

ENGINEERING SERVICES AGREEMENT

THIS AGREEMENT is made and entered into by and between the Fort Bend Grand Parkway Toll Road Authority, a transportation corporation organized and operating under the laws of the State of Texas, hereinafter called the "FBGPTRA" and AECOM Technical Services, Inc., hereinafter called "Engineer."

WITNESSETH

WHEREAS, the FBGPTRA proposes to develop a comprehensive Drainage Study for the Fort Bend Grand Parkway Toll Road, Segment D, in Fort Bend County, Texas, (the "Project") from IH 69/US 59 to FM 1093;

WHEREAS, the FBGPTRA 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;

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 FBGPTRA 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 \$529,071.25. 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 will be paid as a lump sum amount not to exceed \$529,071.25, as shown in Attachment B. Progress payments for work detailed in Attachment A will be made when the Engineer has attained a level of completion equal to or greater than agreed upon milestones of completion in the reasonable opinion of FBGPTRA.

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

- 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 FBGPTRA, 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 FBGPTRA. Payment will be made on the basis of project completion certificate and, for Additional Services, 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 additional services not within the original Scope of 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 FBGPTRA, 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 FBGPTRA 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 FBGPTRA 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 additional services (accompanied by supporting certified time and expense records of such charges in a form acceptable to the FBGPTRA.) 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 FBGPTRA 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 FBGPTRA within thirty (30) calendar days after the FBGPTRA’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 and end October 1, 2017.

4. The FBGPTRA's Option to Terminate

- a. The FBGPTRA 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 FBGPTRA 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 FBGPTRA. The Engineer's final invoice for said services will be presented to and paid by the FBGPTRA 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 FBGPTRA 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 Section 6 shall survive the termination of this Agreement.
- c. If the FBGPTRA 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 FBGPTRA'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 FBGPTRA by virtue of this Agreement or otherwise. Failure of the FBGPTRA 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 FBGPTRA within 30 days or upon Engineer's receipt of termination payment, whichever is sooner, when and if this Agreement is terminated.

5. Inspection of the Engineer's Books and Records

The Engineer will permit the FBGPTRA, or any duly authorized agent of the FBGPTRA, to inspect and examine the books and records of the Engineer for the purpose of verifying the amount of work performed on the Project. FBGPTRA'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 FBGPTRA subject to all of the following terms and conditions; provided, however, FBGPTRA shall not own and shall have no right to receive any documents not deemed "final" by the Engineer until termination of this Agreement. Engineer will deliver the Documents to FBGPTRA within 30 days of the 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 FBGPTRA 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 District's sole risk and without liability or legal exposure to Engineer.

FBGPTRA 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 FBGPTRA 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 FBGPTRA all of Engineer 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 FBGPTRA that Engineer is permitted to use in connection with the services will not be used without FBGPTRA's consent and shall remain in the sole and exclusive properties of FBGPTRA 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 FBGPTRA, to perform the Scope of Services when and as required and without delays. It is understood that the FBGPTRA 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 FBGPTRA'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 FBGPTRA, is incompetent or by his conduct becomes detrimental to the Project shall, upon request of the FBGPTRA, 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 FBGPTRA

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 FBGPTRA. Responsibility to the FBGPTRA for sublet work shall remain with the Engineer.

10. Conference

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

11. Appearance as Witness

If requested by the FBGPTRA, 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 FBGPTRA's Executive Director 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 FBGPTRA 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 of the FBGPTRA relating to the property or facilities with respect to which this Agreement pertains, Engineer and the FBGPTRA agree as follows:

- a. **ENGINEER WILL INDEMNIFY AND HOLD HARMLESS THE FBGPTRA, 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 FBGPTRA OR STRICT LIABILITY IMPOSED UPON THE FBGPTRA AS A MATTER OF LAW (INCLUDING STRICT LIABILITY IMPOSED UPON THE FBGPTRA 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 FBGPTRA 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. Termination, if a dispute arises out of, or relates to, the breach thereof, and if the dispute cannot be settled through negotiation, then the FBGPTRA and the Engineer agree to submit the dispute to mediation. In the event the FBGPTRA 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 FBGPTRA 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 FBGPTRA under this Agreement shall be delivered to the Fort Bend Grand Parkway Toll Road Authority, P.O. Box 1307, Sugar Land, Texas 77406, Attention: Mike Stone, 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 AECOM Technical Services, Inc., 19219 Katy Freeway, Suite 100, Houston, Texas, 77094, Attention: Stephen Berckenhoff, PE, or such other place or places as the Engineer may designate by written notice delivered to the FBGPTRA.

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 FBGPTRA, setting forth a full and concise statement of the facts pertaining thereto. The Engineer shall also immediately send the FBGPTRA 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 FBGPTRA's Acts

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

19. Limitations

Notwithstanding anything herein to the contrary, all covenants and obligations of the FBGPTRA under this Agreement shall be deemed to be valid covenants and obligations only to extent authorized by the Act creating the FBGPTRA 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 FBGPTRA 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 FBGPTRA 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. 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

[EXECUTION PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the 18th day of January, 2016.

FORT BEND GRAND PARKWAY TOLL ROAD
AUTHORITY, a local government Texas
corporation

By: 
Dr. James D. Condrey, DDS
Chairman, Board of Directors

ATTEST: 
By _____
Secretary, Board of Directors

AECOM Technical Services, Inc.
ENGINEER

By: _____
Name: Stephen Berckenhoff, P.E.
Title: Vice President

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.: _____

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the ____ day of _____, 2016.

