. Plan and Profile must be shown on separate or same sheets (this depends upon width of pavement) for main lanes, frontage roads, and direct connectors, ramps, and cross streets.

The plan view must contain the following design elements:

1. Calculated roadway centerlines for mainlanes, ramps, cross streets and frontage roads, as applicable. Horizontal control points must be shown. The alignments must be calculated using OpenRoads or GEOPAK horizontal geometry tools.
2. Pavement edges for all improvements (mainlanes, direct connectors, ramps, cross streets, driveways and frontage roads, if applicable).
3. Lane and pavement width dimensions.
4. The geometrics of ramps, auxiliary and managed lanes.
5. Proposed structure locations, lengths, and widths.
6. Direction of traffic flow on all roadways. Lane lines and arrows indicating the number of lanes must also be shown.
7. Drawing scale shall be 1"=100'
8. Control of access line, ROW lines and easements.

9. Begin and end superelevation transitions and cross slope changes.
10. Limits of riprap, block sod, and seeding.
11. Existing utilities and structures.
12. Benchmark information.
13. Radii call outs, curb location, Concrete Traffic Barrier (CTB), guard fence, crash safety items and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items.

The profile view must contain the following design elements:

1. Calculated profile grade for proposed mainlanes (cite direction), direct connectors, ramps, cross streets and frontage roads, if applicable. Vertical curve data, including "K" values must be shown. The profiles must be calculated using OpenRoads or GEOPAK vertical geometry tools.
2. Existing and proposed profiles along the proposed centerline of the mainlanes, the outside shoulder line of ramps, and the outside gutter line of the designated (north, south, east or west) bound frontage roads.
3. Water surface elevations at major stream crossing for 2, 5, 10, 25, 50, and 100-year storms.
4. Calculated vertical clearances at grade separations and overpasses, taking into account the appropriate superelevation rate, superstructure depth and required clearance.
5. The location of interchanges, mainlanes, grade separations and ramps (shall include cross sections of any proposed or existing roadway, structure, or utility crossing).
6. Drawing vertical scale to be 1"=10'.

160.3. Typical Sections: The Engineer shall prepare typical sections for all proposed and existing roadways and structures. Typical sections must include width of travel lanes, shoulders, outer separations, border widths, curb offsets, managed lanes, and ROW. The typical section must also include Proposed Profile Grade Line (PGL), centerline, pavement design, longitudinal joints, side slopes, sodding or seeding limits, concrete traffic barriers and sidewalks, if required, station limits, proposed and existing structures including retaining walls, existing pavement removal, riprap, limits of embankment and excavation, etc.

160.4. Mainlane and Frontage Road Design: The Engineer shall provide the design of mainlanes with full shoulders, frontage roads, entrance and exit ramps, managed lanes and auxiliary lanes. The design must be consistent with the approved schematic or refined schematic and the current *TxDOT Roadway Design Manual*.

160.5. Interchange. The Engineer shall be responsible for the complete design of the mainlanes and ramps, auxiliary lanes and direct connectors, and managed lanes as shown on the schematic. The interchange design must be consistent with the schematic design and must include a plan and profile of the thoroughfares,

intersection layout, drainage structures, sidewalks, geometrics, signalization, turnaround details, and transitions to existing roadway. The Engineer shall include the structural details of the direct connectors interchange with the PS&E submittal.

160.6. Cross Streets. The Engineer shall provide an intersection layout detailing the pavement design and drainage design at the intersection of each cross street. The layout must include the horizontal and vertical alignments, curb returns, geometrics, transition length, stationing, pavement, drainage details, and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items. The Engineer shall design for full pavement width to the ROW and provide a transition to the existing roadway.

160.7. Cut and Fill Quantities. The Engineer shall develop an earthwork analysis to determine cut and fill quantities and provide final design cross sections at 100 feet intervals. Cross sections must be created from GEOPAK or 3D corridor model and must be delivered in the standard TxDOT format on 11"x17" sheets or roll plots and electronic files. The Engineer shall provide templates and corridors used to generate the design cross sections. Cross sections and quantities must include existing pavement removals. Annotation shall include at a minimum existing and proposed ROW, side slopes (front & back), profiles, etc.

The Engineer shall submit 1 sets of drawings (PDF) at the 30%, 60%, and 90%, and final submittals, respectively. The Engineer shall submit the current GEOPAK files or OpenRoads 3D corridor model for each submittal.

160.8. Plan Preparation. The Engineer shall prepare roadway plans, profiles and typical sections for the proposed improvements. Prior to the 30% submittal, the Engineer shall schedule a workshop to review profiles, OpenRoads 3D corridor models (if applicable) and cross-sections with the FBPTRA. The profile and cross sections must depict the 2, 5, 10, 25, 50, 100 and 500-year (if available) water surface elevations. The drawings will provide an overall view of the roadway and existing ground elevations with respect to the various storm design frequencies for the length of the project. This will enable the FBPTRA to determine the most feasible proposed roadway profile. The FBPTRA will approve the proposed profiles, 3D corridor models (if applicable), and cross sections before the Engineer continues with the subsequent submittals. This scope of services and the corresponding cost proposal are based on the Engineer preparing plans to construct freeway main lanes, direct connectors, ramps, frontage roads, and cross streets at intersections. The roadway plans must consist of the types and be organized in the sequence as described in the *PS&E Preparation manual*.

160.9. Wetlands Information. From the information provided by the FBPTRA Environmental consultant, the wetland areas are to be staked, fenced and the delineation surveyed by the Survey consultant and provided to the Engineer. The survey data must be electronically transferred to the Plan and Profile (P&P) sheets and the volumes calculated for the delineated areas

160.10. Pavement Design. If applicable, the Engineer shall incorporate the pavement design provided by the FBPTRA for this project.

160.11. Pedestrian and Bicycle Facilities. The Engineer shall coordinate with the FBPTRA to incorporate pedestrian and bicycle facilities as required or shown on the project's schematic. All pedestrian and bicycle facilities must be designed in accordance with the latest Americans with Disabilities Act Accessibility Guidelines (ADAAG), the Texas Accessibility Standards (TAS), and the AASHTO Guide for the Development of Bicycle Facilities.

FUNCTION CODE 160(161) - ROADWAY DESIGN

DRAINAGE

161.1. Data Collection. The Engineer shall provide the following data collection services:

1. Conduct field inspections to observe current conditions and the outfall channels, the cross-drainage structures, drainage easements, the tributary channel, and land development projects that contribute flow to the tributary. Document field inspections with digital photos.
2. Collect available applicable data including GIS data and maps, site survey data, construction plans, previous reports and studies, and readily available rainfall history for the area. Particular sources of data collected must include, but are not limited to, the State, County, and Federal Emergency Management Agency (FEMA).
3. Collect available Flood Insurance Rate Maps (FIRMs), Flood Insurance Study (FIS) study data, and models.
4. Review survey data and coordinate any additional surveying needs with FBPTRA.
5. Present existing drainage structures in a 3D corridor-MicroStation model.
6. Meet with local government officials to obtain historical flood records. Interview local residents or local government employees to obtain additional high-water information if available. Obtain frequency of road closure and any additional high-water information from Fort Bend County Engineers office and FBPTRA.
7. Submit a letter report to the FBPTRA Project Manager detailing completion of data collection.

161.2. Hydrologic Studies. The Engineer shall provide the following services:

1. Incorporate in the hydrologic study a thorough evaluation of the methodology available, comparison of the results of two or more methods, and calibration of results against measured data, if available.
2. Calculate discharges using appropriate hydrologic methods and as approved by the FBPTRA.

3. Consider the pre-construction and post-construction conditions in the hydrologic study, as required in the individual Work Authorization.
4. Obtain the drainage area boundaries and hydrologic parameters such as impervious covered areas, and overland flow paths and slopes from appropriate sources including, but are not limited to, topographic maps, GIS modeling, construction plans, and existing hydrologic studies. The Engineer shall not use existing hydrologic studies without assessing of their validity. If necessary, obtain additional information such as local rainfall from official sites such as airports.
5. Include, at a minimum, the “design” frequency to be specified in the Work Authorization and the 1% Annual Exceedance Probability (AEP) storm frequency. The report must include the full range of frequencies (50%, 20%, 10%, 4%, 2%, 1%, and 0.2% AEP).
6. Compare calculated discharges to the effective FEMA flows. If calculated discharges are to be used in the model instead of the effective FEMA flows, full justification must be documented.

