

CAMINO REAL REGIONAL MOBILITY AUTHORITY BOARD RESOLUTION

WHEREAS, the Camino Real Regional Mobility Authority (CRRMA) and Consor Engineers, LLC (Engineer) entered into a Contract for Engineering Services dated December 8, 2022 (Contract) in order for the Engineer to provide various design services to the CRRMA, as may be requested from time to time, via execution of a Work Authorization; and

WHEREAS, the CRRMA and Engineer now desire to enter into a work authorization pursuant to the Contract, in order for the Engineer to provide design services for the completion of design plans for the I-10 Frontage Roads Extension Project, Phase 1.

NOW, THEREFORE, BE IT RESOLVED BY THE CAMINO REAL REGIONAL MOBILITY AUTHORITY:

THAT, the Executive Director be authorized to execute **Work Authorization No. 2** with Consor Engineers, LLC, including any additional documents or materials as may be required, for the provision of design plans for the I-10 Frontage Roads Extension Project, Phase 1.

PASSED AND APPROVED THIS 13TH DAY OF MARCH 2024.

**CAMINO REAL
REGIONAL MOBILITY AUTHORITY**

ATTEST:

James L. (Jim) Smith, Vice Chair

Monica L. Perez
Board Secretary

APPROVED AS TO CONTENT:

Raymond L. Telles
Executive Director

WORK AUTHORIZATION NO. 2
CONTRACT FOR ENGINEERING SERVICES

THIS WORK AUTHORIZATION is made pursuant to the terms and conditions of Article 5 of the Contract for Engineering Services entered into by and between the CAMINO REAL REGIONAL MOBILITY AUTHORITY (CRRMA) and CONSOR ENGINEERS, LLC (ENGINEER), dated December 8, 2022 (Contract).

PART I. The Engineer will perform engineering services generally described as the preparation of environmental document, plans, specifications, and estimate, and associated documents for the project known locally as the I-10 Frontage Roads Extension, Phase 1, as more fully described in this Work Authorization. The responsibilities of the CRRMA and the Engineer as well as the Engineer's work schedule are further detailed in **EXHIBIT A, EXHIBIT B, EXHIBIT C, and EXHIBIT D**, which are attached hereto and made a part of this Work Authorization.

PART II. The maximum amount payable to the Engineer under this Work Authorization is **TWO MILLION FOUR HUNDRED TEN THOUSAND SEVEN HUNDRED THIRTY-SIX AND 84/100 DOLLARS (\$2,410,736.84)** and the method of payment is Specified Rate Basis, as set forth in Article 3 of the Contract. This amount is based upon the rates set forth in Attachment B of the Contract as well as the Engineer's Fee Schedule, which is attached hereto and made a part of this Work Authorization as **EXHIBIT C**.

PART III. Payment to the Engineer for the services identified herein shall be made in accordance with the Contract.

PART IV. This Work Authorization shall become effective upon the last date identified below and shall terminate upon CRRMA final acceptance of the services requested herein, unless extended by a written amendment to this Work Authorization.

PART V. This work authorization does not waive the Parties' responsibilities and obligations provided under the Contract.

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

CONSOR ENGINEERS, LLC

**CAMINO REAL
REGIONAL MOBILITY AUTHORITY**

By: _____
Name: _____
Title: _____
Date: _____

By: _____
Name: Raymond L. Telles
Title: Executive Director
Date: _____

LIST OF EXHIBITS

EXHIBIT A	Services to be provided by the Engineer
EXHIBIT B	Project Schedule
EXHIBIT C	Fee Schedule/Budget
EXHIBIT D	Invoicing Requirements

EXHIBIT A

SERVICES TO BE PROVIDED BY THE ENGINEER

PROJECT DESCRIPTION

IH-10 Westbound Frontage Road design from Executive Center Blvd to Sunland Park Dr.