FORT BEND GRAND PARKWAY TOLL ROAD
AUTHORITY, a local government Texas
corporation

By: _____
Dr. James D. Condrey, DDS
Chairman, Board of Directors

ATTEST:

By _____
Secretary, Board of Directors

AECOM Technical Services, Inc.
ENGINEER

By: 
Name: Stephen Berckenhoff, P.E.
Title: Vice President

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

**Fort Bend County Grand Parkway Toll Road Authority
Drainage Study – SH 99 Segment D
From IH 69/US 59 to FM 1093**

The work to be performed by the Engineer under this Work Authorization shall consist primarily of providing engineering services for the preparation of a drainage report for roadway improvements to SH 99 Segment D from I-69/US 59 to FM 1093 (approximately 12.5 miles). The drainage study will include evaluation of roadway mitigation provided for the recent SH 99 roadway improvements (overpass construction, circa 2012) and approximation of the mitigation needs for the SH 99 roadway ultimate condition (widening to 3 lanes in both directions). The drainage analysis of the 2012 roadway improvements shall include evaluation and potential redesign of the current roadway drainage components, assessing cross drainage structures of multiple varieties, evaluating if the current available mitigation meets the needs for the current roadway configuration, and determining and mitigating impacts to abutting properties and the 100-year floodplain due to the previously constructed improvements. The drainage analysis for the ultimate condition shall evaluate the proposed roadway profile, assess necessary sizing for trunk-line and ditch drainage components, assess cross drainage structures of multiple varieties, evaluate mitigation needs, and determine and mitigate impacts to abutting properties and the 100-year floodplain due to proposed highway improvements. The drainage report, signed and sealed by a professional engineer, shall include applicable hydrologic and hydraulic models such as HEC-HMS and HEC-RAS. The drainage report shall also include but is not limited to the following: drainage area maps, drainage outfall descriptions, hydrologic and hydraulic data and analysis, and recommendations for mitigation of impacts.

GENERAL REQUIREMENTS

Design Criteria. The Engineer shall prepare all work in accordance with the latest version of applicable TxDOT procedures, specifications, manuals, guidelines, standard drawings, standard specifications or previously approved special provisions and special specifications to include: the TxDOT's *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, 2004*, and other TxDOT approved manuals. When design criteria are not identified in TxDOT manuals, the Engineer shall notify the Fort Bend Grand Parkway Toll Road Authority (FBGPTRA) and refer to the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Street*, (latest Edition).

Right-of-Entry and Coordination. The Engineer shall notify the FBGPTRA and secure permission to enter private property to perform any surveying, environmental, engineering or geotechnical activities needed off FBGPTRA right-of-way (ROW). In pursuance of the FBGPTRA's policy with the general public, 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 shall contact each property owner prior to any entry onto the owner's property, and shall request concurrence from the FBGPTRA prior to each entry.

The Engineer shall notify the FBGPTRA 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 FBGPTRA for resolution. The FBGPTRA shall have authority over the Engineer's disagreements and the FBGPTRA's decision shall be final.

The Engineer 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 FBGPTRA. The Engineer shall notify the FBGPTRA in writing prior to beginning any work on any outside agency's exhibit.

Coordination. The Engineer shall coordinate issues and communications with FBGPTRA internal resource areas through the FBGPTRA SH 99 Segment D Program Manager. The FBGPTRA will communicate the resolution of issues and provide the Engineer direction through the FBGPTRA Project Manager. The Engineer shall coordinate with affected counties, cities, and all other governmental agencies through the FBGPTRA's Program Manager.

The Engineer shall perform the services per the task and description of work provided below:

Data Collection.

The Engineer shall collect, review and evaluate data as described below. The Engineer shall notify the FBGPTRA in writing whenever the Engineer finds disagreement with the information or documents:

1. Data from the FBGPTRA including;

- Roadway design requirements.
- Horizontal control points.
- Benchmark elevations and descriptions for vertical control.
- The data on file concerning:
 - An electronic copy of the existing 2D MicroStation planimetric mapping file, on a reproducible CD.
 - Existing roadway 3D MicroStation Digital Terrain Mapping file on a reproducible CD.
 - Existing facilities construction documents and "as-builts".
 - Survey data pre-2012 roadway improvements and post 2012 roadway improvements
- Interface data for any projects adjacent to subject project.
- Existing State's right-of-way maps.
- Existing hydraulic and hydrologic studies associated with the project and project area.
- Bridge Inventory, Inspection, and Appraisal Program reports and any appropriate project files.
- Existing geotechnical information.
- Assist the Engineer to obtain the required data and information from other local, regional, State and Federal agencies.
- Timely review and decisions necessary in order to permit the Engineer to maintain the contracted project schedule as shown in the work authorization.
- Design criteria for roadway, structures, and drainage.
- Available Federal Emergency Management Agency flood insurance study maps and studies.
- The County will secure all required permits and agreements.

2. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development.
3. 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 will include but not limited to the State, County, and the Federal Emergency Management Agency (FEMA). This also includes current and historic LIDAR data sets.
4. Utility plans and documents from appropriate municipalities and agencies.
5. Survey data and coordination of any additional surveying needs with FBGPTRA.

Field Reconnaissance.

The Engineer shall conduct field reconnaissance and collect data including a photographic record of notable existing features. This shall include observation of current conditions and the outfall channels, the cross drainage structures, tributary channels, and land development projects that contribute flow to the tributary and/or ROW.

Roadway and Hydraulic Design Criteria.

The Engineer shall design the project according to the TxDOT's latest design criteria.