161.3. Complex Hydraulic Design and Documentation. The Engineer shall provide the following services:

1. Gather information regarding existing drainage facilities and features from existing plans and other available studies or sources.
2. Perform hydraulic design and analysis using appropriate hydraulic methods, which may include computer models such as HEC-RAS, unsteady HEC-RAS or 2D models such as SWMM. 2D models shall not be developed without the express permission of the FBTRA. Data entry for appropriate hydraulic computer programs shall consist of a combination of both on-the-ground survey and other appropriate sources including but not limited to topographic maps, GIS modeling, and construction plans and existing hydrologic studies.
3. Use the current effective FEMA models, where appropriate, as a base model for the analysis. If a “best available data” model is provided by the local floodplain administrator, it must be utilized accordingly for this analysis. Review the provided base model for correctness and updated as needed. If the provided effective model is not in a HEC-RAS format, convert it to HEC-RAS for this analysis.
4. If the appropriate hydrologic model requires storage discharge relationships, develop HEC-RAS models that will compute these storage discharge relationships along the channel.
5. Consider pre-construction, present and post-construction conditions, as well as future widening, as determined in the Work Authorization.
6. Quantify impacts, beneficial or adverse, in terms of increases in peak flow rates and water surface elevations for the above listed hydraulic conditions

and hydrologic events. Impacts will be determined both upstream and downstream of the bridge crossings.

7. If required in the individual Work Authorization, compute right of way corridor 1% AEP flood plain volumes for existing and proposed roadway elevations. The Engineer shall provide mitigation to offset a decrease in 1% AEP flood plain volumes.
8. Use hydrograph calculations and peak flows to determine the storage required.
9. If necessary, present mitigation measures along with the advantages and disadvantages of each. Each method must consider the effects on the entire area. Include approximate construction costs in the report.
10. Provide hand calculations which quantify the cut and fill within the 1% AEP flood plain, if any.

161.4. Storm Drains

The Engineer shall provide the following services:

1. Design and analyze storm drains using software as approved by the FBPTRA.
2. Size inlets, laterals, trunk line and outfall. Develop designs that minimize the interference with the passage of traffic or incur damage to the highway and local property in accordance with the TxDOT's Hydraulic Design Manual, District criteria and any specific guidance provided by the FBPTRA. Storm drain design software shall be selected as directed by the Work Authorization.
3. Determine hydraulic grade line starting at the outfall channel for each storm drain design. Use the design water surface elevation of the outfall as the starting basis (tailwater) for the design of the proposed storm sewer system.
4. Calculate manhole head losses. Compute manhole head losses as per FHWA's HEC-22.
5. Limit discharge into existing storm drains and existing outfalls to the capacity of the existing system, which will be determined by the Engineer. Evaluate alternate flow routes or detention, if necessary, to relieve system overload. Determine the amount of the total detention storage to control storm drain runoff for the design frequency based on hydrograph routing for the full range of frequencies (50%, 20%, 10%, 4%, 2%, 1%, and 0.2% AEP), as well as a rough estimate of the available on-site volume. When oversized storm drains are used for detention, the Engineer shall evaluate the hydraulic gradeline throughout the whole system, within project limits, for the design frequency or frequencies. The Engineer shall coordinate with the FBPTRA any proposed changes to the detention systems. The FBPTRA will assess the effects of such changes on the comprehensive drainage studies.

6. Identify areas requiring trench protection, excavation, shoring, and dewatering.

161.5. Cross-Drainage Structures: The Engineer shall provide the following services:

1. Determine drainage areas and flows for cross culvert drainage systems.
2. Determine the sizing of the drainage crossings. The scope may include extending, adjusting or replacing non-bridge-class culvert crossing or crossings as specified in the Work Authorization. Develop designs that minimize the interference with the passage of traffic or cause damage to the highway and local property in accordance with TxDOT's Hydraulic Design Manual, District criteria and any specific guidance provided by the FBPTRA. Cross drainage design shall be performed using HY-8 or HEC RAS.

161.6. Temporary Drainage Facilities: The Engineer shall provide the following services:

1. Develop plans for all temporary drainage facilities necessary to allow staged construction of the project and to conform with the phasing of adjacent construction projects without significant impact to the hydraulic capacity of the area. Drainage area maps are not required for temporary drainage.

161.7. Scour Analysis. The Engineer shall provide the following services:

1. Perform a scour analysis for each proposed bridge structure.
2. Prepare each scour analysis using a TxDOT-approved methodology listed in the Work Authorization. The Engineer shall select the methodology based on the site conditions such as the presence of cohesive or cohesionless soil, rock or depth of rock, proposed foundation type, and existing site performance. The Engineer shall follow the methodology outlined in the TxDOT Geotechnical Manual. The Engineer shall coordinate with FBPTRA prior to commencing any work on any Stream Migration Study. This coordination must include consultation with the appropriate technical expert.
3. Provide the FBPTRA the potential scour depths, envelope and any recommended countermeasures including bridge design modifications and/or revetment.

161.8. Environmental Permits:

The Engineer shall notify the FBPTRA project manager when site conditions may require environmental permits such as Nationwide Permit, §404 Individual Permits (including mitigation and monitoring) and U. S. Coast Guard and U.S. Army Corps of Engineers §10 Permits.

161.9. Plans, Specifications and Estimates (PS&E) Development for Hydraulics:

The Engineer shall provide the following services:

1. Prepare the PS&E package in accordance with the applicable requirements of the TxDOT's specifications, standards, and manuals, including the PS&E Preparation Manual. Include the following sheets and documents, as appropriate:
 - i. Hydrologic Data Sheets
 - ii. Hydraulic Data Sheets
 - iii. Scour Data Sheets (if applicable)
 - iv. Culvert Layout Sheets
 - v. Storm Drain Plan/Profile Sheets
 - vi. Detention Pond Layouts
 - vii. Detention Pond Details
 - viii. Roadway Plan & Profile Sheets including profile grade line of parallel ditches, if applicable.
 - ix. All other relevant sheets
2. Prepare culvert cross sections and identify each cross-section's station location.
3. Identify areas requiring trench protection, excavation, shoring and de-watering.
4. Prepare drainage area maps.
5. If applicable, prepare plan and profile sheets for storm drain systems and outfall ditches.
6. Select any necessary standard details from TxDOT's list of standards for items such as inlets, manholes, junction boxes and end treatments.
7. Prepare details for non-standard inlets, manholes and junction boxes.
8. Prepare drainage details for outlet protection, outlet structures and utility accommodation structures
9. Identify pipe strength requirements
10. Prepare drainage facility quantity summaries

11. Identify potential utility conflicts and, if feasible, design to mitigate or avoid those identified conflicts.
12. Consider pedestrian facilities, utility impacts, driveway grades, retaining wall and concrete traffic barrier drainage impacts.
13. Identify existing ground elevation profiles at the ROW lines on storm sewer plan and profile sheets.
14. Locate soil borings every 500 feet along the storm sewer alignment and take piezometric readings at 2000 feet intervals.
15. Prepare Hydraulic Data Sheets for any bridge or cross drainage structures at the outfall channel and indicate site location (e.g., station and name of creek or bayou), if applicable.
16. Develop a 3D model of the proposed drainage structures using the SUDA capabilities of the GeoPak/OpenRoads Product.
17. Develop layouts for the following:
 - i. Subsurface drainage at retaining walls.
 - ii. Outfall channels within existing ROW.
 - iii. Bridge deck drainage systems, including internal drainage piping within the bents where required on structures.
 - iv. Detention ponds, associated outlet structures, and details, if applicable. If information is not available at the time of initial scoping, this work shall be considered as additional work.

FUNCTION CODE 160(162) - ROADWAY DESIGN

SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION (PERMANENT)

162.1. Signing. The Engineer shall prepare drawings, specifications, and details for all signs. The Engineer shall coordinate with the FBPTRA (and other Engineers as required) for overall temporary, interim and final signing strategies and placement of signs outside contract limits. The Engineer shall:

- Prepare sign detail sheets for large guide signs showing dimensions, lettering, shields, borders, corner radii, etc., and shall provide a summary of large and small signs to be removed, relocated, or replaced.

- Designate the shields to be attached to guide signs.
- Illustrate and number the proposed signs on plan sheets.
- Select each sign foundation from TxDOT Standards.

162.2. Pavement Marking. The Engineer shall detail both permanent and temporary pavement markings and channelization devices on plan sheets. The Engineer shall coordinate with the FBPTRA (and other Engineers as required) for overall temporary, interim, and final pavement marking strategies. The Engineer shall select Pavement markings from the latest TxDOT standards.