FUNCTION CODE 102(110) - FEASIBILITY STUDIES

ROUTE AND DESIGN STUDIES

110.1. Data Collection and Field Reconnaissance.

- A. The Engineer shall collect, review and evaluate data described below. The Engineer shall notify the State in writing whenever the Engineer finds disagreement with the information or documents:
 - 1. Data from the State, include, but are not be limited to, “as-built plans”, existing schematics, right-of-way maps, subsurface utility engineering (SUE) mapping, and previous corridor studies, reports, and plans conducted by other agencies and groups, environmental documents, existing channel and drainage easement data, existing traffic counts, accident data, Bridge Inspection records, Project Management Information system (PMIS) data, identified endangered species, identified hazardous material sites, current unit bid price information, current special provisions, special specifications, and standard drawings, if available.
 - 2. Utility plans and documents from appropriate municipalities and utility companies.
 - 3. Flood plain information and studies from the Federal Emergency Management Agency (FEMA), the United States Corps of Engineers (USACE), local municipalities and other governmental agencies.
 - 4. Obtain graphics files, plans, documents, and other pertinent data for existing and proposed improvements along the proposed corridor. Review collected information and process the data into MicroStation reference files and organize it into project reference notebooks.
 - 5. Conduct field reconnaissance and collect data including a photographic record of notable existing features.
- B. The Engineer shall conduct route location, alignment studies and related public involvement in order to determine the locally-preferred alternative.
- C. The Engineer shall participate in a Value Engineering study as requested by the State.
- D. The Engineer shall perform a detailed Level of Service (LOS) traffic analysis and Interstate Access Justification (IAJ) report using the traffic data and projections approved by the State’s Transportation Planning and Programming Division. The Engineer shall prepare the existing and projected traffic volumes and related data for State approval, and provide review, revisions, and evaluations of the traffic data. Based on approved traffic data and the evaluation of alternatives, the Engineer shall develop the design schematic.
- E. The Engineer shall prepare the design schematic using the checklist provided by the State. The horizontal and vertical alignments will be at a scale of 1”=100’ (horizontal) and

1"=10' or 1"=20' (vertical). The Engineer shall prepare a colorized design and guide signing schematic based on the proposed locally-preferred alternative. All geometric designs must be in conformance with the TxDOT Roadway Design Manual except where variances are permitted in writing by the State. The schematic layout must include the information necessary for proper review and evaluation.

- F. The Engineer shall provide design schematic review, support, and any related design services. The Engineer shall consider preliminary drainage analysis and management of traffic during construction in the development of the design schematic. The Engineer shall participate in project meetings and public meetings as required.

110.2. Design Criteria.

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

110.3. Preliminary Cost Estimates.

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

110.4. Design Concept Conference.

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

- A. Roadway and drainage design parameters
- B. Engineering and environmental constraints
- C. Project development schedule
- D. Other issues as identified by the State
- E. Identify any Design Exceptions and Waivers
- F. Preliminary Construction Cost Estimate

110.5. Geotechnical Borings and Investigations:

The Engineer shall determine the location of proposed soil borings for bridge design, embankment settlement analysis, retaining walls, slope stability and along storm drain alignment in accordance with the latest edition of the State's Geotechnical Manual. The State will review and provide comments for a boring layout submitted by the Engineer

showing the general location and depths of the proposed borings. Once the Engineer receives the State's review comments they shall perform soil borings (field work), soil testing and prepare the boring logs in accordance with the latest edition of the State's Geotechnical Manual and State District's procedures and design guidelines.