Hydrologic Analysis

The Engineer shall conduct a hydrologic analysis for approximately 12.5 miles of roadway. The analysis shall be completed for three conditions: the pre-2012 construction condition, current conditions (post 2012) and the ultimate conditions. Specific scope of work includes the following:

- Pre-2012 Construction Condition
 - i. Delineate drainage area boundaries for the approximately 12.5 miles of roadway ROW and contributing drainage areas to the existing roadway ROW. Drainage area delineation from previous studies will be reviewed and information utilized as appropriate if it is determined to be accurate.
 - ii. Determine pre-2012 construction only conditions hydrologic parameters such as impervious cover, overland flow paths and slopes from appropriate sources including but not limited to topographic maps, historical aerial imagery, GIS modeling, and construction plans and existing hydrologic studies. This will be performed for the proposed approximately 12.5 miles of roadway ROW and contributing offsite drainage areas. Hydrologic parameters from previous studies will be reviewed and utilized as appropriate if it is determined to be accurate.
 - iii. Calculate preconstruction conditions discharges using appropriate hydrologic methods for the storm frequencies indicated in the following sections. This includes development of both peak flows and full hydrographs.
- Current Conditions
 - i. Delineate drainage area boundaries for the areas draining to the 2012 constructed improvements. Drainage area delineation from previous studies will reviewed and information utilized as appropriate if it is determined to be accurate.
 - ii. Determine current conditions hydrologic parameters such as impervious cover, overland flow paths and slopes from appropriate sources including but not limited to topographic maps, GIS modeling, and construction plans and existing hydrologic studies. This will be performed for the proposed approximately 12.5 miles of roadway ROW, for the contributing ROW offsite drainage areas, and for the contributing drainage area to the cross drainage structures. This includes the

- larger drainage areas to each crossing/outfall as well as sub-drainage areas specific to each existing and proposed ditch / storm sewer.
 - iii. Calculate current conditions discharges using appropriate hydrologic methods for the storm frequencies indicated in the following sections. This includes development of both peak flows and full hydrographs.
- Ultimate Condition (3-lanes in both directions)
 - i. Delineate drainage area boundaries for the approximately 12.5 miles of roadway ROW and contributing drainage areas to the proposed roadway ROW. Drainage area delineation from previous studies will be reviewed and information utilized as appropriate if it is determined to be accurate.
 - ii. Determine ultimate conditions hydrologic parameters such as impervious cover, overland flow paths and slopes from appropriate sources including but not limited to topographic maps, GIS modeling, and construction plans and existing hydrologic studies. This will be performed for the proposed approximately 12.5 miles of roadway ROW, for the contributing ROW offsite drainage areas, and for the contributing drainage area to the cross drainage structures. This includes the larger drainage areas to each crossing/outfall as well as sub-drainage areas specific to each existing and proposed ditch / storm sewer.
 - iii. Calculate ultimate conditions discharges using appropriate hydrologic methods for the storm frequencies indicated in the following sections. This includes development of both peak flows and full hydrographs.

Drainage Cross Structure Hydraulic Analysis

The analysis shall be completed for three conditions, the pre-2012 condition, current conditions (post 2012) and ultimate conditions. The Engineer shall analyze 17 cross-structures (estimated based on best available information as 6 non bridge-class culverts, 8 bridge-class culverts, and 3 bridges). The current conditions includes only 9 of the 17 identified crossings. Hydraulic analysis will be performed for the following structures:

Crossing Number	Approximate Station (1)	Assumed Crossing Type	Notes
1	662+00	2-Box Culverts	Unknown size. Crossing SB Lane & US 59 FR
2 ²	703+50	2-10'x10'	Upstream and Downstream channel, structure will not need to be extended for ultimate conditions
3	757+00	Bridge	Ditch M
4 ²	792+00	1-6'x3'	Structure will not need to be extended for ultimate conditions
5	801+70	2-5'x3'	Outfall West of SH 99
6 ²	835+00	Bridge	Bullhead Slough
7 ²	885+70	4-7'x3'	Downstream channel. Structure will not need to be extended for ultimate conditions
8	929+50	6-7'x3'	Downstream channel, no upstream channel
9	960+99	Bridge	Oyster Creek
10	963+70	2-8'x6'	Upstream and Downstream channel
11	1017+00	3-10'x6'	Upstream and Downstream channel. Structure will not need to be extended for ultimate conditions.

12 ²	1058+91	5-9'x8'	Upstream and Downstream channel, structure will not need to be extended for ultimate conditions.
13 ²	1117+55	2-8'x8'	Downstream channel, no upstream channel. Mason Road Channel
14 ²	1182+00	2-8'x4'	Upstream and Downstream channel. Structure will not need to be extended for ultimate conditions.
15	1246+50	2-6'x5'	Downstream channel, no upstream channel. Structure will not need to be extended for ultimate conditions.
16 ²	1281+20	1-5'x2'	Structure updated in 2012
17 ²	129+00 (1)	3-10'x6'	Longpoint Slough. Structure will not need to be extended for ultimate conditions.

(1) All stationing is based on preconstruction (before 2012) as-built information. Crossing 17 was reconstructed in 2008 and follows a different stationing than the rest of the crossings.

(2) Crossing included in current condition analysis

Note: The Brazos River Crossing is not included in this analysis as it is being analyzed by others.

The scope of work for the cross-structures shall include the following: specific scope of work for each cross-structure may vary, depending on its role (cross-drainage, internal drainage equalization, or floodplain equalization):

A. Pre-2012 Condition and Current Conditions

1. Determine pre-2012 peak flows at each crossing, based on the hydrologic analysis performed as part of hydrologic analysis task. For the purpose of the cross-structure analysis, it is assumed that the pre-2012 conditions peak flow rates are similar to the current conditions peak flow rates as mitigation is provided under current conditions to limit peak flows to pre-construction peak flow rates.
2. Analyze hydraulics for each crossing and develop models as necessary and appropriate, in HY-8, HEC-RAS, or other approved methodology/software for both pre-2012 and current conditions. Determine a reasonable downstream tailwater condition based on information available. If available, the current effective FEMA models will be used as a base model for the analysis. If a "best available data" model is provided by the local floodplain administrator, it shall be utilized accordingly for this analysis. The provided base model shall be reviewed for correctness and updated as needed. If the provided effective model is not in HEC-RAS format, it shall be converted to HEC-RAS for this analysis. If the FEMA effective model or other "best available" model is not available, the Engineer shall develop the model based on survey information.
3. Determine the pre-2012 condition and current conditions 10-year, 25-year, 50-year and 100-year, water surface elevations at each crossing.
4. Consider and analyze floodplain conveyance impacts, as necessary and appropriate. This includes assessment and/or floodplain modeling of existing and proposed floodplain equalizer structures.
5. Analyze each crossing to assess the hydraulic performance of constructed improvements, in accordance with TxDOT hydraulic design criteria.
6. Quantify impacts, beneficial or adverse. Impacts will be determined both upstream and downstream of the culvert/bridge crossings for events up to and including the 100-year

storm. If necessary, mitigation measures shall be analyzed and developed, including ROW needs.