The Engineer shall provide the following information on signing and pavement marking layouts:

- Roadway layout.
- Center line with station numbering.
- Designation of arrow used on exit direction signs
- Culverts and other structures that present a hazard to traffic.
- Location of utilities.
- Existing signs to remain, to be removed, to be relocated or replaced.
- Proposed signs (illustrated, numbered and size).
- Proposed overhead sign bridges to remain, to be revised, removed, relocated, or replaced.
- Proposed overhead sign bridges, indicating location by plan.
- Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.
- Quantities of existing pavement markings to be removed.
- Proposed delineators, object markers, and mailboxes.
- The location of interchanges, mainlanes, grade separations, frontage roads, cross streets and ramps.
- The number of lanes in each section of proposed highway and the location of changes in numbers of lanes.
- Right-of-way limits.
- Direction of traffic flow on all roadways.

162.3. Traffic Warrant Studies . The Engineer shall prepare a traffic signal warrant study to support their recommendation for the continuous activation of an existing traffic signal or a proposed traffic signal based on projected volumes. Each warrant study must include addressing pedestrian signals along with obtaining both traffic and pedestrian counts.

The Engineer shall implement each proposed traffic signal improvement within existing TxDOT ROW unless otherwise approved by the FBPTRA. The Engineer shall refer to latest version of the *TMUTCD*, *Traffic Signal Manual*, and TxDOT's roadway (ramp) and traffic standards for work performed for either temporary or permanent traffic signals. The Engineer shall develop and include a timing plan for each signal improvement.

162.4. Traffic Signals. Based upon the results of the Traffic Warrant Studies, the Engineer shall identify and prepare Traffic Signal Plans for all warranted traffic signals. The Engineer shall confirm the power source for all signals and coordinate with the appropriate utility agency. Traffic Signal Plans must be signed and sealed by a Texas Registered Professional Engineer. The Engineer shall develop all quantities, general notes, specifications and incorporate the appropriate agency standards required to complete construction. Traffic signal poles, fixtures, signs, and lighting must be designed per FBPTRA's recommendations and TxDOT standards.

The Engineer shall provide the following information in the Traffic Signal Plans:

1. Layout
 - a. Estimate and quantity sheet
 - (1) List of all bid items
 - (2) Bid item quantities
 - (3) Specification item number
 - (4) Paid item description and unit of measure
 - b. Basis of estimate sheet (list of materials)
 - c. General notes and specification data.
 - d. Condition diagram
 - (1) Highway and intersection design features
 - (2) Roadside development
 - (3) Traffic control including illumination
 - e. Plan sheet(s)
 - (1) Existing traffic control that will remain (signs and markings)
 - (2) Existing utilities
 - (3) Proposed highway improvements
 - (4) Proposed installation
 - (5) Proposed additional traffic controls
 - (6) Proposed illumination attached to signal poles.
 - (7) Proposed power pole source
 - f. Notes for plan layout
 - g. Phase sequence diagram(s)
 - (1) Signal locations
 - (2) Signal indications
 - (3) Phase diagram
 - (4) Signal sequence table
 - (5) Flashing operation (normal and emergency)
 - (6) Preemption operation (when applicable)
 - (7) Contact responsible Agency to obtain interval timing, cycle length and offset
 - h. Construction detail sheets(s)
 - (1) Poles (State standard sheets)

- (2) Detectors
 - (3) Pull Box and conduit layout
 - (4) Controller Foundation standard sheet
 - (5) Electrical chart
 - i. Marking details (when applicable)
 - j. Aerial or underground interconnect details (when applicable)
2. General Requirements
 - a. Contact local utility company
 - (1) Confirm power source
 - b. Prepare governing specifications and special provisions list
 - c. Prepare project estimate
 - d. Conduct traffic counts and prepare Traffic Signal Warrant Studies for all proposed and existing traffic signals at designated locations.
 3. Summary of Quantities
 - a. Small signs tabulation
 - b. Large signs tabulation including all guide signs
 4. Sign Detail Sheets
 - a. All signs except route markers
 - b. Design details for large guide signs
 - c. Dimensioning (letters, shields, borders, etc.)
 - d. Designation of shields attached to guide signs

FUNCTION CODE 160(163) - ROADWAY DESIGN

MISCELLANEOUS (ROADWAY)

The Engineer shall provide the following services:

163.1. Retaining Walls and Miscellaneous Structures. The Engineer shall develop each retaining wall design and determine the location of each soil boring needed for the foundation design of each retaining wall in accordance with the *Geotechnical Manual*. Prior to preparation of retaining wall layouts, the Engineer shall prepare a comparative cost analysis of different types of retaining walls versus roadway embankment, pavement, soil stabilization, retaining walls type, and available ROW to determine optimum selection based on economics, construction time duration, ROW encroachments (need for construction easements) and construction feasibility. The Engineer shall submit early in the plan preparation the retaining wall layouts to obtain approval from the FBPTRA. The Engineer shall incorporate all necessary information from above referenced manuals and respective checklists into the retaining wall layouts. For stage construction, the Engineer shall indicate limits of existing retaining walls for removal and reconstruction and determine limits of temporary retaining walls to be shown on the TCP.

For projects that have retaining walls, the Engineer shall develop the retaining walls in the 3D corridor model.

The approximate limits of each retaining wall shall be based on Station or length. The Engineer shall notify the FBPTRA the type of retaining walls that will be used for Cut and Fill locations. Retaining wall types must include:

- Spread Footing Walls (High Footing Pressure Design and Low Footing Pressure Design). The Engineer shall select a spread footing wall for fill situation when considerable room behind the walls is available for forming, constructing, and backfilling the footings and stem. The Engineer shall notify the FBPTRA when the quantity is less than 1000 square feet to have as option in the plans to cast in place a spread footing wall design. This selection has to be approved by the FBPTRA. Mechanically Stabilized Earth (MSE) Walls. The
- Engineer shall prepare the retaining wall layouts showing plan and profile or retaining walls for design by a TxDOT approved vendor. The Engineer is responsible for design of geometry and wall stability. The Engineer shall incorporate a slope of 4:1 or flatter from the existing and finished ground line elevation to the face of the retaining wall.
- Concrete Block Walls (Structural and Landscape).
- Tied Back Walls.
- Soil Nailed Walls.
- Rock Nailed Walls
- Drilled Shaft Walls.
- Temporary MSE Walls.

The Engineer shall provide layouts (scale 1"=100'), elevations, quantity estimate, summary of quantities, typical cross sections and structural details of all retaining walls within the project. Approximate lengths of the retaining walls as shown on the schematic are listed as below. The Engineer shall determine if any additional walls are required and verify the need for and length of the retaining walls as shown on the schematic.

If applicable, the FBPTRA will provide architectural standard drawings. The Engineer shall incorporate architectural standard drawings into design details. The specific requirements for each item are as follows:

1. Layout Plan

- (1) Designation of reference line
- (2) Beginning and ending retaining wall stations
- (3) Offset from reference line
- (4) Horizontal curve data
- (5) Total length of wall
- (6) Indicate face of wall
- (7) All wall dimensions and alignment relations (alignment data as necessary)

- (8) Soil boring locations
 - (9) Drainage, signing, lightning, etc. that is mounted on or passing through the wall.
 - (10) Subsurface drainage structures or utilities which could be impacted by wall construction.
2. Elevation:
- (a) Top of wall elevations
 - (b) Existing and finished ground line elevations
 - (c) Vertical limits of measurement for payment
 - (d) Type, limits and anchorage details of railing (only if Traffic Railing foundation standard is not being used on this project)
 - (e) Top and bottom of wall profiles plotted at correct station & elevation.
 - (f) Underdrains
 - (g) Any soil improvement, if applicable.
 - (h) Drainage, signing, lighting etc. as noted above
 - (i) Drainage structures and utilities as noted above
3. Sectional View:
- (a) Reinforced volume
 - (b) Underdrain location
 - (c) Soil improvements, if applicable.
4. General Guidelines for Retaining Walls
- (a) The Engineer shall verify with the Geotechnical Firm that will perform design calculations to check the external stability of the walls including slope stability, bearing, sliding and overturning and detail drawings in accordance with the standard TxDOT requirements.
 - (b) For retaining wall submittals, the Engineer shall check TxDOT's Bridge Division website for current requirements.

