GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 10-21

Supplement No. 1 to Work Authorization No. 1 with
Kennedy for Engineering and Design Services

WHEREAS, the Central Texas Regional Mobility Authority ("CTRMA") was created pursuant to the request of Travis and Williamson Counties and in accordance with provisions of the Transportation Code and the petition and approval process established in 43 Tex. Admin. Code § 26.1, *et seq*. (the "RMA Rules"); and

WHEREAS, the Board of Directors of the CTRMA has been constituted in accordance with the Transportation Code and the RMA Rules; and

WHEREAS, in a minute order approved on August 25, 2005, the Texas Transportation Commission authorized the CTRMA to pursue the development of the 290 East Turnpike Project (the "Project"); and

WHEREAS, in Resolution No. 07-70, dated December 7, 2007, the CTRMA Board of Directors authorized CTRMA staff to initiate the process for procuring design and engineering services for the design and engineering of the Project in three segments; and

WHEREAS, in Resolution No. 08-16, dated March 26, 2008, the Board of Directors authorized entering into a contract with Kennedy Consulting, Ltd. ("Kennedy") for the design and engineering of Segment 3 of the Project; and

WHEREAS, the CTRMA subsequently executed a contract and Work Authorization No. 1 with Kennedy for the design and engineering of Segment 3; and

WHEREAS, the CTRMA now desires to modify the scope of services that Kennedy will perform in connection with Segment 3 of the Project to allow for certain changes in design; and

WHEREAS, attached hereto and incorporated herein as Attachment "A" is Supplement No. 1 to Work Authorization No. 1 under the contract with Kennedy ("Supplement No. 1"), which sets forth a revised scope of services for engineering and design services Segment 3 of the Project; and

WHEREAS, it is necessary that the Board of Directors approve Supplement No. 1 and its execution by the Executive Director.

NOW THEREFORE, BE IT RESOLVED, that the Board of Directors of the CTRMA hereby approves Supplement No. 1 and the related Scope of Services in the form or substantially the same form attached hereto as Attachment "A"; and

BE IT FURTHER RESOLVED, that Supplement No. 1 may be finalized and executed by the Executive Director on behalf of the CTRMA and that Supplement No. 1 may be amended from time to time by written amendment as deemed necessary by the Board of Directors.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 31st day of March 2010.

Submitted and reviewed by:

Andrew Martin
General Counsel for the Central
Texas Regional Mobility Authority

Approved:

Ray A. Wilkerson
Chairman, Board of Directors
Resolution Number 10-21
Date Passed 03/31/10

ATTACHMENT "A"
TO
RESOLUTION NO. 10-21
SUPPLEMENT NO. 1 TO KENNEDY WORK AUTHORIZATION NO. 1

ATTACHMENT C-2

SUPPLEMENTAL WORK AUTHORIZATION NO. 1
TO WORK AUTHORIZATION NO. 1
CONTRACT FOR ENGINEERING SERVICES

THIS SUPPLEMENTAL WORK AUTHORIZATION is made pursuant to the terms and conditions of Article 4 of the Contract for Engineering Services (the Contract) entered into by and between the Central Texas Regional Mobility Authority (the Authority) and Kennedy Consulting, Ltd. (the Engineer) dated 07.30.08.

The following terms and conditions of Work Authorization No. 1 are hereby amended as follows:

PART I. The Engineer will perform engineering services generally described as transportation engineering and design services for the 290 East Toll Project Segment #3 (approximate limits from just west of FM 3177 to FM 734) in accordance with the project description attached hereto and made a part of this Supplemental Work Authorization. The responsibilities of the Authority and the Engineer as well as the work schedule are further detailed in Exhibits A-1, B-1 and C-1 which are attached hereto and made a part of the Work Authorization. The Engineer will provide services as outlined in the attached Exhibit B-1 modified to complete 60% PS&E for Segment 3.

PART II. The maximum amount payable under this Supplemental Work Authorization is $4,318,413.95 which is $523,355.92 less than the Lump Sum amount of the original Work Authorization. This amount is based upon the Engineer's revised estimated Work Authorization costs included in Exhibit D-1, Fee Schedule, which is attached and made a part of this Supplemental Work Authorization. The basis for payment will remain as shown in Exhibit D of the original Work Authorization.

This Supplemental Work Authorization shall become effective on the date of the final execution of the parties hereto. All other terms and conditions of Work Authorization No. 1, not hereby amended, are to remain in full force and effect.

IN WITNESS WHEREOF, this Supplemental Work Authorization is executed in duplicate counterparts and hereby accepted and acknowledged below.

THE ENGINEER	**CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**
_____	_____
(Signature)	(Signature)
J. Kevin Kennedy	_____
(Printed Name)	Mike Heiligenstein
President of the G.P.	_____
(Title)	Executive Director
_____	_____
(Date)	(Date)

LIST OF EXHIBITS

Exhibit A-1	Scope of Services to be provided by the Authority
Exhibit B-1	Scope of Services to be provided by the Engineer
Exhibit C-1	Work Schedule
Exhibit D-1	Fee Schedule
Attachment H-2	DBE subprovider Form

EXHIBIT A-1

SERVICES TO BE PROVIDED BY THE AUTHORITY

The Authority shall perform and provide the following in a timely manner so as not to delay the Services to be provided by the Engineer:

1. Authorize the Engineer in writing to proceed.
2. Designate in writing a person to act as the Authority's representative, such person to have complete authority to transmit instructions, receive information, and interpret and define Authority's decisions with respect to the Services to be provided by the Engineer.
3. Render reviews, decisions and approvals as promptly as necessary to allow for the expeditious performance of the Services to be provided by the Engineer.
4. Place at Engineer's disposal all reasonably available information pertinent to the Project, including but not limited to the following:
    a. Available "as-built plans", existing schematics, right-of-way maps, SUE mapping, existing cross sections, existing planimetric mapping, etc.
    b. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development as necessary to complete the design.
    c. Available flood plain information and studies from the Federal Emergency Management Agency, the Corps of Engineers, local municipalities and other governmental agencies as necessary to complete the design.
    d. Information such as Preliminary Construction Sequencing Concept Plan, Preliminary Signage Concept Plan, Conceptual Drainage Analyses and Preliminary ITS Concept Plan.
5. Provide previous/existing Project Control.
6. Coordinate with the Engineer and utility companies in identifying utility impacts.
7. Revise/update ROW mapping as necessitated by the design.
8. Provide existing or updated SUE data (Level B SUE for revised project limits).
9. Provide Pavement Design Report and existing boring logs.
10. Handle all necessary submittals to the Texas Department of Licensing and Regulation (TDLR) for final review and inspection of all proposed pedestrian and bicycle facilities.
11. Coordinate with Segment Engineer and Landscape Architect to ensure final plans accommodate hardscape and future planting zones.
12. Provide guidance and direction regarding hydraulic drainage mitigation measures to reduce impacts into receiving streams, as necessary.

13. Coordinate with the Corps of Engineers, FEMA, TxDOT and COA for any approvals and permits required.
14. Provide the EPIC sheet for inclusion in the final plans.
15. Provide direction regarding informal NFIP coordination.
16. Provide recommendations/concurrence for overall temporary and final signing strategies.
17. Provide the 290 East Toll System Facilities Infrastructure Guidelines.
18. Provide Master General Notes for the project, and include the General Notes in the final plans with the Engineer's mark-ups incorporated.

EXHIBIT B-1
SERVICES TO BE PROVIDED BY THE SEGMENT ENGINEER

The Segment Engineer, herein referred to as the "Engineer", shall be responsible for the work outlined in this Scope of Services.

1.01 Design Features

A. Major elements of work include the following:

The work to be performed under this project will include final geometric design for Segment 3 (Approximate Station 458+50 to 595+00) of the 290 E Toll Project, structures, storm drainage, signing, overhead sign structures, illumination, pavement markings, traffic control plans, guardrail, ITS system, retaining walls and the preparation of PS&E documents including any other incidental items necessary for the proposed project.