7. Compute approximate changes in right-of-way corridor 100-year floodplain volumes between the pre-2012 and current roadway conditions. Offsite mitigation may be required to offset a decrease in 100-year floodplain volumes. If necessary, conceptual mitigation measures shall be presented, including ROW needs.

B. Pre-2012 Condition and Ultimate Condition

1. For the purpose of the cross-structure analysis, it is assumed that the pre-2012 conditions peak flow rates are similar to the ultimate conditions peak flow rates as mitigation will be provided under ultimate conditions to limit peak flows to pre-construction peak flow rates.
2. Analyze hydraulics for each crossing and develop models as necessary and appropriate, in HY-8, HEC-RAS, or other approved methodology/software for the ultimate condition. Determine a reasonable downstream tailwater condition based on information available. If available, the current effective FEMA models will be used as a base model for the analysis. If a “best available data” model is provided by the local floodplain administrator, it shall be utilized accordingly for this analysis. The provided base model shall be reviewed for correctness and updated as needed. If the provided effective model is not in HEC-RAS format, it shall be converted to HEC-RAS for this analysis. If the FEMA effective model or other “best available” model is not available, the Engineer shall develop the model based on survey information.
3. Determine the ultimate conditions 10-year, 25-year, 50-year and 100-year, water surface elevations at each crossing.
4. Consider and analyze floodplain conveyance impacts, as necessary and appropriate. This includes assessment and/or floodplain modeling of existing and proposed floodplain equalizer structures.
5. Analyze each crossing to identify recommended improvements to each crossing to accommodate roadway improvements and meet TxDOT hydraulic design criteria. The improvements may include extending, adjusting, or replacing culvert or bridge crossings.
6. Quantify impacts, beneficial or adverse. Impacts will be determined both upstream and downstream of the culvert/bridge crossings for events up to and including the 100-year storm. If necessary, mitigation measures shall be analyzed and developed, including ROW needs.
7. Compute approximate changes in right-of-way corridor 100-year floodplain volumes between the pre-2012 and ultimate roadway conditions. Offsite mitigation may be required to offset a decrease in 100-year floodplain volumes. If necessary, conceptual mitigation measures shall be presented, including ROW needs.

Roadway Impact Analysis

This analysis shall be completed for three conditions, the pre-2012 construction, current conditions (post 2012) and ultimate conditions. The Engineer shall analyze discharge into approximately 18 outfalls and assess detention needs necessary to mitigate impacts associated with development using methods described below. The majority of the roadway is drained by roadside and median ditches that outfall to storm sewer systems. Center median ditches are also present in some locations. The two depressed sections, at FM 1093 and US 90A, will be evaluated separately as discussed under the Depressed Section Evaluation section.

Outfall Number	Approximate Station (1)	Channel System
1	662+00	Long Point Slough
2	703+50	Oyster Creek
3	735+00	Brazos River
4	757+00	Ditch M
5	792+00	Unnamed Chanel
6	801+70	2-5'x3'
7	835+00	Bridge
8	885+70	4-7'x3'
9	929+50	6-7'x3'
10	960+99	Bridge
10	963+70	2-8'x6'
12	1017+00	3-10'x6'
13	1058+91	5-9'x8'
14	1117+55	2-8'x8'
15	1182+00	2-8'x4'
16	1246+50	2-6'x5'
17	1281+20	1-5'x2'
18	129+00	3-10'x6'

(1)All stationing is based on preconstruction (before 2012) as-built information. Crossing 17 was reconstructed in 2008 and follows a different stationing than the rest of the crossings.

Hydraulic analysis of the current condition and ultimate condition ditch / storm sewer systems, including any necessary in-line or off-line detention, will be performed for the 100-year storm event using dynamic hydraulic modeling software such as XP SWMM or PC SWMM. Specific scope of work includes the following:

A. Pre-2012 Construction Conditions

1. Quantify pre-2012 roadway discharges at each outfall using hydrologic methods. The flows calculated will be considered as the allowable discharges to each outfall for Current and Ultimate conditions.

B. Current Conditions (2012 Construction, 10 overpasses only)

1. Determine the current condition peak flows and hydrographs for each ditch / sewer section for the 100-year storm events, based on the hydrologic analysis performed as part of the Hydrologic Analysis task.
2. Develop a current conditions dynamic model for each of the 10 overpass systems. The dynamic model shall include median / roadside ditches, storm sewer systems and culverts connecting independent drainage systems. The dynamic hydraulic model shall terminate at each outfall.
3. Assess the current drainage system to evaluate if the current conditions discharges to the drainage system outfalls are less than or equal to the pre-2012 conditions for the 100-year storm event. Potential proposed drainage improvements shall minimize the interference with the passage of traffic or incur damage to the highway and local property in accordance with the TxDOT Hydraulic Design Manual, District Criteria and any specific guidance provided by the FBGPRA.