- A. All geotechnical work should be performed in accordance with the latest version of the State's Geotechnical Manual. All testing shall be performed in accordance with the latest version of the State's Manual of Test Procedures. American Society for Testing Materials (ASTM) test procedures can be used only in the absence of the State's procedures. All soil classification should be done in accordance with the Unified Soil Classification System.
- B. If applicable, the Engineer shall perform any retaining wall analyses to include settlement analysis, computation of the factor of safety for bearing capacity, global stability, overturning and sliding. In addition, the Engineer shall include allowable bearing pressure, passive earth pressure, friction factor, settlement analysis (consolidation report) and lateral earth pressure for the retaining walls.
- C. If applicable, the Engineer shall perform soil borings, coring for pavement removal items, piezometric readings, testing and analysis to include slope stability analysis, settlement analysis, and foundation design recommendations along storm drain alignment, retaining walls, overhead sign structures, bridges, embankments and any temporary soil retaining systems.
- D. The Engineer shall provide a signed, sealed and dated geotechnical report which contains, but is not limited to, soil boring locations, boring logs, laboratory test results, generalized subsurface conditions, ground water conditions, piezometer data, analyses and recommendations for settlement and slope stability of the earthen embankments, skin friction tables and design capacity curves including skin friction and point bearing. The skin friction tables and design capacity curves must be present for piling and drilled shaft foundation.
- E. If applicable, the Engineer shall perform scour analysis in accordance with TxDOT's Geotechnical Manual. For cohesionless soils the D50 and D95 values from the grain size distribution curves is required.
- F. The Engineer shall sign, seal and date soil boring sheets to be used in the PS&E package. The preparation of soil boring sheets must be in accordance with a State's District standards.
- G. Foundation Studies: The Engineer shall coordinate with the State to determine the location of soil borings to be drilled along the retaining wall alignments. The soil borings shall extend a minimum of 35 feet below the bottom elevation of the wall or deeper as soil conditions warrant. Spacing of soil borings shall not exceed 500 feet. The Engineer shall provide a boring layout for the State's review and comment.
- H. The Engineer shall incorporate soil boring data sheets prepared, signed, sealed, and dated by the Geotechnical Engineer. The soil boring sheets shall be in accordance with the State's WINCORE software as can be found on the Texas Department of Transportation (TxDOT) website. Bentley's gINT software may be used in lieu of WINCORE to produce the soil boring sheets, as long as the information conveyed is consistent with the information provided by WINCORE.

FUNCTION CODE 120(120) - SOCIAL/ECON/ENVIRON STUDIES - OMITTED

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

FUNCTION CODE 145(164) - MANAGING CONTRACTED/DONATED PS&E

CONTRACT MANAGEMENT AND ADMINISTRATION

145.1. Contract Management and Administration

The Engineer shall:

- A. Perform all work in accordance with the State's latest practices, criteria, specifications, policies, procedures and Standards of Uniformity (SOU). All documents shall be sufficient to satisfy the current SOUs available from the State.
- B. Act as an agent for the State when specified in this work authorization.
- C. Notify the State of its schedule, in advance, for all field activities.
- D. When specified, seek right of entry from public or private land owners to perform environmental services. Right of entry permission shall be written and signed by the land owner. Develop letters or other materials for seeking right of entry. Letters or other materials seeking right of entry shall not be distributed without prior approval of the State. Letters or other materials seeking right of entry shall contain explicit reference to the kinds of activities for which right of entry is requested and an indication of the impacts (if any) that will result from performance of environmental services.
- E. Prepare monthly written progress reports for each project.
- F. Develop and maintain a detailed project schedule to track project conformance to Exhibit C, Work Schedule, for this work authorization. The schedule submittals shall be hard copy and electronic format.
- G. Meet on a scheduled basis with the State to review project progress.
- H. Prepare, distribute, and file both written and electronic correspondence.
- I. Document phone calls and conference calls as required during the project to coordinate the work for various team members.

FUNCTION CODE 160 (150) – ROADWAY DESIGN

150.1. Design surveys and construction surveys

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

A. PURPOSE

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

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

B. DEFINITIONS

A design survey is defined as the combined performance of research, field work, analysis, computation, and documentation necessary to provide detailed topographic (3-dimensional) mapping of a project site. A design survey may include, but need not be

limited to locating existing right-of-way, cross-sections or data to create cross-sections and Digital Terrain Models (DTM), horizontal and vertical location of utilities and improvements, detailing of bridges and other structures, review of right-of-way maps, establishing control points, etc.