B. The design progression shall be as follows:

Initial Design – Review and refine horizontal and vertical geometry for the design segment. The eastern connection to existing US 290 will be modified to provide lane balance and route continuity from US 290 to the proposed 290E frontage roads, which will likely necessitate the extension of proposed improvements east of Gilleland Creek. Also, modifications to the Decker Lane connection will be made as directed by the GEC. In preparation for the Design Concept Conference the Segment Engineer shall prepare; a drainage design report, schematic exhibit illustrating proposed changes and a preliminary construction cost estimate.

60% Design - Prepare 60% plans for the roadway, striping, large guide signs, proposed structures, interchange layouts and final drainage design.

Pre-Final Submittal - Prepare 100% paper plans for the project and all supporting documents.

Final Submittal – Final Mylar submittal with all comments resolved.

1.02 Governmental Agency Coordination

A. The Segment Engineer will be required to coordinate with and assist in securing the approval of all interested agencies involved. These agencies include, but are not necessarily limited to the TxDOT, City of Austin, Travis County, and the Federal Highway Administration.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.03 Data Collection

A. The Engineer shall collect, review and evaluate data described below. The Engineer shall notify the Corridor GEC, herein referred to as the "GEC", in writing whenever the Engineer finds disagreement with the information or documents:

1. Data from the GEC, including available "as-built plans", existing schematics, right-of-way maps, SUE mapping, existing cross sections, existing planimetric mapping, etc.
2. Documents for existing and proposed development along proposed route from local municipalities and local ordinances related to project development as necessary to complete the design.
3. Gather available flood plain information and studies from the GEC, Federal Emergency Management Agency, the Corps of Engineers, local municipalities and other governmental agencies as necessary to complete the design.
4. Information prepared by the GEC such as; Preliminary Construction Sequencing Concept Plan, Preliminary Signage Concept Plan, Conceptual Drainage Analyses and Preliminary ITS Concept Plan.

B. The Engineer is responsible for any adjustments to electronic files received by others, as described above, in order to ensure they line up with the 290 East Project Control. The Engineer will perform sufficient field investigations to gather information for the development of the construction plans.

1.04 Geotechnical Investigations

A. The Engineer will review the Pavement Design Report and existing boring logs performed by others. Pavement Design Report provided by others shall include permanent, short term temporary, and long term temporary pavement designs for all main lanes, ramps, frontage roads, side streets, temporary roadways, and detours.

B. General Requirements

For all investigations, the Engineer shall:

1. Clear boring locations for underground and overhead utilities with DIG-TESS, the GEC and Travis County.
2. Provide a traffic control plan for all work to be performed adjacent to traffic.
3. Record coordinates of each bore hole utilizing project survey control. Bore holes will be marked for surveying of the ground elevations and coordinates in order to locate in the plans.
4. Backfill borings with soil cuttings and bentonite plug and patch pavements with cold mix asphalt or concrete (match existing paving surface of affected road or drive).
5. Supplement existing boring logs performed by others with new borings for the design of bridge structures, retaining walls, sign structures and toll gantries.

C. Bridges

The Engineer will:

1. Supplement existing boring logs performed by others as necessary to complete the bridge design. Proposed boring locations shall be identified by the Engineer and approved by the GEC prior to performing geotechnical investigations.
2. Analyze subsurface conditions and Cone Penetration Test (TCP) test results for each bridge location.
3. Develop recommendations for suitable foundation type, allowable bearing and skin friction resistance in bedrock, and minimum required penetration depths for each bridge location.
4. Perform laboratory testing to include: USCS Soil Classification, Atterberg limits, particle size analysis (D50), moisture content and unconfined compression tests.
5. At bridge locations, for each column, provide soil parameters and other necessary data so that structural engineer can determine point-of-fixity. Also, if appropriate, any necessary data for lateral analysis of drilled shafts.
6. Identify potential drilled shaft construction problems related to groundwater, caving soils, or very hard rock layers.

The Engineer will drill two additional Bridge Borings for a new proposed EBFR bridge across Gilleland Creek.

D. Retaining Walls

The Engineer will:

1. Supplement existing boring logs performed by others as necessary to complete the retaining wall design. Proposed boring locations shall be identified by the Engineer and approved by the GEC prior to performing geotechnical investigations.
2. Perform laboratory testing to characterize the uniformity and strength for the soils that will be supporting MSE walls and soil and rock conditions for design of drilled shaft walls. Laboratory testing will include: USCS Soil Classification, Atterberg limits, particle size analysis, moisture content and unconfined compression tests.
3. Analyze the bearing and sliding resistance of the foundation soils at each wall location.
4. Analyze the stability of each wall for rotational stability with respect to deep-seated shearing movements by performing slope stability analyses.
5. Analyze settlement of retaining walls.
6. Compare anticipated MSE wall applied bearing pressures with the allowable bearing resistance to determine whether or not the foundation soils need to be strengthened to support the walls.

7. Identify wall locations where global or rotational stability of the MSE walls is found to have a factor of safety of less than 1.3 based on un-drained soil shear strengths.

The Engineer will drill one additional Retaining Wall boring for a new wall along the proposed EBFR extension across Gilleland Creek.

E. Geotechnical Report

The Engineer will prepare a geotechnical report that will present recommendations for the design of the bridge foundations, retaining wall foundations, and sign structure and toll gantry foundations to include:

1. Site vicinity and geology map.
2. Generalized subsurface conditions, as well as groundwater conditions encountered during drilling operations.
3. Engineering and construction considerations, structural fill requirements and earthwork recommendations.
4. Subgrade depth and elastic modulus.
5. Wincore Version 3.1 logs in English units, laboratory test results, and plan of borings with station and offset and top-of-hole elevations.
6. Recommended foundation type, minimum embedment, allowable end bearing and skin friction resistance in bedrock.
7. Soil parameters and other data provided to structural engineers for use in determining point-of-fixity of bridge foundations for bridge column design and lateral analysis of drilled shafts.
8. Recommended bearing and sliding resistance for design of MSE walls. Where the allowable bearing resistance is likely to be exceeded by the walls bearing pressure, recommendations for increasing wall anchor lengths or improving the foundation soils will be presented to provide adequate bearing capacity.
9. Rotational stability analyses results for each retaining wall location. At wall locations where stability may be of concern the Engineer shall develop conceptual approaches to improve the rotational stability. Upon approval by the GEC the Engineer will further develop the selected concept.
10. Drilled shaft wall design recommendations to include active and passive soil and rock pressures and minimum embedment depths.
11. Soil nail wall design recommendations to include active soil and rock pressures, minimum anchor lengths, minimum grout hole sizes, minimum anchor spacing, and ultimate and allowable pullout values.
12. Spread footing wall design recommendations to include active and passive soil and rock pressures.

13. Tied-back wall design recommendations to include active soil and rock pressures, minimum tieback lengths, minimum tieback spacing, and ultimate and allowable pullout values.
14. Identification of potential foundation construction problems with recommendations to treat or avoid the problems.
15. Existing boring logs performed by others presented in the appendix to supplement the new borings for bridge structures, retaining walls, and sign and gantry structures. The intent is to have one report for the limits of this project. The Engineer assumes no liability for the accuracy of borings performed by others.
16. Minimum side slope and slope stability recommendations for storm water detention basins.
17. Calculated D50 soil size within potential scour locations for scour analysis computations.

The Engineer will modify the Geotechnical Report to include foundation recommendations for new EBFR Gilleland Creek bridge and analysis of new retaining wall along EBFR extension across Gilleland Creek.

F. Deliverables

The Engineer shall:

1. Submit three (3) draft copies of the geotechnical report for review and comment to the GEC. Two (2) additional draft copies of the geotechnical report shall also be kept on file with the Engineer for future reference.
2. Respond to GEC comments and make the appropriate revisions.
3. Submit three (3) final copies of geotechnical report that incorporate review comments. Two (2) additional final copies of the geotechnical report that incorporate review comments shall also be kept on file with the Engineer for future reference.
4. Provide signed and sealed sheets of boring logs for insertion into the construction plan set.
5. Coordinate with Engineer and provide geotechnical engineer signature and seal on all bridge and retaining wall foundation sheets to ensure conformance with recommendations provided in the geotechnical report.
6. Provide electronic copies of Soil Boring locations in MicroStation dgn file.
7. Provide complete soil boring data files in Wincore format.