4. If the current condition drainage system results in peak flows greater than the pre-2012 conditions for the 100-year storm event, optimize the current drainage system to meet design criteria and to limit discharge into outfalls to the capacity of the system. Typically this will involve not increasing proposed discharges above existing discharges. Optimization will include, when possible, the use of in-line detention within the ditch / storm sewer system, with discharges controlled by restrictors or similar structures at interim culverts and outfalls. The Engineer shall also evaluate alternative flow routes, if necessary, to relieve system overload. Should in-line detention not be feasible, off-site detention in the vicinity of the proposed outfall may also be considered and assessed in the dynamic model. Detention requirements shall be coordinated with the FBGPTRA. However, it is assumed that hydrograph routing within dynamic model will be performed to assess no adverse impact for the 100-year event.
5. Conduct a 100-year sheet flow analysis using the dynamic model for the current condition.

C. Ultimate Conditions (3-lanes in both directions)

1. Determine the ultimate condition peak flows and hydrographs for each ditch / sewer section for the 100-year storm event, based on the hydrologic analysis performed as part of the Hydrologic Analysis task.
2. Develop a ultimate conditions dynamic model for each of the 18 outfall systems. The dynamic model shall include median / roadside ditches, storm sewer systems and culverts connecting independent drainage systems. The dynamic hydraulic model shall terminate at each outfall.
3. Develop a ultimate conditions dynamic model for each of the 10 overpass systems. The dynamic model shall include median / roadside ditches, culverts connecting ditches, trunk-line storm sewer components, and shall terminate at the system outfall.
4. Assess the ultimate drainage system to evaluate if the ultimate conditions discharges to the drainage system outfalls are less than or equal to the pre-2012 conditions for the 100-year storm event. Proposed drainage improvements shall minimize the interference with the passage of traffic or incur damage to the highway and local property in accordance with the TxDOT Hydraulic Design Manual, District Criteria and any specific guidance provided by the FBGPTRA.
5. Optimize the ultimate condition drainage system to meet design criteria and to limit discharge into outfalls to the capacity of the system. Typically this will involve not increasing proposed discharges above existing discharges. Optimization will include, when possible, the use of in-line detention within the ditch / storm sewer system, with discharges controlled by restrictors or similar structures at interim culverts and outfalls. The Engineer shall also evaluate alternative flow routes, if necessary, to relieve system overload. Should in-line detention not be feasible, off-site detention in the vicinity of the proposed outfall may also be considered and assessed in the dynamic model. Detention requirements shall be coordinated with the FBGPTRA. However, it is assumed that hydrograph routing within dynamic model will be performed to assess no adverse impact for the 100-year event.
6. Conduct a 100-year sheet flow analysis using the dynamic model for the ultimate condition.

Fill in the floodplain will also be assessed at each regulatory crossing. This includes estimating fill within the 100-yr floodplain and assessing whether or not compensatory mitigation has been provided. This analysis will be done for current conditions only.

Direct Connector Analysis

The analysis shall be completed for the ultimate condition only. The Engineer shall analyze the drainage design for up to four future direct connectors between SH 99 and the Westpark Tollway and for up to four direct connectors between SH 99 and US 90A.

It is understood that the drainage design for the direct connectors should prohibit storm water runoff from entering the existing depressed section at SH 99 and Westpark Tollway interchange. A hydrologic impact analysis of the direct connectors will be performed for the 100-year storm event using a simplified method. There will be no detailed hydraulic analysis of the direct connectors conveyance system performed under this scope of work. Outcomes of this analysis will include identification of preliminary mitigation needs and a conceptual approach for draining runoff from the direct connectors.

Depressed Sections Evaluation

The Engineer shall evaluate the two depressed sections. The two current depressed sections are as follows;

- The current depressed section at the SH 99 and Westpark Tollway interchange
- The current depressed section at the SH 99 and US 90A interchange

Each of the depressed sections outfall to adjacent drainage channels via a pumped system. The evaluation will be completed for all three conditions, pre-2012 construction, the current condition, and the ultimate condition. Specific scope of work includes the following:

1. Review the drainage reports prepared for the depressed section design (pre-2012 construction condition).
2. Evaluate the current condition drainage design in the vicinity of the depressed section to re-assess drainage boundaries and inflow to the depressed section.
3. Determine the approximate level of protection provided by the current pumped facility at each of the depressed sections.
4. Estimate pump capacity needed to provide an improved level of protection at each depressed section.
5. Coordinate the findings with the FBGPTRA and TxDOT.

There will no hydraulic modeling performed under this scope of work. Pumped facility improvements and design recommendations are not included as part of this work effort. If issues are identified, potential improvements to be considered include reducing drainage area to the pump station.

Drainage Report

The Engineer shall provide the following services:

1. The Engineer shall prepare a brief summary of the roadway profile analysis for current and ultimate conditions. Water Surface Elevation profiles generated by this effort shall be utilized to inform the FBGPTRA of potential design challenges and current design issues.
2. The Engineer shall prepare a single comprehensive drainage study and report of the project area, signed, sealed, and dated by a registered or licensed engineer. This shall include a draft report and a final report which addresses comments provided by the FBGPTRA Project Manager. The drainage report shall include, at a minimum, the following sections:
 - i. Introduction: location, study objectives, general creek and watershed information, and other pertinent facts

- ii. Hydrology: watershed description, soil and land use information, hydrologic data and methodology or models used to develop flow data, pertinent input data and parameters of hydrologic analyses, summary table of results for a full range of peak discharges.
- iii. Hydraulics: overview of hydraulic modeling process, including data sources, specific models used, description of existing structures, drainage system characteristics, and other pertinent facts; discussion of design alternatives and the results of respective hydraulic modeling for the scenarios evaluated; hydraulic model output data for existing and proposed conditions
- iv. Summary of Conclusions / Recommendations: summary of study objectives, alternatives considered, analysis findings, and recommended solutions.
- v. Exhibits, including at a minimum: location map, topography map, drainage area map, land-use map, and FEMA FIRM
- vi. Appendices: detailed hydrologic and hydraulic calculations, models, model output files, photographs, and other pertinent information
- vii. Compact Disc: including PDF of full report and exhibits and all appendices (including hydrologic and hydraulic models)