163.2. Traffic Control Plan, Detours, Sequence of Construction. The Engineer shall prepare Traffic Control Plans (TCP) including TCP typical sections, for the project. A detailed TCP must be developed in accordance with the latest edition of the TMUTCD. The Engineer shall implement the current TxDOT Barricade and Construction (BC) standards and TCP standards as applicable. The Engineer shall interface and coordinate phases of work, including the TCP, with adjacent Engineers. The Engineer shall:

- 1. Provide a written narrative of the construction sequencing and work activities per phase and determine the existing and proposed traffic control devices (regulatory signs, warning signs, guide signs, route markers, construction pavement markings, barricades, flag personnel, temporary traffic signals, etc.) to be used to handle traffic during each construction sequence. The Engineer shall show proposed traffic control devices at grade intersections during each construction phase (stop signs, flag person,

- signals, etc.). The Engineer shall show temporary roadways, ramps, structures (including railroad shoo-fly) and detours required to maintain lane continuity throughout the construction phasing. If temporary shoring is required, prepare layouts and show the limits on the applicable TCP.
2. Coordinate with the FBPTRA in scheduling a Traffic Control Workshop and submittal of the TCP for approval. The Engineer shall assist FBPTRA in coordinating mitigation of impacts to adjacent schools, emergency vehicles, pedestrians, bicyclists and neighborhoods.
 3. Develop each TCP to provide continuous, safe access to each adjacent property during all phases of construction and to preserve existing access. The Engineer shall notify the FBPTRA in the event existing access must be eliminated and must receive approval from FBPTRA prior to any elimination of existing access.
 4. Design temporary drainage to replace existing drainage disturbed by construction activities or to drain detour pavement. The Engineer shall show horizontal and vertical location of culverts and required cross sectional area of culverts.
 5. Prepare each TCP in coordination with the FBPTRA. The TCP must include interim signing for every phase of construction. Interim signing must include regulatory, warning, construction, route, and guide signs. The Engineer shall interface and coordinate phases of work, including the TCP, with adjacent Engineers, which are responsible for the preparation of the PS&E for adjacent projects.
 6. Maintain continuous access to abutting properties during all phases of the TCP. The Engineer shall develop a list of each abutting property along its alignment. The Engineer shall prepare exhibits for and attend meetings with the public, as requested by the FBPTRA.
 7. Make every effort to prevent detours and utility relocations from extending beyond the proposed Right-of-way lines. If it is necessary to obtain additional permanent or temporary easements and Right-of-Entry, the Engineer shall notify the FBPTRA in writing of the need and justification for such action. The Engineer shall identify and coordinate with all utility companies for relocations required.
 8. Describe the type of work to be performed for each phase of sequence of construction and any special instructions (e.g. storm drain, culverts, bridges, railing, illumination, signals, retaining walls, signing, paving surface sequencing or concrete placement, ROW restrictions, utilities, etc.) that the contractor should be made aware to include limits of construction, obliteration, and shifting or detouring of traffic prior to the proceeding phase.
 9. Include the work limits, the location of channelizing devices, positive barrier, location and direction of traffic, work area, stations, pavement markings, and other information deemed necessary for each phase of construction.
 10. Identify and delineate any outstanding ROW parcels.
 11. Delineate areas of wetlands on traffic control plans.

- 163.3. Temporary Traffic Signals and Illumination:** The Engineer shall immediately notify the FBPTRA if the Engineer determines that an existing traffic signal or roadway illumination will be affected by the project. The Engineer shall address the adjustment or realignment of traffic signal heads and the use of detection for mainlanes and side streets on the plans as directed by the FBPTRA. The Engineer shall obtain traffic movement counts to address any new timing plans to minimize the impact during construction and to determine the storage length needed for left and right turn movements. The Engineer shall address lighting of signalized intersections and shall coordinate with local utilities as approved by the FBPTRA.
- 163.4. Illumination.** The Engineer shall refer to TxDOT's *Highway Illumination Manual* and other deemed necessary TxDOT approved manuals for design of continuous lighting and ramp safety lighting for all conventional, high-mast underpass lighting. The Engineer shall include safety lighting as part of each design on each flashing beacon and traffic signal. The Engineer shall provide a preliminary layout for initial review and approval by the FBPTRA. The Engineer shall prepare circuit wiring diagrams showing the number of luminaries on each circuit, electrical conductors, length of runs, service pole assemblies. Underpass lighting must be used on all structures within each project. The Engineer shall integrate existing illumination within the project limits into the proposed design. The Engineer shall coordinate with the FBPTRA to determine the location of proposed high-mast, conventional, and underpass lighting.
- 163.5. Storm Water Pollution Prevention Plans (SWP3).** The Engineer shall develop SWP3, on separate sheets from (but in conformance with) the TCP, to minimize potential impact to receiving waterways. The SWP3 must include text describing the plan, quantities, type, phase and locations of erosion control devices and any required permanent erosion control.
- 163.6. Compute and Tabulate Quantities.** The Engineer shall provide the summaries and quantities within all formal submittals.
- 163.7. Special Utility Details (Water, Sanitary Sewer, etc.)** The Engineer shall develop special details to accommodate or adjust utilities. Prior to developing any special utility detail, the Engineer shall notify the FBPTRA in writing regarding each utility conflict that may require an accommodation. As directed by the FBPTRA the Engineer shall coordinate with each utility to develop each special detail. The Engineer shall develop each utility detail or accommodation in compliance with the TxDOT's *Utility Accommodation Rules*. The Engineer shall prepare each plan sheet, detail sheet, special specification, special provision, and special note required to incorporate the details into the FBPTRA's plans.
- 163.8. Miscellaneous Structural Details.** The Engineer shall provide necessary details required to supplement standard details.

163.9. Agreements (Railroad, etc.) and Layouts. The Engineer shall prepare each railroad or other agency agreement, exhibit, and layout sheet in accordance with the requirements of each railroad and as directed by the FBPTRA. The Engineer shall coordinate with each railroad or agency and the FBPTRA to determine submittal requirements, processing schedules, and exhibit formats. The Engineer shall submit each exhibit to the FBPTRA for review and processing.

163.10. Testimony for Right of Way Hearings. If required, the Engineer shall support and testify in possible Right of Way hearings. As requested by the FBPTRA, the Engineer shall be required to do the following:

1. Research, study, analyze and review the project and the assigned parcels for acquisition.
2. Prepare litigation designs and standard 8.5 x 11 inch, 11 x 17 inch or 24 x 36 inch paper exhibits. These deliverables are considered to be litigation documents and not engineering documents requiring a P.E. seal;
3. Be available to prepare for and testify at hearings, depositions and trials, and;
4. Be available to assist and consult with the Attorney General's Office, with case preparation.

163.11. Estimate. The Engineer shall independently develop and report quantities necessary to construct the contract in standard FBPTRA bid format at the 30, 60, 90% milestone and Final PS&E submittals. The Engineer shall prepare each construction cost estimates using Estimator or any approved method.

163.12. Contract time determination. The Engineer shall prepare a detailed contract time estimate to determine the approximate time required for construction of the project in calendar and working days (based on the TxDOT standard definitions of calendar and working days) at the 90% and Final PS&E milestone. The schedule must include tasks, subtasks, critical dates, milestones, deliverables, and review requirements in a format which depicts the interdependence of the various items and adjacent construction packages. The Engineer shall provide assistance to the FBPTRA in interpreting the schedule.

163.13. Specifications and General Notes. The Engineer shall identify necessary standard specifications, special specifications, special provisions and the appropriate reference items. The Engineer shall prepare General Notes from the FBPTRA *Master List of General Notes*, Special Specifications and Special Provisions for inclusion in the plans and bidding documents. The Engineer shall provide General Notes, Special Specifications and Special Provisions in the required format.

163.14. Constructability Review. The Engineer shall provide Independent Quality Review of the constructability PS&E sets.

The Engineer shall perform constructability reviews at major project design milestones (e.g. 60%, 90%, and final plan) to identify potential constructability issues and options that would provide substantial time savings during construction. The constructability review must be performed for all roadway and structural elements such as Sequence of Work/Traffic Control, Drainage (Temporary and Permanent), Storm Water Pollution Prevention Plan (SWP3), Environmental Permits, Issues and Commitments (EPIC) addressed, identify Utility conflicts; ensuring accuracy and appropriate use of Items, Quantities, General Notes, Standard and Special Specifications, Special Provisions, Contract Time/Schedule, Standards; and providing detailed comments in an approved format. Reviews must be captured in a Constructability Log identifying areas of concern and potential conflict. The Engineer shall provide the results of all Constructability reviews and recommendations at major project design milestone submittals.

163.15 Utility Adjustment Coordination.

Utility Adjustment Coordination must include utility coordination meetings with individual utility companies, communication and coordination with utilities.

The Engineer shall provide Utility Adjustment Coordination as described below:

- Coordination with FBPTRA, PS&E design team, anticipated utility owners, and project stakeholders as required to develop a Utility Conflict Matrix (UCM)

1. UTILITY COORDINATION

The Utility Coordinator shall perform utility coordination and liaison activities with involved utility owners, their consultants, and FBPTRA to achieve project notifications, concurrence letters (Letter of No Objection (LONO)), formal coordination meetings, conflict analysis, and resolution.