1.05 Supplemental Surveying

A. The Engineer shall coordinate all survey requirements with the GEC.

B. Project Control

The Engineer shall:

1. Review and utilize the Project Control provided by the GEC including recovery, verification, re-establishment, densification and extension of control as necessary. All supplemental survey shall be developed in accordance with this project control.

C. Topographic Survey

The Engineer shall:

1. Provide staking in the field for boring locations as identified by the Engineer prior to performing geotechnical investigations. The Engineer shall provide horizontal and vertical locations that tie to project control for these staked locations and locate in plans. As-drilled locations shall be provided if substantially different from staked locations.
2. Supplement existing topographic survey to evaluate critical ROW points, drainage features, bridges, driveways, existing edge of pavements and pavement markings as necessary to complete the construction drawings.
3. Conduct a topographic survey to locate newly constructed direct connector and cross sections at tie-in points to the 290 East Toll Project. Locate SH 130 main lanes and elevations within north and south US 290 East frontage roads, if completed prior to commencement of this design survey.
4. Conduct survey necessary to develop inventory of existing roadway signs including the type, size, text, and location of all large and small signs. Digital photographs shall be provided of each sign.
5. Secure right-of-entry (ROE) by signed letter from any landowners from whom permission will be needed to complete the supplemental survey.
6. Provide temporary signs, traffic control, flags, safety equipment, etc. and obtain necessary permits.
7. Control traffic in and near surveying operations adequately to comply with the latest edition of the Texas Manual on Uniform Traffic Control Devices. In the event field personnel must divert traffic or close traveled lanes, the Engineer shall prepare a Traffic Control Plan for approval by the GEC prior to commencement of field work. A copy of the approved plans shall be in the possession of field personnel on the job site at all times and shall be made available to GEC personnel upon request.
8. Merge survey data provided into one combined topographic (2d) file and one combined DTM (3d) file. Bridge data may be in a separate .dgn file. Survey data to be obtained by the Engineer will be developed and delivered in 2D Microstation format compatible with TxDOT's system. The combined 3D Microstation file will also be supplied showing all spot points and break lines. The DTM will be compatible with GEOPAK and Microstation and all level symbology, location, and formats will match TxDOT's Microstation Graphic File Format prior to delivery. If

any AutoCAD to Microstation conversions have taken place, it will be the Surveyors responsibility to ensure all such formatting is maintained.

D. Survey Deliverables:

1. Merged 2D dgn (V8) file with planimetrics including survey control and bench marks
2. Merged 3D MicroStation (dtm) (V8) file with spot points and break lines clearly delineated on separate levels
3. 2D dgn of Project horizontal and vertical control
4. ASCII text file containing the survey data points
5. GEOPAK file and field book copies

1.06 ROW Mapping

A. The Engineer shall review and evaluate proposed 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.

B. If it is necessary to obtain additional easements and/or right-of-way parcels, the Engineer shall notify the GEC in writing of the need and justification for such action. The Engineer shall identify all utility relocations required within these new easements and/or right-of-way parcels and the GEC will coordinate between the Utility companies and the Engineer.

C. The GEC will be responsible for all ROW mapping revisions / updates necessitated by design. The Engineer will support the GEC in this effort by providing drawings defining the proposed ROW or easement modifications.

The Engineer will investigate possible ROW needs for the proposed extension of EBFR across Gilleland Creek.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.07 Utility Coordination and Design

A. The GEC shall coordinate with the Engineer and the utility companies. The Engineer shall attend meetings at the Initial Design, 60% and Pre-Final submittals with the various utility companies to discuss potential conflicts.

B. The Engineer shall incorporate existing utility survey and SUE work into the Initial Design for presentation at a utility coordination meeting. If additional or supplemental SUE mapping by the Engineer is necessary for the completion of this project, it will be added to the scope of services when approved by the GEC.

C. The Engineer shall evaluate and accommodate reasonable changes to plans as necessary or as requested by the GEC to avoid utility conflicts. It is anticipated that available ROW will be constrained at certain points in the corridor where design adjustments may be required to work with utilities.

D. Illustrate existing utility locations on Roadway Plan sheets based on SUE data provided by the GEC. Roadway Profile sheets shall illustrate existing/proposed crossing utility locations.

E. Show Proposed utility locations in the Proposed Cross Sections with each submittal using utility alignment and profile information provided in GEOPAK format by others.

F. Review Utility Design's prepared by others for conflicts with construction plans.

G. Notify the Utility Coordinator of any design changes which may affect existing utility locations or proposed utility designs.

H. Utility designs and specifications will be prepared by agreement under a future work authorization as directed by the GEC.

I. By supplemental agreement, incorporate utility plans, specifications and provisions prepared by others into the bid package. This includes, but is not limited to, the coordination of; Bid Items, Special Provisions and Specifications, Plan Sheet Page Numbers, Unit Prices and Estimate.

1.08 Initial Design and Design Concept Conference

A. The Engineer shall review the 290 E Project Manual.

B. The Engineer shall develop project specific geometric and drainage criteria and summarize in a Design Summary Report (DSR) which shall form the basis of the design and development of final construction drawings. The Engineer will furnish copies of this report to the GEC for review and approval prior to refinements to the final schematic.

C. The Engineer shall review the current approved schematic and check all design values to ensure conformance with the Design Criteria established in the approved DSR. The Engineer shall notify the GEC if elements of schematic do not meet the specified Design Criteria. The Engineer shall also verify or refine the schematic to ensure compatibility with the ultimate project and ultimate adjacent projects.

D. The Engineer shall proceed with refinements to the final schematic.

1. The Engineer shall refine the horizontal and vertical alignment of the design schematic in English units for main lanes, direct connectors, ramps, frontage roads, and side streets.

2. The Engineer will revise the connection to existing US 290 on the project's eastern termini. The revisions will address lane balance, route continuity, and access as necessary to meet project requirements and improve operations. It is anticipated that

the revisions will extend eastward and may require a new bridge over Gilleland Creek.

3. Determine vertical clearances at grade separations and overpasses, taking into account the appropriate super-elevation rate.
4. Schematic refinements shall include changes to cross sections and geometry to optimize and finalize bridge limits and span arrangements, location of overhead sign structures and toll gantries, location of shared use pedestrian facility, development of feasible construction sequence and cost saving measures to reduce construction cost of the segment.
5. Coordinate modifications to the schematic with the GEC and adjacent Engineers. It is the intent that the schematic refined by the Engineer will be used to progress directly to the 60% Design Phase.
6. Prepare and submit preliminary bridge layouts for review by the GEC.
7. Notify the GEC of any additional ROW needs.
8. Notify the GEC of any changes in Control of Access limits illustrated in the refined schematic.

E. The Engineer shall prepare a preliminary cost estimate for discussion at the Design Concept Conference (DCC).

F. Develop Proposed Cross-Sections for the Engineer's refined schematic. The cross-sections should illustrate utilities based on proposed assignments.

G. The Engineer shall plan, attend and document a DCC. Personnel from the GEC will participate. The conference will provide for a brainstorming session in which decision makers, stakeholders and technical personnel may discuss and agree on:

1. Roadway, bridge, and drainage design parameters
2. Engineering constraints
3. Changes to the Schematic
4. Project development schedule
5. Other issues as identified by the GEC

H. Deliverables

1. Submit three (3) copies of a schematic layout illustrating the finalized typical sections, horizontal and vertical geometry, and preliminary bridge limits and bent locations.
2. Submit three (3) plots of the proposed design cross-sections on 11"x17" sheets including utilities based on the proposed assignments.
3. Provide memorandum stating schematic is in compliance with specified Design Criteria or the exceptions that have been identified by the Engineer.

4. Submit three (3) copies of the preliminary cost estimate.
5. Submit electronic Meeting Minutes from DCC documenting any decisions made and/or direction received from the GEC.

The Engineer will rectify an error in Survey Control between the SH 130 construction and the US 290 Schematic. This rectification requires adjusting all schematic geometry to a common survey control with the SH 130 construction.

The Engineer will adjust the schematic for the closure of Decker Lane.

The Engineer will investigate several alternatives to terminate Segment 3 construction on the East end of the project. Critical issues are replacement of the existing eastbound Gilleland Creek bridge, control of access for Manor Tech High School, and traffic merging.