PROJECT MANAGEMENT

The Engineer shall provide the following services:

1. Attend kick-off meeting with the FBGPTRA SH 99 Segment D Program Manager and TxDOT to discuss the project locations and limits, design criteria and requirements.
2. Coordinate with the FBGPTRA Program Manager and TxDOT in the development of the analysis for the required drainage improvements. This shall include, but is not limited to, attending meetings to discuss progress, clarify design issues, schedule, etc. The Engineer shall coordinate all milestone submittals. This includes up to 10 total in-person meetings.
3. Coordinate with affected counties, cities and all other government agencies, as necessary.
4. Perform general project management tasks including invoicing, progress reports, and general coordination with the FBGPTRA. This includes preparation of meeting minutes within five business days of the meeting.
5. Implement Quality Assurance / Quality Control program for each deliverable. The FBGPTRA may at any time review the Engineer's Quality Control. The FBGPTRA may request all markup documents including drawings and engineering reports from the Engineer.

DELIVERABLES

The Engineer shall submit the following to the FBGPTRA:

Reports:

1. Letter Report – the Engineer shall prepare a brief letter report summarizing data collection efforts and preliminary findings related to the current roadway condition. The letter report should highlight identified outfalls where additional detention volume may be required to bring the roadway system up to TxDOT design standards.
2. Draft Drainage Report (Three [3] copies) – The report shall document and justify all data, boundary conditions, assumptions, methodologies, and results. The text, tables, exhibits, and appendices shall document clearly and concisely the work performed and results found. The report shall provide recommendations for critical review by the FBGPTRA. The text, tables, exhibits, and appendices

(including computer models) shall be saved on a compact disc and included with each report. Assume one round of comments from the FBGPTRA. The Engineer shall address all FBGPTRA comments.

3. Final Drainage Report (Three [3] copies) - The report shall be signed and sealed by a professional engineer.

Calculations:

The Engineer shall provide the copies of all spreadsheets and output from any programs used on a CD/DVD in a universally reliable format. The Engineer may provide the requested information on a CD/DVD in pdf format.

Schedule:

The schedule below is based on two week agency reviews. Schedule may be adjusted if review times are exceeded.

Letter Report: May 12, 2017

Draft Drainage Report: June 19, 2017

Final Report: September 8, 2017

ATTACHMENT B
COMPENSATION FOR SCOPE OF SERVICES
FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
DRAINAGE STUDY – SH 99 SEGMENT D
FROM IH 69/US 59 TO FM 1093

PRIME PROVIDER NAME: AECOM TECHNICAL SERVICES, INC.

TASK DESCRIPTION	PROJECT MANAGER	QUALITY MANAGER	SENIOR ENGINEER	PROJECT ENGINEER II	PROJECT ENGINEER I	ENGINEER IN TRAINING	SENIOR HYDROLOGIST	SENIOR ENGINEER TECH	ENGINEER TECH	JUNIOR ENGINEER TECH	SENIOR CADD OPERATOR	CADD OPERATOR	JUNIOR CADD OPERATOR	ADMIN / CLERICAL	TOTAL LABOR HRS & COSTS
DATA COLLECTION AND FIELD RECONNAISSANCE															
DATA COLLECTION	8		2			16	2					12		6	46
FIELD RECONNAISSANCE	4			16		16			4						40
ROADWAY AND HYDRAULIC DESIGN CRITERIA	2					2									4
HOURS SUB-TOTALS	14	0	2	16	0	34	2	0	4	0	0	12	0	6	90
	\$2,520.00	\$0.00	\$330.00	\$2,112.00	\$0.00	\$2,992.00	\$340.00	\$0.00	\$320.00	\$0.00	\$0.00	\$804.00	\$0.00	\$330.00	\$9,748.00
HYDROLOGIC ANALYSIS (12.5 MI CORRIDOR, 18 CROSSINGS)															
<i>PRE-2012 CONSTRUCTION CONDITION</i>															
DELINEATE DRAINAGE AREAS (ROW, OFFSITE)	6		8	12	12	40	8	4			24				114
DETERMINE HYDROLOGIC PARAMETERS	8		4	8	12	40	4	4			16				96
CALCULATE DISCHARGES & DEVELOP HYDROGRAPHS	6		2	4	8	20									40
<i>CURRENT CONDITION</i>															
DELINEATE DRAINAGE AREAS (ROW, OFFSITE)	4		4	4	12	24		4			24				76
DETERMINE HYDROLOGIC PARAMETERS	6		2	4	12	20		4			12				60
CALCULATE DISCHARGES & DEVELOP HYDROGRAPHS	6		2	8	6	16									38
<i>ULTIMATE CONDITION</i>															
DELINEATE DRAINAGE AREAS (ROW, OFFSITE)	4			4	12	24					16				60
CALCULATE HYDROLOGIC PARAMETERS	4		4	4	6	16		4			12				50
CALCULATE DISCHARGES & DEVELOP HYDROGRAPHS	2		4	4	8	12									30
HOURS SUB-TOTALS	46	0	30	52	88	212	12	20	0	0	104	0	0	0	564
	\$8,280.00	\$0.00	\$4,950.00	\$6,864.00	\$9,680.00	\$18,656.00	\$2,040.00	\$2,040.00	\$0.00	\$0.00	\$8,944.00	\$0.00	\$0.00	\$0.00	\$61,454.00
DRAINAGE CROSS STRUCTURES HYDRAULIC ANALYSIS (6 SINGLE AND MULTI-BARREL CULVERTS, 8 BRIDGE-CLASS CULVERTS, 3 BRIDGES)															
<i>PRE-2012 CONDITION & CURRENT CONDITION</i>															
ASSIGN HYDROLOGY (17 CROSSINGS)	4				4	10									18
DEVELOP HYDRAULIC MODEL (17 CROSSINGS)	8		10	12	20	140	24		20		48				282
DETERMINE PRE-2012 WSES (9 CROSSINGS)	4	4		10		24	8				12				62
ANALYZE CURRENT CONDITION CROSSINGS (9CROSSINGS)	6		6	10	20	60	16		8		40				166
ANALYZE FLOODPLAIN CONVEYANCE (3 MAJOR FLOODPLAINS)	4		6	24		68	24								126
IMPACT / MITIGATION ANALYSIS (9 CROSSINGS)	6		4	12		30	10					12			74
FLOODPLAIN FILL ANALYSIS	2					40			8						50
<i>PRE-2012 CONDITION & ULTIMATE CONDITION</i>															
ASSIGN HYDROLOGY (17 CROSSINGS)	2				4	10									16
DEVELOP HYDRAULIC MODEL (17 CROSSINGS)	8		10	25	20	80	20		16		48				227
ANALYZE ULTIMATE CONDITION CROSSINGS (17 CROSSINGS)	4	4	6	12	20	60	8		8		40				162
ANALYZE FLOODPLAIN CONVEYANCE (3 MAJOR FLOODPLAINS)	4		12	24		40	12								92
IMPACT / MITIGATION ANALYSIS (17 CROSSINGS)	4		4	12		30	8					16			74
FLOODPLAIN FILL ANALYSIS	2					40			8						50
HOURS SUB-TOTALS	58	8	58	141	88	632	130	0	68	0	188	28	0	0	1,399
	\$10,440.00	\$1,680.00	\$9,570.00	\$18,612.00	\$9,680.00	\$55,616.00	\$22,100.00	\$0.00	\$5,440.00	\$0.00	\$16,168.00	\$1,876.00	\$0.00	\$0.00	\$151,182.00