- a. The Utility Coordinator shall coordinate all activities with FBPTRA or their designee, to facilitate the orderly progress and completion of design phase. The Utility Coordinator shall be responsible for the following:
 - i. **Work Plan.** Coordinate a work plan including a list of the proposed meetings and coordination activities, and related tasks to be performed, a schedule, and an estimate. The work plan must satisfy the requirements of the project and must be approved by FBPTRA prior to commencing work.
 - ii. **External Communications.** The Utility Coordinator shall coordinate all activities with FBPTRA and its consultants, or other contractors or representatives as authorized by FBPTRA. Also, the Utility Coordinator shall provide FBPTRA copies of

diaries, correspondence, and other documentation of work-related communications between the Utility Coordinator, utility owners, and other outside entities.

iii. **Permits and rights of entry.** Obtain all necessary permits from city, county, municipality, railroad, or other jurisdiction to allow the Engineer to work within existing streets, roads, or private property for additional designating and subsurface utility locating.

- b. As required, the Utility Coordinator shall coordinate with the local utility committees to present a footprint of FBPTRA's project with represented utility companies and owners for their markups of their locations. The Utility Coordinator shall also coordinate with any other utility committees which may include county, city, or other officials, if needed.
- c. The Utility Coordinator shall provide initial project notification letters to all affected utility companies, owners, and other concerned parties, if needed.
- d. The Utility Coordinator shall provide FBPTRA a Utility Contact List for each project with all information such as: (a) Owner's Name; (b) Contact Person; (c) Telephone Numbers; (d) Emergency Contact Number; (e) E-mail addresses; (f) as well as pertinent information concerning their respective affected utilities and facilities, including but not limited to: size, number of poles, material, and other information which readily identifies the utilities companies' facilities.

2. UTILITY AGREEMENTS FOR UTILITY ADJUSTMENTS

- a. Utility Agreements are excluded from this Scope of Services.

DELIVERABLES:

The Engineer shall provide the following:

- Work Plan
- NOPC Letters
- Utility Contact List
- Meeting Minutes (PDF electronic format)

163.16. Utility Engineering.

Utility Engineering includes the identification of utility conflicts, coordination, compliance with the UAR, and resolution of utility conflicts. The Engineer shall coordinate all activities with FBPTRA, or FBPTRA's designee, to facilitate the

orderly progress and completion of FBPTRA's design phase.

The Engineer shall provide Utility Engineering as described below:

- Engineering/Coordination with FBPTRA, PS&E design team, anticipated utility owners, and project stakeholders as required to develop a Utility Conflict Matrix (UCM)
- Up to 4 iterations of the UCM based on 30%, 60%, 90%, and 100% design

1. COORDINATION OF ENGINEERING ACTIVITIES

- a. Utility Layout: The Engineer shall maintain a utility layout in the latest version of MicroStation used by FBPTRA. This layout must include all existing utilities which are to remain in place or be abandoned, and all adjusted utilities. This layout must be utilized to monitor the necessity and evaluate alternatives. The Utility Engineer shall utilize the layout of existing utilities as prepared, if available, and make a determination of the following:
 - i. Facilities in conflict with the proposed project that are to be relocated.
 - ii. Facilities to be abandoned in place.
 - iii. Facilities to remain in service and in place as a result of roadway design adjustments.
 - iv. The Utility Engineer shall be responsible for determining if there are additional facilities not shown in the Subsurface Utility Engineering (SUE) documents, which require relocation. The Engineer shall coordinate this information with FBPTRA immediately upon discovery.

2. PUBLIC & INDIVIDUAL MEETINGS WITH UTILITY COMPANIES

As required, to facilitate utility conflict identification and resolution, the Engineer shall:

- a. Establish contact with all existing utilities within and adjacent to the project limits, and set up monthly utility coordination meetings to discuss concepts and options for construction.
- b. Schedule all utility coordination meetings and ensure compatibility with the schedule of FBPTRA.
- c. Set agenda for all coordination meetings as directed by FBPTRA.

- d. Establish and promote the desired agenda and methodologies for utility construction within the project limits. The agenda and methodologies will consist primarily of promoting the construction of utilities as a part of the Highway Contract.
- e. Work Plan: Develop a work plan including a list of the tasks to be performed, a schedule, and an estimate. The work plan must satisfy the requirements of the project and must be approved by FBPTRA prior to commencing work.
- f. Progress Meetings. The Utility Coordinator shall implement a schedule of monthly meetings (up to X meetings) with all utility companies and owner or owner's representatives for coordination purposes. Such meetings must commence as early as possible in the design process and shall continue until completion of the project. The Utility Coordinator shall notify FBPTRA at least two business days in advance of each meeting to allow FBPTRA the opportunity to participate in the meeting. The Utility Coordinator shall provide and produce meeting minutes of all meetings with said utility companies, owners, or owners' representatives within seven business days.

3. REVIEW OF UTILITY'S PROPOSED ADJUSTMENTS

- a. Evaluate Alternatives: The Utility Engineer shall evaluate alternatives in the adjustment of utilities balancing the needs of both FBPTRA and the Utility.
- b. Review Estimates and Schedules: The Utility Engineer shall review the Utility Adjustment Estimates for reasonableness of cost and the timely scheduling of the adjustment.
- c. Review Plans for compliance with Utility Accommodation Rules and proposed location data. The responsibility for quality and accuracy of Utility Adjustment Plans will remain with the Utility Company.

4. The Engineer shall not provide services for the sole benefit of third parties.

5. The Engineer shall prepare a Signed and Sealed Proposed Utility Layout in the latest version of Micro Station used by FBPTRA that can be overlaid on the base file with drainage. The Engineer shall:

- a. Ensure all facilities conflicts have been resolved.
- b. Ensure all stakeholders have concurred with the various alignments.
- c. Establish the sequence of construction for all utility relocation work whether it is included as a part of the Highway Construction or not.

- d. Determine which utilities will be built as part of the contract.
 - e. Determine which facilities will be relocated prior to construction.
6. The Engineer shall coordinate, develop, and review plans, specifications, and estimates (PS&E) for all utilities included in the construction contract.
 7. The Utility Coordinator shall submit the required number of executed copies of the Utility Agreement Assemblies, a copy of the recorded easement Deed, plans, and estimate to FBPTRA by letter, recommending approval (two original signature and two copies of each). The Transmittal letter should include the following statement “The proposed utility adjustment will not conflict with proposed highway construction and will comply with applicable utility codes and regulations. The utility should be reimbursed for eligible costs incurred within their easement limits for replacement in kind.” The transmittal should also provide a description of the work being done as well as the estimated cost, and schedule of work.

DELIVERABLES:

The Engineer shall provide the following:

- Utility Conflict Matrix
- Utility Conflict Matrix Exhibit
- Meeting Minutes (PDF electronic format)

163.17. Utility Engineering Investigation (currently Subsurface Utility Engineering)

Utility Engineering Investigation (currently Subsurface Utility Engineering) includes utility investigations subsurface and above ground prepared in accordance with AASHTO standards [ASCE C-1 38-22 (<http://www.fhwa.dot.gov/programadmin/asce.cfm>)] and Utility Quality Levels.

The Engineer shall provide additional SUE Quality Levels as described below and incorporate with prior SUE data collected:

- SUE Quality Level B investigation for all utilities
- SUE Quality Level A investigation up to X test holes

1. UTILITY QUALITY LEVELS

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

- Quality Level D - Existing Records: Utilities are plotted from review of available existing records.
- Quality Level C - Surface Visible Feature Survey: Quality level "D" information from existing records is correlated with surveyed surface-

visible features. Includes Quality Level D information. If there are variances in the designated work area of Level D, a new schematic or plan layout will be necessary to identify the limits of the proposed project and the limits of the work area required for this work authorization; including highway stations, limits within existing or proposed right of way, additional areas outside the proposed right of way, and distances or areas to be included along existing intersecting roadways.

- Quality Level B - Designate: Two-dimensional horizontal mapping. This information is obtained through the application and interpretation of appropriate non-destructive surface geophysical methods. Utility indications are referenced to established survey control. Incorporates quality levels C and D information to produce Quality Level B. If there are variances in the designated work area of Level D, a new schematic or plan layout will be necessary to identify the limits of the proposed project and the limits of the work area required for this work authorization; including highway stations, limits within existing or proposed right of way, additional areas outside the proposed right of way, and distances or areas to be included along existing intersecting roadways.
- Quality Level A - Locate (Test Hole): Three-dimensional mapping and other characterization data. This information is obtained through exposing utility facilities through test holes and measuring and recording (to appropriate survey control) utility and environment data. Incorporates quality levels B, C and D information to produce Quality Level A.

2. 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. Designate (Quality Level B) Services are inclusive of Quality levels C and D.