The Engineer will investigate several construction options to reduce project cost. Options include constructing only the northbound or southbound mainlanes, constructing only the interior mainlanes, etc.

Engineer will adjust schematic geometry as necessary to verify that future direct connectors can be accommodated properly.

The Engineer will relocate the EB entrance ramp to 290E from its location on the schematic to utilize the straddle and cantilever bents built with the existing DC.

The Engineer will develop temporary retaining wall layouts, ultimate wall layouts, and ultimate abutment layouts at Parmer Lane to accommodate future interchange Direct Connectors.

The Engineer will adjust geometry to accommodate an oversized truck route at Parmer and SH 130 and allow the greater vertical clearance requirements.

1.09 Roadway Design

A. Basic Plan Sheets

The Engineer will:

1. Prepare the PS&E Title Sheet.
2. Complete the detailed Index of Sheets that identifies each sheet location in the plan set, as well as its corresponding sheet number. The Engineer will update the Index of Sheets throughout the submittal process to allow for easier reference during the review process.
3. Prepare Project Layout Sheets at a scale of 1"=200' that clearly indicates the limits of the entire project.
4. Prepare Benchmark Layout Sheets at a scale of 1"=200' that clearly indicate the benchmark locations and associated control information. These sheets will later be sealed by a RPLS for submittal.

B. Roadway Plans & Geometry

The Engineer will:

1. Develop Proposed Typical Sections Sheets depicting the improvements to the 290 East Toll Project mainlanes, ramps, frontage roads, and side streets. The typical sections shall depict the appropriate pavement structure as provided by the GEC.
2. Complete Existing Typical Sections Sheets depicting the existing conditions of the project roadways, according to information provided by the GEC.
3. Complete Mainlane Roadway Plan and Profile sheets depicting the proposed construction of the 290 East Toll Project, frontage roads and ramps in the plan view. Drawings will be prepared at a scale of 1"=100' H and 1"=10' V.
4. Complete Frontage Road Plan and Profile Sheets separate from the mainlanes, depicting the area in the plan view from mainlane centerline out for each direction. Drawings will be prepared at a scale of 1"=100' H and 1"=10' V.
5. Prepare Cross Street Plan and Profiles and Intersection details showing spot elevations and contours.
6. Complete separate Ramp Plan and Profile sheets.
7. Develop Ramp Gore Layouts at the intersection of each ramp with its adjacent roadways. These layouts will show proposed grading, as well as station, offsets, curb radius and curb locations.
8. Prepare Horizontal Alignment Data Sheets depicting the horizontal geometric information for the project roadways to be included in the construction plan set.
9. Develop Super-elevation Data Sheets to be included in the PS&E set. These sheets will define the pavement cross slopes for individual roadway alignments and describe transition locations and values.
10. Prepare Removal Plan Sheets at a 1"=100' scale. Removal sheets shall clearly indicate pavement and other pertinent items to be removed.
11. Develop Pedestrian and Bicycle Facilities. Prepare plan and profile sheets for the Shared-Use Path with details relating to the construction of the path. All pedestrian facilities must be designed under the guidelines set forth in the AASHTO Guide for the Development of Bicycle Facilities in accordance with the American Disabilities Act Accessibility Guidelines (ADAAG) and the Texas Accessibility Standards (TAS). Show sidewalk and locations of ADA compliant route and grade break information at driveways within the project limits. The GEC will be responsible for all necessary submittals to the Texas Department of Licensing and Regulation (TDLR) for final review and inspection of all proposed pedestrian and bicycle facilities

The Engineer will develop additional Roadway Plan and Geometry Sheets to extend the proposed EBFR across Gilleland Creek. This includes extending Project Layout Sheets, Plan and Profile Sheets, and new Typical Section Sheets.

C. Grading and Details

The Engineer will:

1. Prepare Design Cross Sections at 100-foot stations and other locations as necessary for the determination of cut and fill quantities. Cross sections shall display proposed storm sewer and proposed utility elements.
2. Prepare Driveway Details for each driveway along the project corridor. When possible these driveways will be defined in a tabular format. Unique driveways will require individual details defining their construction.
3. Develop Driveway Profiles as required for the project. These profiles will be developed to show driveway tie-back slopes, as well as limits for contractor's information.
4. Develop Miscellaneous Roadway Detail sheets for the project. The sheets will depict details required that are not defined in TxDOT standard detail sheets. When possible Statewide TxDOT or Austin District standards will be used for the project development.
5. Coordinate with GEC and Landscape Architect to ensure final plans accommodate hardscape and future planting zones and incorporate the necessary irrigation sleeves and power to accommodate future landscaping to be determined in a separate landscaping design and construction package developed by others.

The Engineer will extend Design Cross Sections to extend the proposed EBFR across Gilleland Creek.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.10 Drainage Design

A. Review Conceptual Drainage Analyses prepared by the GEC.

B. Drainage Impact Study: Engineer will perform all drainage design with a specific hydrologic and hydraulic study. Engineer will design and construct outfalls to not have any adverse impacts as defined below. Engineer will provide hydraulic drainage mitigation measures to reduce impact into receiving streams, if deemed necessary by the GEC. The criteria below are meant to clarify and supplement but not supersede the TxDOT Hydraulic Design Manual. Should any apparent conflicts arise, the Engineer should consult the GEC for clarification.

The Drainage Impact Study will include the following:

1. Identify all existing drainage outfalls within the limits of the project. Delineate drainage area boundaries for each drainage outfall including any area outside the limits of the project that drain to the outfall. Existing storm drain systems will be located and analyzed to the extent necessary for this study. Measure the existing impervious cover within each drainage area and compute the time of concentration for each drainage area.

2. Compute existing condition flows at all outfalls draining into receiving streams. Utilize 24-Hour rainfall depths in the City of Austin Drainage Criteria Manual and rainfall distributions employed in the most recent FEMA studies of the watersheds of interest to compute discharges for 2, 5, 10, 25, 50, 100 yr rainfall frequencies.

3. Delineate proposed condition drainage area boundaries. Include areas that are outside the project that drain to the proposed outfalls. Coordinate the drainage area delineation with adjacent projects. Measure the proposed condition impervious cover within each drainage area and compute the proposed condition time of concentration. Existing land use condition will be assumed for drainage areas outside the proposed ROW. Preliminary proposed condition storm drain trunk systems will be located and sized.

4. Compute proposed condition flows at all proposed outfalls draining into receiving streams. Utilize rainfall data as shown in previous bullet.

5. Determine hydrologic impacts from the proposed project by comparing the existing and proposed flow rates at each outfall, taking into account the hydrographs from upstream watersheds.

6. The primary criterion for no adverse impact is no more than one foot accumulative increase in water surface elevation of the 100-year flood. Engineer should use HEC-RAS or equivalent modeling approach to evaluate changes in water surface elevation. The community floodplain administrator will be consulted whether or not records are available to determine cumulative impacts from other projects. If such records exist, cumulative effects of other projects should be considered in determining a total one foot impact. Consideration should also be made to determine if one foot increase of water surface elevation would place additional structures or significant properties in the floodplain and this may necessitate reducing the one foot limit to a lower number for those locations. Impacts of the 2, 5, 10, 25, 50-year events should also be evaluated. Engineer will evaluate (on a case by case basis) structures or properties that could potentially be impacted by comparing levels of the structures or properties with the water surface elevations. Engineer will present results of impact analysis to the GEC. The decision to mitigate for impacts that are less than the one foot accumulative or due to the 2, 5, 10, 25, 50-year events will be made by the GEC. Other factors such as cost and significance of water level increase will also be taken into account in the decision.

7. Determine mitigation alternatives if the proposed project could have an adverse impact. The mitigation alternatives may include storm water detention basins and/or adjustments to proposed drainage area boundaries, possible adjustment to roadway profiles and adjustment of preliminary storm drain trunk system to accommodate required mitigation alternatives. The Engineer shall perform analysis to verify the need for a detention pond west of SH 130 on the north side of US 290 E proposed in the GEC's preliminary analysis. If the need is confirmed, the Engineer shall develop design and plan details for the pond. Any other mitigation alternatives will be coordinated with the GEC and added to the scope of services when approved.