ATTACHMENT B
COMPENSATION FOR SCOPE OF SERVICES
FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
DRAINAGE STUDY – SH 99 SEGMENT D
FROM IH 69/US 59 TO FM 1093

PRIME PROVIDER NAME: AECOM TECHNICAL SERVICES, INC.

ROADWAY CONVEYANCE & IMPACT ANALYSIS (12.5 MI, 18+ POTENTIAL OUTFALLS)															
PRE-2012 CONSTRUCTION CONDITION															
QUANTIFY PRE-2012 ROADWAY DISCHARGES AT EACH OUTFALL	16	4	12	24		80	20								156
CURRENT CONDITION (LIMITED TO 10 OVERPASSES)															
ASSIGN HYDROLOGY	4					12									16
DITCH AND STORM SEWER HYDRAULIC ASSESSMENT (10 OVERPASSES)	12		10	16	40	100	16			32					226
MITIGATION ANALYSIS (10 + OUTFALLS)	12	2	8	16	20	68	16		12						154
MITIGATION MODIFICATIONS (10+ OUTFALLS)	8		4		12	32	16								72
1% AEP SHEET FLOW ANALYSIS (10 OVERPASSES)	8		4		8	32	8								60
ULTIMATE CONDITION (3-LANES IN BOTH DIRECTIONS)															
ASSIGN HYDROLOGY	4					12									16
DITCH AND STORM SEWER HYDRAULIC ASSESSMENT (17+ OUTFALLS)	16		10	24	40	150	16		20	40					316
DETERMINE ROUTED ULTIMATE CONDITIONS PEAK DISCHARGES AT EACH OUTFALL (18+ OUTFALLS)	16	6	8	16	24	50	24								144
MITIGATION ANALYSIS (18 + OUTFALLS)	12	6	8		24	52	30		24						156
MITIGATION MODIFICATIONS (18+ OUTFALLS)	12		4		12	50	10		4						92
1% AEP SHEET FLOW ANALYSIS (12.5 MILES)	8		4		8	32	8								60
FLOODPLAIN FILL ASSESSMENT (CURRENT CONDITIONS ONLY)	6	2			12	24	4		24						72
HOURS SUB-TOTALS	134	20	72	96	200	694	168	0	84	72	0	0	0	0	1,540
	\$24,120	\$4,200	\$11,880	\$12,672	\$22,000	\$61,072	\$28,560	\$0	\$6,720	\$4,536	\$0	\$0	\$0	\$0	\$175,760.00
DIRECT CONNECTOR ANALYSIS (Up to 8 DC)															
IDENTIFY OUTFALLS / CONSTRAINTS (12.5 MILES)	8			8	8	16	4		4						48
DRAINAGE OUTFALL ASSESMENT	8			8	12	24	4		8						64
PRELIMINARY MITIGATION ANALYSIS	4			12	24	36	12		20						108
DEVELOP CONCEPTUAL DRAINAGE APPROACH	4	2		8		24									38
HOURS SUB-TOTALS	24	2	0	36	44	100	20	0	32	0	0	0	0	0	258
	\$4,320	\$420	\$0	\$4,752	\$4,840	\$8,800	\$3,400	\$0	\$2,560	\$0	\$0	\$0	\$0	\$0	\$29,092.00
DEPRESSED SECTION EVALUATION (2 SECTIONS)															
REVIEW DRAINAGE REPORTS FOR DEPRESSED SECTIONS	4		4			16	2								26
EVALUATE THE CURRENT CONDITION DRAINAGE DESIGN	4	2	8			40	20								74
ESTIMATE THE CURRENT LEVEL OF PROTECTION PROVIDED BY THE PUMPED FACILITY	4			8		16	4								32
ESTIMATE PUMP CAPACITY NEEDED TO PROVIDE AN IMPROVED LEVEL OF PROTECTION	6	2		10		18									36
HOURS SUB-TOTALS	18	4	12	18	0	90	26	0	0	0	0	0	0	0	168
	\$3,240	\$840	\$1,980	\$2,376	\$0	\$7,920	\$4,420	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,776.00
DRAINAGE REPORT															
PREPARE PRELIMINARY LETTER REPORT	10		4		10	20			4		4		16	8	76
PREPARE DRAINAGE REPORT (DRAFT)	10	12	8	20	36	80		4		20	40		60	8	298
PREPARE DRAINAGE REPORT (FINAL)	4	8	4	8	16	24			8		2		12	4	90
HOURS SUB-TOTALS	24	20	16	28	62	124	0	4	12	20	46	0	88	20	464
	\$4,320	\$4,200	\$2,640	\$3,696	\$6,820	\$10,912	\$0	\$408	\$960	\$1,260	\$3,956	\$0	\$3,960	\$1,100	\$44,232.00
PROJECT MANAGEMENT															
ATTEND KICKOFF MEETING	4		4												8
COORDINATE WITH FBGPTRA	40		24			16	8							4	92