The Engineer shall:

- a. As requested by FBPTRA 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 and their service laterals to the apparent existing right-of-way using non-destructive surface geophysical techniques. No storm sewer facilities are to be designated unless authorized by the FBPTRA. A non-water base paint, utilizing the APWA color code scheme, must be used on all surface markings of underground utilities.
- d. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. A color-coded composite utility facility plan with utility owner names, quality levels, line sizes, and subsurface utility locate (test-hole) locations, must be prepared and delivered to FBPTRA. It is understood by both the Engineer and FBPTRA that the line sizes of designated utility facilities detailed on the deliverable are 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 appurtenance locations must be included in the deliverable to FBPTRA. This information must be provided in the latest version of Micro Station or Geopak used by FBPTRA. The electronic file will be delivered on CD or DVD, as required by FBPTRA. A hard copy is required and must be signed, sealed, and dated by the Engineer. When requested by FBPTRA, the designated utility information must be over laid on FBPTRA's design plans.
- e. Determine and inform FBPTRA of the approximate utility depths at critical locations as determined by FBPTRA. This depth indication is understood by both the Engineer and FBPTRA to be approximate only and is not intended to be used preparing the right of way and construction plans.
- f. Provide a monthly summary of work completed and in process with adequate detail to verify compliance with agreed work schedule.
- g. Close-out permits as required.
- h. 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.
- i. Comply with all applicable FBPTRA policy and procedural manuals.

3. SUBSURFACE UTILITY LOCATE (TEST HOLE) SERVICE (QUALITY LEVEL A)

Locate means 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 shall:

- a. Review requested test hole locations and advise FBPTRA 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. Neatly cut and remove existing pavement material, such that the cut does not to exceed 0.10 square meters (1.076 square feet), unless unusual circumstances exist.
- d. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Engineer:
 - i. Elevation of top and/or bottom of utility tied to the datum of the furnished plan.
 - ii. Identify a minimum of two benchmarks utilized. Elevations must be within an accuracy of 15mm (.591 inches) of utilized benchmarks.
 - iii. Elevation of existing grade over utility at test hole location.
 - iv. Horizontal location referenced to project coordinate datum.
 - v. Outside diameter of pipe or width of duct banks and configuration of non-encased multi-conduit systems.
 - vi. Utility facility material(s).
 - vii. Utility facility condition.
 - viii. Pavement thickness and type.
 - ix. Coating and Wrapping information, and condition.
 - x. Unusual circumstances or field conditions.
- e. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection, or other protective coverings and features.
- f. Be responsible for any damage to the utility during the locating process. In the event of damage, the Engineer shall stop work, notify

the appropriate utility facility owner, FBPTRA, and appropriate regulatory agencies. The regulatory agencies include, but are not limited to 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 shall be liable for all costs involved in the repair or replacement of the utility facility.

- g. Back fill all excavations with appropriate material, compact backfill by mechanical means, and restore pavement and surface material. The Engineer shall be responsible for the integrity of the backfill and surface restoration for a period of three years. Install a marker ribbon throughout the backfill.
- h. Furnish and install a permanent above ground marker directly above center line of the utility facility.
- i. 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 FBPTRA.
- j. Plot utility location position information to scale and provide a comprehensive utility plan sign and sealed by the responsible Engineer. This information shall be provided in the latest version of Micro Station or Geopak format used by the FBPTRA. The electronic file will be delivered on C.D or DVD. When requested by FBPTRA, the Locate information must be over laid on FBPTRA's design plans.
- k. Return plans, profiles, and test hole data sheets to FBPTRA. If requested, conduct a review of the findings with FBPTRA.
- l. Close-out permits as required.

DELIVERABLES:

The Engineer shall provide the following:

- One set of Electronic Files (MicroStation and PDF) on USB and/or Dropbox service of Quality Level A and B (inclusive of QL-C and QL-D) SUE in MicroStation format as requested by FBPTRA
- Two sets of signed and sealed Subsurface Utility Locate (Quality Level A) Test Hole data sheets on 11" x 17" size sheets, (as needed upon request from FBPTRA). Provide digital PDF version as well

- A monthly summary, or at intervals as requested by FBPTRA, with updates of work completed and in process with adequate detail to verify compliance with agreed work schedule
- KMZ of the Quality Level A and B (inclusive of QL-C and QL-D) SUE

FUNCTION CODE 160(165) – ROADWAY DESIGN

Traffic Management Systems (Permanent)

The Engineer shall design and provide details as a part of the FBPTRA's Intelligent Transportation System to be managed from the Combined Transportation, Emergency and Communications Center (CTECC). The design must include elements such as lane-use control signals, variable message signs, closed-circuit Television (TV) cameras, and loop or other vehicle detection devices. The Engineer shall prepare the design and details including conduit and cable, support structures, control equipment, etc. necessary to implement the system. Design specifications shall be defined in the work authorization. The Engineer shall also coordinate with the FBPTRA Computerized Transportation Management Systems (CTMS) Section should the FBPTRA have a computerized traffic management system under construction or in place and operating within the project limits.

FUNCTION CODE 160(170) – ROADWAY DESIGN

BRIDGE DESIGN

170.1 Bridge Layout. The Engineer shall prepare a bridge layout plan sheet for each bridge and bridge class culvert.

Bridges

1. List bridges

Bridge Class Culverts

1. List Culvert Station

The Engineer shall determine the location of each soil boring needed for foundation design in accordance with the *Geotechnical Manual*.

Prior to preparation of each bridge layout, the Engineer shall prepare a comparative cost analysis of bridge structures to determine: (1) the optimum bridge beams for vertical clearance over railroads, roadway, or waterways, (2) the optimum bridge structure versus roadway embankment, pavement, soil stabilization, and retaining walls, and (3) to determine optimum in bridge beams for the direct connectors. .

The Engineer shall submit a bridge layout for each structure early in the plan preparation process to obtain approval from the FBPTRA. The Engineer shall comply with all relevant sections of the latest edition of *TxDOT's LRFD Bridge Design Manual, Bridge Project Development Manual, Bridge Detailing Guide, and AASHTO LRFD Bridge Design Specifications and respective checklists*. Each bridge layout sheet must include bridge typical sections, structural dimensions, abutment and bent locations, superstructure and substructure types. The Engineer shall locate and plot all soil borings and utilities, show proposed retaining walls, and, for staged construction, indicate limits of existing bridge for removal and reconstruction.

170.2 Bridge Detail Summary. The Engineer shall prepare total bridge quantities, estimates, and summary sheets for each bridge or bridge class culvert.

170.3 Bridge Structural Details. The Engineer shall prepare each structural design and develop detailed structural drawings of all required details in compliance with above-listed manuals and guidelines. The Engineer shall assemble and complete all applicable TxDOT Standard Details sheets.

Additionally, the Engineer shall:

- Perform calculations for design of bridge abutments.
- Perform calculations for bridge slab design.
- Perform calculations to determine elevations of bridge substructure and super structure elements.
- Perform calculations for bridge box beam design.
- Prepare necessary foundation details and plan sheets.
- Prepare plan sheets for abutment design.
- Prepare plan sheets for additional abutment details.
- Prepare framing plan and slab plan sheets.
- Compute and prepare tables for slab and bearing seat elevations, dead load deflections, etc.
- Design beams and prepare beam design tables.
- Prepare special provisions and special specifications in accordance with the above-listed manuals and guidelines.

FUNCTION CODE 300(351) – DESIGN VERIF/CHANGES/ALTER

CONSTRUCTION PHASE SERVICES

The Engineer shall provide Construction Phase Services at the written request of the FBPTRA's Project Manager. The written request must include a description of the work requested, a mutually agreed upon time limit, and any special instructions for coordination and submittal. These services shall include, but are not limited to the following:

1. Attend preconstruction meeting
2. Attend partnering meeting

3. Attend field meetings and make visits to site
4. Calculate quantities and assist the area engineer in preparing change orders
5. Review and approval of shop drawings
6. Review and approval of forming details
7. Responding to requests for information (RFIs)
8. Providing minor redesign (major redesign should be handled with a contract supplement), which will include changes to the affected plan sheets and an updated copy of the 3D corridor model.
9. Answering general questions
10. Providing clarification
11. Other project related tasks in support of the FBPTRA during construction

Deliverables

Plans

The Engineer shall provide the following information at each submittal:

1. 30% Plans Submittal

- 1.1. One pdf set of 11" x 17" plan sheets for the FBPTRA Review.
- 1.2. Estimate of construction cost.
- 1.3. Engineer's internal QA and QC markup set.
- 1.4. Design Exceptions with existing and proposed typical sections, location map and design exception exhibits.
- 1.5. A Preliminary 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 30% plan sheets.