8. If detention is chosen as the alternative for mitigation, the design of the pond will achieve mitigation of impacts for 2, 5, 10, 25, 50, 100 yr rainfall events. In the case where two adjacent drainage areas discharge to the same watercourse, an adverse impact is determined, and it would be difficult to provide detention for one of the areas, the detention pond for the other area could be sized such that the combined proposed flow from both areas does not result in adverse impacts. Consideration should be made on the stream reach that does not receive detention to insure no adverse impact. Distance downstream for these confluences would be determined on a case by case basis. Engineer will provide proper documentation of such situations to the satisfaction of the GEC.
9. Engineer will support the GEC in coordination with the Corps of Engineers, FEMA, TxDOT and COA for any approvals and permits required.
10. Submit a report that discusses the pertinent site information, analysis assumptions, hydrologic and hydraulic analyses, and the proposed design of any mitigation measures. Report should include a table that lists existing flows, proposed flows without mitigation, and proposed flows with mitigation (if mitigation proposed). A draft report with recommended mitigation measures will be submitted at the Initial Design Submittal. A final report with mitigation measures agreed by the GEC will be submitted at 60% Design Submittal.

C. Bridge and Culvert Plan Sheets

1. Hydraulic data Sheets: The Engineer will prepare hydraulic data sheets for bridges over creeks and any culvert within the project.
2. External Drainage Area Maps: The Engineer will finalize previously determined drainage areas from the hydrologic analysis and prepare exterior drainage area map sheet at a scale of 1"=200' or a scale approved by the GEC. The Engineer will show structure locations and, for large drainage basins, will indicate pertinent hydraulic information on these sheets.
3. Culvert layouts: The Engineer will prepare culvert plan and profile layouts at a scale of 1"=40'H and 1"=20'V that will depict culvert geometry for reconstruction or lengthening, as well as the applicable hydraulic information.

D. Storm Drain Plan Sheets

The Engineer will address the required project storm drain systems as follows:

1. Storm Drain Computations: The Engineer will analyze and design both open channel (ditches) and enclosed storm drains. Computations and design information will be presented in the appropriate plan sheets.
2. Interior Drainage Area Maps: The Engineer will prepare interior drainage area map plan sheets at an appropriate scale. These maps will depict drainage area boundaries and flow direction arrows. Each drainage area will be identified with a unique number corresponding to run-off information from the calculation sheets.

3. Drainage Plan and Profile Sheets: The Engineer will prepare drainage plan and profile sheets depicting locations of inlets, manholes, storm drains, culverts, utilities, channel improvements, ditch locations, cross-sections and flowlines as required. These sheets will be prepared at a scale of 1"=50'. Storm drain profiles will be prepared at a scale of 1"=50' H and 1"=10' V. Enclosed storm drain plans and profiles will show pipe size and type, slope, existing and proposed ground lines above the pipe, pertinent hydraulic information, and locations and sizes of inlets and junctions
4. Lateral Profiles Sheets: The Engineer will prepare lateral profile sheets for the enclosed storm drain systems. These sheets will be developed at a scale of 1"=50' H and 1"=10' V
5. Ditch Layout Schedule: The Engineer will prepare a tabular ditch layout schedule that depicts pertinent information about the roadside ditch geometry and design. This table will include station, offset, flow line elevation, ditch lining material, as well as ditch bottom width. The tables will be shown on the drainage plan sheets.
6. Drainage Detail Sheets: The Engineer shall use TxDOT standard details where practical. The Engineer shall provide drainage design details for "non-standard" drainage structures in instances where TxDOT standard details cannot be utilized.
7. Temporary Drainage Facilities: The Engineer will develop temporary drainage facilities plans necessary to allow staged construction of the project. The Engineer will design required temporary drainage structures for a 5-year frequency event, and include structure size, flow line elevations and approximate structure location in the plan sheets. The Engineer will evaluate temporary drainage ditches between temporary drainage structures and outfall locations and designate a typical ditch section in the plans along with plan notes for the contractor to maintain positive drainage for these temporary ditches.
8. Trench Protection Determination: The Engineer will identify storm drain and culvert construction areas that will require trench protection or special shoring and indicate this information on the plans.

E. Scour Analysis

The Engineer will conduct scour analysis of creek crossings for contraction scour conditions and local scour of piers and abutments and will provide estimates of total scour depth for use in the design process. Utilize borings from the geotechnical investigation to determine proper treatment under the bridge. The results of the scour analysis should be included in the Drainage Impact Study.

F. Storm Water Pollution Prevention Plan (SW3P)

1. Erosion and Sediment Control Plans: Temporary storm water management devices will be needed to minimize the sediment runoff during construction of this project. The Engineer will develop a temporary erosion and sediment control plan for the

length of the project that complements the design and construction phasing of the project, and will include notes that indicate the contractor is responsible for detailed sequencing of the devices. The Engineer will consider the following design components: non-disturbance area delineation (preserving existing vegetation), temporary and permanent seeding or sodding, erosion control blankets, diversion dikes or swales, temporary mulch, silt fence, sand bags, rock filter dams, sediment traps, and construction exits. Permanent erosion control measures will be included on these sheets if needed.

2. SW3P: The Engineer will prepare SW3P summary plan sheet(s) in accordance with Texas Pollution Discharge Elimination System (TPDES) regulations and TxDOT practices. The Engineer will use TxDOT SW3P text sheet(s) to summarize erosion and sediment control measures.
3. Erosion and Sediment Control Details: The Engineer will prepare Erosion and sediment control details for any related items that are not covered by TxDOT standard details.
4. Environmental Issues, Permits, and Commitments: The GEC will provide the EPIC sheet for inclusion in the final plans.

G. National Flood Insurance Program (NFIP) Coordination

As directed by the GEC, the Engineer will conduct a limited NFIP informal coordination role with the local floodplain manager. Informal coordination includes information collection including identification of the latest Flood Insurance Study (FIS) applicable to the site, and acquisition of the FIS back-up data. The Engineer does not and will not present themselves as a CTRMA representative, or as having any other coordinating authority, including that for any map revision requirements.

H. Deliverables

The Engineer shall deliver:

1. Electronic version of the validated Project Specified Unit Hydrograph Model
2. Electronic versions of the Design Model and applicable data and maps
3. Electronic version of the Hydrologic Report in both *.doc and *.pdf Formats
4. Three (3) 8 ½"x 11" Bound Paper copies of the Hydrologic Report
5. Electronic version of the Hydraulic Impacts, Mitigation, and Design Report in both*.doc and *.pdf Formats
6. Three (3) 8 ½"x 11" Bound Paper copies of the Hydraulic Impacts, Mitigation, and Design Report
7. Electronic versions of the Storm Drainage Model, applicable data and maps
8. PS&E Storm Drainage sheets

9. PS&E SW3P sheets

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.11 Structural Design

The Engineer will use Load and Resistance Factor Design (LRFD) for all new bridges on this project and will design all bridge structures for HL 93 loading.

A. Bridge Layouts: The Engineer shall prepare Bridge Layout plans and elevations for all bridge types listed below in accordance with the latest editions of the State's *LRFD Bridge Design Manual, Bridge Project Development Manual*, and *Bridge Detailer's Manual*.

Prior to commencing with the bridge layouts, the Engineer shall prepare a Bridge Type and Cost report that documents the analyses comparing costs for each bridge length versus pavement/embankment/retaining walls, to determine optimum bridge lengths and submit the report to the GEC. The report will also provide a cost comparison of different bridge types for each structure. The GEC will approve this analysis prior to preparation of the bridge layouts.