ATTACHMENT B
COMPENSATION FOR SCOPE OF SERVICES
FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
DRAINAGE STUDY – SH 99 SEGMENT D
FROM IH 69/US 59 TO FM 1093

PRIME PROVIDER NAME: AECOM TECHNICAL SERVICES, INC.

DEVELOP AND MAINTAIN SCHEDULE	2			8										2	12
COORDINATE WITH STAKEHOLDERS	8		4		16										28
GENERAL PROJECT MANAGEMENT	32					24								8	64
IMPLEMENT QA/QC PLAN	4		12				12								28
HOURS SUB-TOTALS	90	0	44	8	16	40	20	0	0	0	0	0	0	14	232
	\$16,200	\$0	\$7,260	\$1,056	\$1,760	\$3,520	\$3,400	\$0	\$0	\$0	\$0	\$0	\$0	\$770	\$33,966.00
TOTAL HOURS	408	54	234	395	498	1,926	378	24	200	92	338	40	88	40	4,715
CONTRACT RATE PER HOUR	\$180.00	\$210.00	\$165.00	\$132.00	\$110.00	\$88.00	\$170.00	\$102.00	\$80.00	\$63.00	\$86.00	\$67.00	\$45.00	\$55.00	
TOTAL LABOR COSTS	\$73,440	\$11,340	\$38,610	\$52,140	\$54,780	\$169,488	\$64,260	\$2,448	\$16,000	\$5,796	\$29,068	\$2,680	\$3,960	\$2,200	\$526,210
DISTRIBUTION OF HOURS	8.7%	1.1%	5.0%	8.4%	10.6%	40.8%	8.0%	0.5%	4.2%	2.0%	7.2%	0.8%	1.9%	0.8%	100.0%
SUBTOTAL															\$526,210.00

ATTACHMENT B
COMPENSATION FOR SCOPE OF SERVICES
FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
DRAINAGE STUDY – SH 99 SEGMENT D
FROM IH 69/US 59 TO FM 1093

PRIME PROVIDER NAME: AECOM TECHNICAL SERVICES, INC.

OTHER DIRECT EXPENSES	UNIT		QTY	COST										
Mileage	Mile		750	\$ 0.575										\$431.25
Photocopies B/W (8 1/2"X11")	Each		1,000	\$ 0.10										\$100.00
Photocopies B/W (11"X17")	Each		750	\$ 0.20										\$150.00
Photocopies Color (8 1/2"X11")	Each		500	\$ 0.50										\$250.00
Photocopies Color (11"X17")	Each		500	\$ 1.25										\$625.00
Plots (B/W on Bond)	square foot		250	\$ 0.50										\$125.00
Plots (Color on Bond)	square foot		1,000	\$ 1.00										\$1,000.00
Courier Services (Deliveries)	Each		6	\$ 30.00										\$180.00
SUBTOTAL DIRECT EXPENSES														\$2,861.25

SUMMARY				
DATA COLLECTION AND FIELD RECONNAISSANCE				\$9,748.00
HYDROLOGIC ANALYSIS				\$61,454.00
DRAINAGE CROSSING STUCTURE HYDRAULIC ANALYSIS				\$151,182.00
ROADWAY CONVEYANCE & IMPACT ANALYSIS				\$175,760.00
DIRECT CONNECTOR ANALYSIS				\$29,092.00
DEPRESSED SECTION EVALUATION				\$20,776.00
DRAINAGE REPORT				\$44,232.00
PROJECT MANAGEMENT				\$33,966.00
NON-SALARY (OTHER DIRECT EXPENSES)				\$2,861.25
			GRAND TOTAL	\$529,071.25

ATTACHMENT C

The Engineer shall furnish certificates of insurance to the FBGPTRA 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 FBGPTRA with at least 30 days prior written notice of cancellation of the insurance coverage required under this Agreement. The Engineer shall obtain such insurance from such companies having a Best's rating of B+NII 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, Contractors' Protective Liability Broad Form Property Damage, Personal Injury/Advertising Liability, and Bodily Injury and Property Damage with limits of not less than:
 - \$3,000,000 general aggregate limit
 - \$2,000,000 each occurrence, combined single limit
 - \$2,000,000 aggregate Products, combined single limit
 - \$2,000,000 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 \$3,000,000 each occurrence combined single limit.
- e. Professional Liability insurance with limits not less than \$2,000,000 each claim and \$4,000,000 annual aggregate.

The FBGPTRA and the FBGPTRA'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 FBGPTRA and the FBGPTRA's Directors, with the exception of insurance required under paragraph "e."