2. Between 30% Submittal and 60% Submittal:

- 2.1. One pdf set of 11" x 17" bridge and retaining wall layouts for the FBPTRA review.
- 2.2. External stability analysis for retaining walls.
- 2.3. Engineer's internal QA and QC marked up set.
- 2.4. One set of a roll format TCP phasing layouts and one .pdf of plan sheets for TCP concept.
- 2.5. A preliminary 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the Bridge and Retaining Wall layouts.

3. 60% Plans Submittal:

- 3.1. One pdf set of 11" x 17" plan sets for the FBPTRA review.
- 3.2. Estimate of construction cost.
- 3.3. Engineer's internal QA and QC marked up set.

- 3.4. One set of a roll format TCP phasing layouts and one .pdf of plan sheets for TCP concept.
 - 3.5. A preliminary 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 60% plan sheets. The level of detail of the surface and subsurface features will be at the direction of the FBPTRA.
4. Review Submittal (90%)
 - 4.1. 1 pdf sets of 11" x 17" plan sheets for the FBPTRA Review.
 - 4.2. Estimate of construction cost.
 - 4.3. Marked up general notes
 - 4.4. Construction schedule.
 - 4.5. New Special Specifications and Special Provisions if applicable.
 - 4.6. Engineer's internal QA and QC marked up set.
 - 4.7. Other supporting documents.
 - 4.8. A detailed 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 90% plan sheets. The level of detail of the surface and subsurface features will be at the direction of the FBPTRA.
5. Review Submittal (95%):
 - 5.1. 1 pdf set of 11" x 17" plan sheets for the FBPTRA review
 - 5.2. List of governing Specifications and Special Provisions in addition to those required.
 - 5.3. Marked up general notes.
 - 5.4. Construction Schedule.
 - 5.5. Plans estimate.
 - 5.6. New Special Specifications and Special Provisions, if applicable.
 - 5.7. Triple Zero Special Provisions to be furnished by FBPTRA.
 - 5.8. Engineer sign, seal and date supplemental sheets (8 ½" x 11").
 - 5.9. Contract time determination summary.
 - 5.10. Engineer's internal QA and QC marked-up set.
 - 5.11. Other supporting documents.
 - 5.12. A detailed 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 95% plan sheets. The level of detail of the surface and subsurface features will be at the direction of the FBPTRA.
6. Final submittal (100%).
 - 6.1. 1 pdf set of 11" x 17"
 - 6.2. Revised supporting documents from 95% review comments.
 - 6.3. A final 3D corridor model, in the most current format, created using Bentley's OpenRoads tools. The level of detail of the surface and subsurface features will be at the direction of the FBPTRA.

- 6.4. Final earthwork cross-sections using GEOPAK or Bentley's OpenRoads tools. The level of detail of the surface and subsurface features will be at the direction of the FBPTRA.

Electronic Copies

The Engineer shall furnish the FBPTRA with the electronic files of the final plans in the format requested by FBPTRA, and .pdf format.

The Engineer shall also provide separate electronic files containing cross section information (in dgn, XLR, & ASCII formats) for the FBPTRA contractor to use.

The Engineer shall provide an electronic copy of Primavera file or the latest scheduling program used by the FBPTRA for the construction time estimate.

Calculations

The Engineer shall provide the following:

Provide all quantity and non-structural design calculations.

Provide all engineering calculations, analysis, input calculations, quantities, geometric designs (GEOPAK GPK files), etc. relating to the project's structural elements. Project structural elements include, but are not limited to: bridges, retaining walls, overhead sign foundations, high-mast illumination foundations, non-standard culverts, custom headwalls and drainage appurtenances.

The Engineer may provide the calculations in .pdf format in lieu of the bound hard copies. The .pdf file should be submitted via email or file transfer.

Note: Base rates and Loaded rates listed below are Maximum allowable rates . Payment will be based on actual raw rates x 3.0 not exceeding listed loaded rates.

EHRA		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Clerical	\$26.00	\$78.00
Design CAD Technician	\$31.00	\$93.00
Senior Design CAD Technician	\$52.00	\$156.00
Engineer I	\$36.00	\$108.00
Engineer III	\$46.00	\$138.00
Asst Project Manager	\$65.00	\$195.00
Project Manager	\$80.00	\$240.00
Senior Project Manager	\$90.00	\$270.00
Quality Manager	\$100.00	\$300.00

Associated		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Principal Engineer	\$92.00	\$276.00
Project Engineer	\$90.00	\$270.00
Support Manager	\$82.00	\$246.00
Staff Engineer	\$74.00	\$222.00
Field Service Engineer	\$38.76	\$116.28
Lab Manager	\$35.00	\$105.00
Lab Technician	\$27.50	\$82.50
Traffic Control	\$25.00	\$75.00
Driller	\$90.00	\$270.00
Driller Helper	\$32.00	\$96.00
Logger	\$32.00	\$96.00
Draftsmen	\$46.00	\$138.00
Admin/Clerical	\$31.00	\$93.00

APPLICABLE FOR ALL TEAM MEMEBERS

OTHER DIRECT EXPENSES	COST/UNIT	UNITS
Mileage	\$0.67	Miles
Photocopies B/W (11"x17")	\$0.20	Each
Photocopies B/W (8 1/2"x 11")	\$0.10	Each
Photocopies Color (11"x17")	\$1.00	Each
Photocopies Color (8 1/2"x 11")	\$0.50	Each
Plots (Color on Bond)	\$1.20	Per sq ft.
Overnight Delivery	\$30.00	Each
Report Binding and Tabbing	\$5.00	Each
Postage (Public)	\$0.60	Each
Postage (Certified Mail)	\$7.00	Each

EHRA Team

Note: Base rates and Loaded rates listed below are Maximum allowable rates . Payment will be based on actual raw rates x 3.0 not exceeding listed loaded rates.

IMS		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Principal	\$110.00	\$ 330.00
Senior QA/QC Reviewer	\$110.00	\$ 330.00
Senior Project Manager	\$95.00	\$ 285.00
Project Manager / Deputy Project Manager	\$90.00	\$ 270.00
Senior Engineer	\$90.00	\$ 270.00
Project Engineer	\$70.00	\$ 210.00
Design Engineer	\$60.00	\$ 180.00
Engineer In Training II (E.I.T)	\$45.00	\$ 135.00
Engineer In Training I (E.I.T)	\$35.00	\$ 105.00
Senior CADD/ Designer	\$50.00	\$ 150.00
CADD Technician	\$36.00	\$ 108.00
Engineering Tech	\$40.00	\$ 120.00
Jr. Engineering Tech	\$35.00	\$ 105.00
Sr. Engineering Tech	\$50.00	\$ 150.00
Admin / Clerical Staff	\$38.00	\$ 114.00

KREST		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Admin Clerical	\$26.00	\$78.00
Engineer Tech	\$35.00	\$105.00
Engineer in Training	\$49.00	\$147.00
Project Engineer	\$61.00	\$183.00
Senior Engineer	\$70.00	\$210.00
Quality Manager	\$75.00	\$225.00
Project Manager	\$86.00	\$258.00

Note: Base rates and Loaded rates listed below are Maximum allowable rates . Payment will be based on actual raw rates x 3.0 not exceeding listed loaded rates.

MV		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Support Manager	\$91.99	\$275.97
Technical Advisor - Senior	\$100.60	\$301.80
Quality Manager	\$100.60	\$301.80
Engineer (Senior)	\$90.00	\$270.00
Engineer (Project) - Senior	\$86.00	\$258.00
Engineer (Project)	\$55.40	\$166.20
Engineer (Design)	\$50.50	\$151.50
Engineer (Structural) - Senior	\$95.00	\$285.00
Engineer (Structural)	\$70.00	\$210.00
Engineer (Bridge) - Senior	\$95.00	\$285.00
Engineer (Bridge)	\$64.00	\$192.00
Engineer (Hydraulic) - Senior	\$92.00	\$276.00
Engineer (Hydraulic)	\$64.00	\$192.00
Engineer-In-Training II	\$37.50	\$112.50
Engineer-In-Training I	\$29.56	\$88.68
Engineer Technician	\$26.99	\$80.97
Engineer Technician - Junior	\$26.50	\$79.50
CADD Operator - Senior	\$33.00	\$99.00
CADD Operator	\$33.00	\$99.00
Administrative/Clerical	\$30.02	\$90.06

Thompson		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Support Manager	\$110.58	\$331.74
Quality Manager	\$110.58	\$331.74
Engineer (Senior)	\$84.15	\$252.45
Engineer-In-Training	\$52.93	\$158.79
Administrative/Clerical	\$34.50	\$103.50
Professional Land Surveyor II	\$67.30	\$201.90
Professional Land Surveyor I	\$51.50	\$154.50
Drone Data Processor	\$64.61	\$193.83
Drone Pilot	\$35.24	\$105.72
Surveyor, Party Chief	\$37.62	\$112.86
Surveyor, Instrument Man	\$25.00	\$75.00
Surveyor, Rodman	\$20.00	\$60.00

Note: Base rates and Loaded rates listed below are Maximum allowable rates .
Payment will be based on actual raw rates x 3.0 not exceeding listed loaded rates.