Proposed Bridge Limits Table:

Description	Approx. Length	Approx. Width	Estimated # of spans	Anticipated Beam Type
EB SH 130 Overpass	700'	74'	7	TX-Girder (TX54)
WB SH 130 Overpass	700'	74'	7	TX-Girder (TX54)
EBFR SH 130 Overpass	280'	14'	3	TX-Girder (TX54)
EB Parmer Overpass	870'	74'	8	TX-Girder (TX54)
EBFR Gilleland Trib	100'	48'	1	TX-Girder (TX46)
WBFR Gilleland Trib	100'	48'	1	TX-Girder (TX46)
WB Gilleland Creek	400'	48'	4	TX-Girder (TX46)

B. Final Design Calculations and Details: The Engineer shall make final design calculations and final detail drawings for the 290 East Toll Project mainlane and frontage road structures, in accordance with standard requirements of TxDOT. All bridge design shall be in conformance with the latest edition of the State's *LRFD Bridge Design Manual, Bridge Project Development Manual, Bridge Detailer's Manual*, and AASHTO *LRFD Bridge Design Specifications*. The Engineer's designer and checker shall both check all calculations and initial each page. The Engineer shall submit all structural design calculations and quantity calculations for review at the Pre-Final submittal.

The Engineer shall incorporate, in the final design of the bridge elements, aesthetic design features and details as shown in the 290 E Landscape and Aesthetic

Requirements. Standard details for corridor wide aesthetic treatments will be provided by the Segment #2 Design Engineer.

C. Summary of Bridge Quantities: The Engineer shall provide at 60%, Pre-Final and Final Plan submittals.

D. Abutment Details: The Engineer shall provide as per the proposed bridge table shown above.

E. Interior Bent Details: The Engineer shall provide as per the proposed bridge table shown above.

F. Framing Plan: The Engineer shall provide as per the proposed bridge table shown above.

G. Slab Plan: The Engineer shall provide as per the proposed bridge table shown above.

H. Deck Drainage Details: The Engineer shall provide details for concealed drainage for bridge deck scuppers. Drainage slots in bridge rails shall not be used for the mainlane structures.

I. Miscellaneous Details: The Engineer shall provide as per the proposed bridge table shown above.

J. Standard Details: The Engineer will use the latest TxDOT standard details for beams, diaphragms, railings, expansion joints, riprap, etc. when possible.

K. Demolition: The Engineer shall review and evaluate the need for phased demolition for all structures in the project limits and provide phased removal for the structures. Phased demolition of structures may be shown on bridge construction sequence plans, removal plans, and/or traffic control plans. The Engineer shall review the as-builts and perform any necessary analysis to determine the structural integrity of any part of a structure that would remain open to traffic.

The Engineer will develop a bridge layout and options for phased construction of the proposed EBFR bridge over Gilleland Creek.

The Engineer will modify the existing Frontage Road Bridges over SH 130 to retrofit a typical sidewalk (WBFR) and a wide SUP sidewalk (EBFR). This includes plan details and deck drain modification details.

The Engineer will develop structural details for an ultimate abutment at Parmer Lane to accommodate future interchange Direct Connectors. This includes developing special details for a temporary condition.

The Engineer will prepare additional structural calculations beyond the typical required at 60% to provide enough data for an accurate project estimate.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.12 Retaining Wall Design

A. Retaining Walls: The Engineer shall provide layouts (scale Max:1"=40' and Min: 1"=100'), elevations, quantity estimate, summary of quantities, typical cross sections and structural details of all retaining walls within the project.

1. 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. The Engineer shall make proposals to the GEC regarding most suitable wall type for each application.

2. Engineer will prepare retaining wall layout sheets showing plan and profile of retaining walls. Engineer will provide associated details, including soil borings in plan and profile views.

   Prepare Layout Plan which includes:

   a. Designation of reference line
   b. Beginning and ending retaining wall stations
   c. Offset from reference line
   d. Horizontal curve data
   e. Total length of wall
   f. Indicate face of wall
   g. All wall dimensions and alignment relations (alignment data as necessary)
   h. Soil core hole locations

   Prepare Elevation Plan which includes:

   a. Top of wall elevations
   b. Existing and finished ground line elevations
   c. Limits of measurement for payment

   Proposed Retaining Wall Limits Table:

Description	Approx. Location	Orientation	Approx. Length (ft)	Type
Wall A	Sta. 490+00 to Sta. 495+75	Left	575'	MSE
Wall B	Sta. 490+00 to Sta. 495+75	Right	575'	MSE
Wall C	Sta. 505+50 to Sta. 511+00	Left	550'	MSE
Wall D	Sta. 505+50 to Sta. 510+00	Right	450'	MSE
Wall E	Sta. 529+50 to Sta. 534+00	Left	650'	MSE
Wall F	Sta. 538+00 to Sta. 541+00	Right	300'	MSE
Wall G	Sta. 542+00 to Sta. 545+00	Right	300'	MSE
Wall H	Sta. 542+00 to Sta. 544+50	Left	200'	MSE

3. Engineer will prepare structural details for non-proprietary wall designs, (i.e., tie-back, soil nailed, drilled shaft).

4. Engineer will identify temporary shoring needs and prepare layouts as necessary.

5. Type, limits and anchorage details of railing (If applicable)
    a. Structural Details: The Engineer shall provide connection details for the retaining walls at bridge abutments

B. Summary of Retaining Wall Quantities: The Engineer shall provide the summaries and quantities within all formal submittals.

C. Soil Boring Logs: The Engineer shall provide all boring logs utilized within their design. Borings shall be shown on bridge plans at actual location with log information. Separate logs shall be submitted to the GEC for records purposes.

D. Context Sensitive Design: The Engineer shall utilize detail drawings for aesthetic features as shown in the 290 E Landscape and Aesthetic Requirements.

The Engineer will design additional retaining walls along the EBFR to extend across Gilleland Creek.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.13 Signing, Markings and Signalization

A. Review the Preliminary Signage Concept Plan prepared by the GEC.

B. Signing and Pavement Marking Layouts: The Engineer shall prepare layouts, specifications, and details for pavement markings. The Engineer shall prepare drawings, specifications and details for all signs. The Engineer shall coordinate with the GEC (and other Engineers as required) for overall temporary and final signing strategies including toll signing and placement of signs outside contract limits. Sign detail sheets shall be prepared for large guide signs showing dimensions, lettering, shields, borders, corner radii, etc., and shall provide large sign summary sheets and small sign summary sheets. The Engineer shall also designate the shields to be attached to guide signs. The proposed signs shall be illustrated and numbered on plan sheets. Sign foundation shall be selected from TxDOT Standards. Sign poles, attachments, and details shall be designed per the GEC recommendations and standards.

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

1. Roadway layout.
2. Center line with station numbering.
3. ROW lines.
4. Designation of arrow used on exit direction signs.
5. Culverts and other structures that present a hazard to traffic.
6. Existing signs to remain, to be removed, or to be relocated.
7. Proposed signs (illustrated and numbered).
8. Existing overhead sign bridges to remain, to be revised, removed or relocated.
9. Proposed overhead sign bridges including toll signing, indicating location by plan.
10. The Engineer shall detail permanent and temporary pavement markings and channelization devices on plan sheets. Pavement marking plans shall also be

11. Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.
12. The location of interchanges, main-lanes, grade separations, frontage roads and ramps.
13. The number of lanes in each section of proposed highway and the location of changes in numbers of lanes.
14. Direction of traffic flow on all roadways

C. Overhead Sign Structures Elevations: Engineer shall provide overhead sign structure elevations including foundation, walkway, and electrical service for future ITS facilities.

D. Summary of Overhead Sign Quantities: Engineer shall provide quantity summary sheets at the 60%, Pre-Final and Final Plan submittals.

E. Signing Summaries: Engineer shall provide sign summary sheets at the 60%, Pre-Final and Final Plan submittals.

F. Large Signing Details: Engineer shall provide details for large signs.

G. Summary of Signing and Pavement Marking Quantities: Engineer shall provide quantity summary sheets at the 60%, Pre-Final and Final Plan submittals.

H. The temporary and permanent traffic signal design documents will be prepared by the Segment 2 Consultant for the entire corridor as a single set of traffic signal plans for all three segments and incorporate into the PS&E package. The Engineer shall coordinate and provide plan drawings showing the locations of roadway and other facilities designed for Segment 3.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.14 Traffic Control Plan

The Engineer will:

A. Review the Preliminary Construction Sequencing Concept Plan prepared by the GEC.

B. Prepare Traffic Control Typical Sections for each stage of the construction sequence to clearly delineate the position of the existing traffic with respect to the proposed construction. Temporary traffic barriers and pavement markings will also be shown and dimensioned.