Zainkel		
MAXIMUM SALARY RATE		
JOB CLASSIFICATION	BASE RATE	LOADED RATES (3x BASE RATE)
Principal	\$105.00	\$315
Project Manager	\$85.00	\$255
Senior Project Engineer	\$65.00	\$195
Senior H&H Engineer	\$65.00	\$195
Lead Designer	\$50.00	\$150
GIS	\$60.00	\$180
Senior CADD	\$40.00	\$120
Junior CADD	\$30.00	\$90
EIT	\$30.00	\$90
Inspector	\$38.00	\$114
Admin	\$25.00	\$75

Thompson Survey Rates

Surveying / ROW		
TASK DESCRIPTION	Unit	Unit Rate
Mobilization for LiDAR Mobile mapping System (travel to project) (includes vehicle)	per mile	\$10.00
Fixed Wing Airborne Aerial Imagery/LiDAR - Project Flight Miles (to/from local airport and on-project flight miles)	per mile	\$65.00
RTK Base Radio	hour	\$30.00
GPS Receiver Rate	hour	\$30.00
Helicopter Equipment Aerial Imagery/LiDAR - Project Flight Miles (to/from local airport and on-project flight miles)	per mile	\$65.00
Terrestrial Laser Scanner (rates applied to actual time scanner unit is in use) (scanner owned by provider)	hour	\$125.00
Type II ROW/Control Monument - Excavated/Drilled, rocks, rocky soil. 2-4 inch depth (includes equipment, materials, & rentals). Marker supplied by TxDOT	each	\$100.00
Type II ROW/Control Monument - Poured 2-3 Feet (includes equipment, materials, & rentals). Marker supplied by TxDOT	each	\$300.00
Terrestrial Photogrammetry Camera	hour	\$125.00
Airborne GPS/IMU Data collection/Processing	per project	\$2,500.00
Datum Point Rod Setting (3/4 inch aluminum rod driven to refusal, TxDOT Survey Manual Fig. C-7)	each	\$375.00
Fathometer	day	\$90.00
Ground Target (includes paint and panel material)	each	\$30.00
Hydrographic Sonar Equipment	day	\$500.00
Photo Lab Service - Black and White Processing (film, development, scanning)	per frame	\$20.00
Photo Lab Service - Color Infrared Processing (film, development, scanning)	per frame	\$28.00
Photo Lab Service - Color Processing (film, development, scanning)	per frame	\$30.00
Photo Lab Service - Digital image processing	per frame	\$28.00
Photo Lab Service - Enlargements, Lamination, Mounting	per sq. ft.	\$8.00
Portable LiDAR System (Back Pack Mounted)	day	\$1,750.00
Certified Deed Copies	sheet	\$2.65
Deed Copies	sheet	\$2.00
Reprographics	per sq. ft.	\$5.00
T-Posts (Materials only)	each	\$5.00
Delineator Posts (Materials only)	each	\$25.00
Terrestrial Laser Scanner (rental rates applied to actual time scanner unit is in use)	hour	\$120.00
Mobilization for Aerial Imagery/LiDAR Fixed Wing Aircraft (Includes aircraft, pilot, sensor/LiDAR operator, fuel and transportation cost)	per project	\$25,000.00
Mobilization for Helicopter Aerial Imagery/LiDAR (Includes helicopter pilot, sensor/LiDAR operator, fuel and transportation cost)	per project	\$25,000.00
Mobilization for Unmanned Aerial System (travel to project) (includes vehicle)	per project	\$7,500.00

Associated Testing Rates

Subsurface Field Investigation		
TASK DESCRIPTION	Unit	Unit Rate
Mobilization/Demobilization	LS	\$1,012.00
Drilling and Sampling (continuous) 0-20'	LF	\$27.00
Drilling and Sampling (intermittent) 20'-50'	LF	\$32.00
Drilling and Sampling (intermittent) 50'-125'	LF	\$45.00
Surcharge for Drilling and Sampling Over 100'	LF	\$12.00
ATV Surcharge	LF	\$11.00
TDH Drilling and Sampling Surcharge	LF	\$33.00
Piezometer Installation	LF	\$26.00
Piezometer Abandonment	LF	\$21.00
Grouting (Tremie Method)	LF	\$13.00
24-Hour, 7- and 30-day PZ Water Level Readings	HRS	\$96.00
Vehicle Charge	HRS	\$13.00
Pavement Coring and Patching (up to 6" thick)	EA	\$150.00
Pavement Coring and Patching (> 6" thick)	Inches	\$13.50
One Lane Closure with Crash Truck	EA	\$3,500.00
Laboratory Tests		
Liquid and Plastic Limits - Atterberg Limits (ASTM D-4318)	EA	\$76.00
Percent Passing No. 200 Sieve (ASTM D-1140)	EA	\$59.00
Moisture Content (ASTM D-2216)	EA	\$12.00
Unconsolidated Compression (ASTM D-2166)	EA	\$54.00
Unconsolidated Undrained (ASTM D-2850)	EA	\$77.00
Consolidated-Undrained Triaxial Test (ASTM D-)	SET	\$2,500.00
Specific Gravity	EA	\$71.00
Crumb Tests (ASTM D-6572)	EA	\$46.00
Double Hydrometer Tests (ASTM D-4221), with	EA	\$266.00
Consolidation Tests	EA	\$1,200.00

ATTACHMENT C

The Engineer shall furnish certificates of insurance to the FBCTRA evidencing compliance with the insurance requirements hereof. Certificates shall indicate name of the Engineer, name of insurance company, policy number, term of coverage and limits of coverage. The Engineer shall cause its insurance companies to provide the FBCTRA with at least 30 days prior written notice of any cancellation or non-renewal of the insurance coverage required under this Agreement. The Engineer shall obtain such insurance from such companies having a Bests rating of B+/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

- a. Workers' Compensation insurance in accordance with the laws of the State of Texas, or state of hire/location of Services, and Employers' Liability coverage with a limit of not less than \$1,000,000 each employee for Occupational Disease, \$1,000,000 policy limit for Occupational Disease; and Employer's Liability of \$1,000,000 each accident.

- b. Commercial General Liability insurance including coverage for Products/Completed Operations, Blanket Contractual, Broad Form Property Damage, Personal Injury/Advertising Liability, and Bodily Injury and Property Damage with limits of not less than:
 - \$2,000,000 general aggregate limit
 - \$1,000,000 each occurrence, combined single limit
 - \$2,000,000 aggregate Products, combined single limit
 - \$1,000,000 aggregate Personal Injury/Advertising Liability
 - \$50,000 Fire Legal Liability
 - \$5,000 Premises Medical

- c. Business Automobile Liability coverage applying to owned, non-owned and hired automobiles with limits not less than \$1,000,000 each occurrence combined single limit for Bodily Injury and Property Damage combined.

- d. Umbrella Excess Liability insurance written as excess of Employer's Liability, with limits not less than \$2,000,000 each occurrence combined single limit.

- e. Professional Liability insurance with limits not less than \$2,000,000 each claim/annual aggregate.

The FBCTRA and the FBCTRA's Directors shall be named as additional insureds to all coverages required above, except for those requirements in paragraphs "a" and "e." All policies written on behalf of the Engineer shall contain a waiver of subrogation in favor of the FBCTRA and the FBCTRA's Directors, with the exception of insurance required under paragraph "e."

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

1 of 1

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

**OFFICE USE ONLY
CERTIFICATION OF FILING**

Certificate Number:
2024-1246193

Date Filed:
12/05/2024

Date Acknowledged:
12/09/2024

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

Edminster, Hinshaw, Russ & Associates, Inc.
Houston, TX United States

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

Fort Bend County Toll Road Authority

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

101-1050
Professional civil engineering services

4	Name of Interested Party	City, State, Country (place of business)	Nature of interest (check applicable)	
			Controlling	Intermediary
	Russ, James	Houston, TX United States	X	
	Bowlin, Jared	Houston, TX United States	X	
	McGregor, Preston	Houston, TX United States	X	
	Palermo, Andrew	Houston, TX United States	X	
	Syed, Aqil	Houston, TX United States	X	

5 Check only if there is NO Interested Party.

6 UNSWORN DECLARATION

My name is _____, and my date of birth is _____.

My address is _____, _____, _____, _____, _____.
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20____.
(month) (year)

Signature of authorized agent of contracting business entity
(Declarant)