C. Develop TCP Overview Plans for each stage of traffic control. These plans will act as key maps for each phase of TCP and shall be developed at a 1"=400' scale.

D. Advanced Signing Layouts: The Engineer shall provide a detailed layout and arrangement of construction signs, construction pavement marking, traffic control

devices (including temporary signals and signal heads). The TCP shall include locations of portable changeable message sign devices at all key locations both within the project limits, and outside the right-of-way for every phase of construction. Prepare Advanced Warning Sign Layouts at a 1"=400' scale for the 290 East Toll Project and all cross streets.

E. Prepare Detailed Traffic Control Plan Sheets at a scale of 1"=100'. This plan will describe the maintenance of traffic and sequence of work for each phase of the proposed construction. Detour alignments, location of work areas, temporary paving, temporary shoring, signing, barricades and other details will be required to describe the traffic control plan. The Engineer will be required to ensure that proper drainage can be maintained during each phase of construction utilizing cross section analyses per TCP phase.

F. Prepare a detailed Sequence of Construction narrative and submit it to the GEC for review. The Engineer will revise and incorporate the narrative into the plans. The narrative will include a phase-by-phase, step-by-step written account of the proposed activities throughout the construction process. This is intended to be a narrative account of the activities shown in the traffic control plan layouts.

G. Prepare Detour Layout Sheets showing plan & profiles where required to define the geometry for detours required in the traffic control plans. Where detours are required, the Engineer shall develop typical cross sections, calculate quantities, and show horizontal and vertical alignment information. Detour layouts will be prepared at a scale of 1"=100' H and 1"=10' V. The GEC will provide the pavement design section for temporary detours.

H. Prepare Temporary Shoring Profiles for temporary shoring required during construction. These profiles will be prepared at a scale of 1"=100' H and 1"=10' V and depict existing ground and top of shoring. Existing ground and top of shoring elevations will be indicated at a minimum every 50 feet.

I. Develop Traffic Control Details for items not covered by TxDOT standard drawings.

J. Attend one Safety Review Meeting to present the proposed traffic handling scheme to the TxDOT's Safety Review Committee. The Engineer will incorporate the comments from the Safety Review Committee into the traffic control plans.

K. Prepare an Engineer's Opinion of Construction Schedule to determine an approximate duration for each phase of construction. The schedule will be prepared using Primavera or Suretrak and delivered at 90% and Final submittals.

L. Temporary Signals: The Engineer shall prepare temporary signal layouts if necessary to accommodate the proposed traffic control plan.

M. Temporary Retaining walls: The Engineer shall provide temporary retaining wall layouts and adequate information (station, offset, length, elevation, type) in TCP plans for various phases of construction.

N. Summary of TCP Quantities: The Engineer shall provide summary of TCP quantities at the 60%, Pre-Final and Final Plan submittals.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.15 Traffic Management System

A. Intelligent Vehicle Highway Systems: The Engineer shall review the Preliminary ITS Concept Plan provided by the GEC. This review will be based on standard placement practices.

B. Utilize the ITS Concept to provide the design plans including layouts, general notes, special specifications, and details for the ITS system infrastructure including the duct bank, pull boxes and conduit system that will be included in the construction bid package. The Engineer shall include the foundations for the Closed Circuit Television (CCTV) Surveillance, Microwave Video Detection System (MVDS), and the Dynamic Message Signs (DMS) and plans for the installation of laterals from the duct bank to the CCTV's, DMS's, Vehicle Detectors, Lane Control Signals (LCS), MVDS, HUB buildings, power supplies and signal interconnect locations.

C. Review and coordinate placement of DMS devices in conjunction with guide signing along the corridor.

D. Verify CCTV coverage within the corridor.

E. Prepare cross-sections for CCTV, DMS, and lane-control signals.

F. Coordinate ITS design elements with roadway, traffic signal communications, and Toll facility designs.

G. Compute and Summarize Quantities – ITS: The Engineer shall provide summary of quantities at the 60%, Pre-Final and Final plan submittals.

H. The Toll facility design documents will be prepared by the Segment 3 Consultant and incorporated into the PS&E package. The Engineer shall coordinate and provide plan drawings showing the locations the traffic management systems elements designed for Segments 1 and 2.

The Engineer will develop 8 additional layout sheets and 1 quantity summary sheet, and prepare general notes and special specifications for the Segment 1A PS&E.

The Engineer will analyze the ITS design prepared for Segment 2 and adjust to accommodate the Segment 1A ITS design.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.16 Illumination

The Illumination design documents will be prepared by the Segment 1 Consultant for the entire corridor as a single set of illumination plans for all three segments and incorporate into the PS&E package. The Engineer shall coordinate and provide plan drawings showing the locations of roadway and other facilities designed for Section 3.

1.17 Toll Facility Design

The Engineer will incorporate Toll facility design documents within the PS&E package. The Engineer shall provide roadway and civil activities for all the toll facilities in the corridor (Segments 1, 2 and 3) following the GEC provided US 290 East Toll System Facilities Infrastructure Guidelines including;

A. Review and evaluate the latest design guidelines for CTRMA toll facilities.

B. Review and provide comments on the preliminary toll layout locations provided by the GEC. This review will be based on standard placement practices.

C. Prepare site plan and maintenance driveway layouts for each gantry site.

D. Prepare typical sections through toll gantry areas with special pavement section.

E. Develop dimension control and sensor locations for each gantry.

F. Coordinate Toll facility design elements with roadway, ITS, drainage, illumination, traffic signals, utilities, and toll gantry designers.

G. Concrete traffic barrier layouts and details as appropriate for the Project. These designs and details will incorporate special sections necessary to allow for proper roadway cross slope drainage, special section detailing through the toll gantry area, and taper sections.

H. Prepare layouts and details for toll gantry locations, exterior and interior toll facility enclosures, foundations for toll facility enclosure and gas tank foundation, conduit runs required for toll collection equipment and other means of communication from the proposed truss to ground level. Provide designs and detailing for junction boxes, manholes, or any other elements necessary for detailing conduit/column interfaces or conduit terminations. Furthermore, provide traffic loop detector layouts in a formation acceptable and prescribed by the Toll facility design documents.

I. Compute and Summarize Quantities – Toll Gantry: The Engineer shall provide summary of quantities at the 60%, Pre-Final and Final plan submittals.

J. Coordinate with the Segment Engineers for Segments 1 & 2 to exchange the appropriate roadway and civil/site design information.

The Engineer will develop details for an additional toll gantry as part of the Segment 1A PS&E that will be used as an interim gantry prior to the construction of Segment 2.

In addition to additional services related with Segment 1A, additional coordination meetings on toll guidelines are required at the request of the GEC. Additional toll gantry detail sheets will be required based on updated guidelines for Segments 1, 2 and 3 that were not accounted for in the original scope of services.

The Engineer will develop additional detail sheets and coordination for each gantry location for the following items:

1. ILP Communication/Fiber Optic Detail
2. ILP Power detail
3. ILP AVI Riser Detail
4. ILP VES Data and Power Detail
5. ILP loop conduit detail
6. ILP Riser Detail
7. MISC. Conduit Detail
8. Misc. ground box detail
9. Misc. driveway detail.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.18 Miscellaneous

A. Quantities and Summary Sheets

The Engineer will tabulate quantities and prepare Summary Sheets for the following: Traffic Control (per phase), Earthwork, Roadway, Retaining Walls, Removals, Pavement markings, Small / Large Signs, ITS, Toll Facilities, Erosion Control and SW3P, Drainage related items including inlets, manholes and storm drain pipes.

B. Standards, Specifications and Estimate

The Engineer shall:

1. Download the appropriate TxDOT Standards from the State's web site. The Engineer will revise and seal any Standard that requires modification. All other standards will have their title blocks filled out with the applicable project data and printed for inclusion in the final plan set. The Engineer will utilize Austin District Standards where applicable.
2. The Engineer shall provide (signed and sealed) any necessary details required to supplement standard details.
3. Prepare a tabulation of applicable Specifications, Special Specifications and Special Provisions for submission with the final PS&E package.
4. Review General Notes provided by the GEC for applicability to the project. The Engineer will mark-up a set and return it to the GEC for their inclusion in the final plan set.
5. Prepare a Construction Cost Estimate at the 60%, Pre-Final and final PS&E submittal, and supply a copy to the GEC in Microsoft Excel format.

C. Deliverables

The Engineer will submit ten (10) 11" X 17" paper copies at the 60%, and Pre-Final submittal. Final PS&E submittal shall include ten (10) 11" X 17" paper copies in

addition to the signed, sealed and dated 11" x 17" Final Mylars including all supporting documentation and paperwork.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.19 Coordination, Meetings and Invoicing

A. The Engineer will need to participate and attend project workshops with other segment design consultants, specialty consultants, TxDOT, Corridor GEC, and CTRMA to establish the project issues, concerns, and objectives of the project that will influence the location and configuration of the proposed project and further define the scope of services to be provided by the Engineer.

B. The Engineer will need to participate and attend monthly and bi-weekly design coordination meetings and production meetings as further detailed in the 290 E Project Manual.

C. The Engineer will need to participate in the review process and attend comment resolution meetings for the various submittal milestones. The Engineer will respond to reviewer comments in tabular format for each submittal with explanations included for any items in disagreement. The Engineer will then attend a comment resolution meeting following each submittal to discuss review comments.

D. All team members involved in the preparation of engineering plans, studies and reports shall have established QA/QC procedures and shall conform to those procedures during the life of the project. Engineering schematics, final design plans, calculations and cost estimates prepared by the Corridor GEC, TxDOT, Specialty Consultants, and Segment Design Consultants are to be thoroughly reviewed and checked before submittal to the Corridor GEC or CTRMA for review. The Segment Design Consultants have total responsibility for the accuracy and completeness of the plans and related designs prepared under this project and shall check all such material accordingly. The plans will be reviewed by the Corridor GEC and TxDOT for conformity with the CTRMA's procedures and the terms of the project, as well as continuity with adjacent design segments. To ensure that adequate procedures will be employed to provide quality products and uniformity between project Segments, each Specialty and Segment Design Consultant will submit for approval it's proposed QA/QC Plan to be used on this program. CTRMA will provide independent QA/QC audits to verify project compliance with this plan. The Specialty and Segment Design Consultants shall have a quality control plan in effect during the entire time work is being performed under this project.

E. The Engineer shall provide assistance to the GEC during the bidding process.

F. Follow invoice procedures as described in the 290 E Project Manual.

G. The engineer shall attend pre-bid meeting.

H. The engineer shall attend pre-construction meeting.

The Engineer will attend additional Bi-Weekly, Production, and Internal Coordination meetings to coordinate the added scope and during the extended schedule.

The Engineer will provide additional Monthly Progress reports and Project Accounting during extended schedule.

The Engineer will provide additional Project Management during the extended schedule.

The Engineer will remove effort necessary to stop work at a 60% submittal.

1.20 Construction Phase Services

It is anticipated that the Engineer shall perform the following construction phase services under this contract. These services are not included in this fee effort and will be covered in a future work authorization.

SUPPLEMENTAL WORK AUTHORIZATION
C-1

SUPPLEMENTAL WORK AUTHORIZATION NO. 1
TO WORK AUTHORIZATION NO.1

EXHIBIT C-1
WORK SCHEDULE

The Engineer will perform engineering services as described in this Work Authorization and will submit deliverables to the Authority based on the following work schedule:

Transmittal of completed 60% Design.....January 13, 2010

EXHIBIT D-1
FEE SCHEDULE

FOR
KENNEDY CONSULTING, LTD.

290 EAST TOLL PROJECT - SEGMENT #3
SUPPLEMENTAL NO. 1

For services describe in the Scope of Services, we request the compensation as detailed below. Cost breakdowns for engineering services and explanation of expenses are shown on the following pages.

TOTAL COMPENSATION

Segment 3 - PS&E Design Items	**$**	**-523,355.92**

EXHIBIT D-1
Fee Schedule Summary
Kennedy Consulting, Ltd.
290E Toll Project - Segment 3

	Description of Work or Task	KCI (0.0%)	PESC (0.0%)	KHA -(42.4%)	ISE -(33.3%)	KFA -(55.7%)	BA (0.0%)	HVJ -(3.4%)	Cost / Task Totals	Original Fee Totals
1.01	Design Features	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	*$0.00*
1.02	Governmental Agency Coordination	-$11,086.18	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$11,086.18	*$21,394.32*
1.03	Data Collection	-$13,968.08	$0.00	$13,968.08	$0.00	$0.00	$0.00	$0.00	$0.00	*$192,762.22*
1.04	Geotechnical Investigations	$6,443.18	$0.00	$0.00	$0.00	$0.00	$0.00	$6,511.68	$12,954.86	*$138,156.18*
1.05	Supplemental Surveying	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	*$234,629.80*
1.06	ROW Mapping	-$1,999.74	$0.00	$1,225.72	$0.00	$0.00	$0.00	$0.00	-$774.02	*$14,359.24*
1.07	Utility Coordination and Design	-$23,873.32	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$23,873.32	*$100,855.52*
1.08	Initial Design and Design Concept Conference	$115,919.84	$0.00	-$2,687.78	$2,390.88	$0.00	$0.00	$0.00	$115,622.94	*$392,704.08*
1.09	Roadway Design	-$32,484.80	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$32,484.80	*$559,620.28*
1.10	Drainage Design	-$539,424.74	$0.00	$50,091.84	$0.00	$291,751.59	$0.00	$0.00	-$197,581.31	*$632,894.88*
1.11	Structural Design	-$40,254.44	-$166,671.52	$2,535.03	$0.00	$0.00	$0.00	$0.00	-$204,390.93	*$636,372.07*
1.12	Retaining Wall Design	-$29,800.85	-$3,257.08	$0.00	$0.00	$0.00	$0.00	$0.00	-$33,057.93	*$198,158.71*
1.13	Signing, Markings and Signalization	-$15,569.80	-$10,142.55	$0.00	$0.00	$0.00	$0.00	$0.00	-$25,712.35	*$129,228.08*
1.14	Traffic Control Plan	-$287,786.64	$0.00	$173,287.14	$0.00	$0.00	$0.00	$0.00	-$114,499.50	*$413,470.64*
1.15	Traffic Management System	-$2,374.79	$0.00	-$9,303.24	$0.00	$0.00	$0.00	$0.00	-$11,678.03	*$82,102.58*
1.16	Illumination	-$2,374.79	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$2,374.79	*$5,923.48*
1.17	Toll Facility Design	-$3,871.36	$0.00	-$77,034.85	$133,926.85	$0.00	$0.00	$0.00	$53,020.64	*$191,018.36*
1.18	Miscellaneous	-$109,051.02	-$9,743.06	$33,985.53	$13,072.48	$0.00	$0.00	$0.00	-$71,736.07	*$315,975.81*
1.19	Coordination, Meetings and Invoicing	-$24,618.26	-$23,305.53	$36,000.98	$25,112.68	$0.00	$0.00	$11,105.00	$24,294.87	*$582,143.62*
1.20	Construction Phase Services	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	*$0.00*
	FEE SCHEDULE SUMMARY	**-$1,016,175.79**	**-$213,119.74**	**$222,068.45**	**$174,502.89**	**$291,751.59**	**$0.00**	**$17,616.68**	**-$523,355.92**	*$4,841,769.87*
	KCI - Kennedy Consulting, Ltd.								**-$1,016,175.79**	*$3,367,502.49*
	PESC - PE Structural Consultants, Inc. (DBE)								**-$213,119.74**	*$682,454.37*
	KHA - Kimley-Horn & Associates, Inc.								**$222,068.45**	*$346,942.65*
	ISE - I.S. Engineers, LLC								**$174,502.89**	*$0.00*
	KFA - K Friese & Associates, Inc. (DBE)								**$291,751.59**	*$31,862.20*
	BA - Baker-Aicklen & Associates, Inc.								**$0.00**	*$223,815.00*
	HVJ - HVJ Associates, Inc. (DBE)								**$17,616.68**	*$189,193.16*
	PROJECT TOTAL								**-$523,355.92**	*$4,841,769.87*