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

C. TASKS TO BE COMPLETED

1. Design Surveys

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

- a. Obtain or collect data to create cross-sections and digital terrain models.
- b. Locate existing utilities.
- c. Locate topographical features and existing improvements (2D, 3D).
- d. Provide details of existing bridge structures.
- e. Provide details of existing drainage features, (e.g., culverts, manholes, etc.).
- f. Locate wetlands
- g. Establish additional and verify existing control points. Horizontal and Vertical control ties must be made and tabulated, to other control points in the vicinity, which were established by other sources such as, the National Geodetic Survey (NGS), and the Federal Emergency Management Agency (FEMA), and any other local entities as directed by the State.
- h. Locate existing right-of-ways.
- i. Review right-of-way maps. Locate boreholes.
- j. Perform hydrographic surveys.
- k. Update existing control data and prepare survey control data sheets, as directed by the State for inclusion into a construction plan set.

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

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

- a. Overall view of the project and primary control monuments set for control of the project
- b. Identification of the control points
- c. Baseline or centerline

- d. Graphic (Bar) Scale
- e. North Arrow
- f. Placement of note "*The survey control information has been accepted and incorporated into this PS&E*" which shall be signed, sealed and dated by a Texas Professional Engineer
- g. RPLS signature, seal, and date
- h. The State's title block containing District Name, County, Highway, and CSJ

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

- a. Location for each control point, showing baseline or centerline alignment and North arrow.
- b. Station and offset (with respect to the baseline or centerline alignments) of each identified control point.
- c. Basis of Datum for horizontal control (base control monument/benchmark name, number, datum).
- d. Basis of Datum for the vertical control (base control monument, benchmark name, number, datum).
- e. Date of current adjustment of the datum.
- f. Monumentation set for Control (Description, District name/number and Location ties).
- g. Surface Adjustment Factor and unit of measurement.
- h. Coordinates (State Plan Coordinates [SPC] Zone and surface or grid).
- i. Relevant metadata.
- j. Graphic (Bar) Scale.
- k. Placement of note "*The survey control information has been accepted and incorporated into this PS&E*" which shall be signed, sealed and dated by a Texas Professional Engineer.
- l. RPLS signature, seal and date.
- m. The State's title block containing District Name, County, Highway, and CSJ.

2. Construction Surveys - **OMITTED**

D. TECHNICAL REQUIREMENTS

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

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

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

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

4. Side shots or short traverse procedures used to determine horizontal and vertical locations must meet the following criteria:
 - a. Side shots or short traverses must begin and end on horizontal and vertical ground control as described above.
 - b. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that horizontal locations relative to the control may be reported within the following limits:
 - (1) Bridges and other roadway structures: less than 0.1 of one foot.
 - (2) Utilities and improvements: less than 0.2 of one foot.
 - (3) Cross-sections and profiles: less than 1 foot.
 - (4) Bore holes: less than 3 feet.
 - c. Standards, procedures, and equipment (may be GPS Equipment, LiDAR, Total Stations, etc.) used must be such that vertical locations relative to the control may be reported within the following limits:
 - (1) Bridges and other roadway structures: less than 0.02 of one foot.
 - (2) Utilities and improvements: less than 0.1 of one foot.
 - (3) Cross-sections and profiles: less than 0.2 of one foot.
 - (4) Bore holes: less than 0.5 of one foot.

E. AUTOMATION REQUIREMENTS

1. Planimetric design files (DGN) must be fully compatible with the State's *MicroStation* graphics program without further modification or conversion.
2. Electronically collected and processed field survey data files must be fully compatible with the State's computer systems without further modification or conversion. All files must incorporate only those feature codes currently being used by the State.
3. DTM must be fully compatible with the State's OpenRoads civil design system without further modification or conversion. All DTM must be fully edited and rectified to provide a complete digital terrain model with all necessary break lines.

F. DELIVERABLES

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

1. Digital Terrain Models (DTM) and the Triangular Irregular Network (TIN) files in a format acceptable by the State.
2. Maps, plans, or sketches prepared by the Engineer's Surveyor showing the results of field surveys.
3. Computer printouts or other tabulations summarizing the results of field surveys.
4. Digital files or media acceptable by the State containing field survey data (ASCII Data files).
5. Maps, plats, plans, sketches, or other documents acquired from utility companies, private corporations, or other public agencies, the contents of which are relevant to the survey.
6. Field survey notes, as electronic and hard copies.

7. An 8 ½ inch by 11-inch survey control data sheet for each control point which must include, but need not be limited to, a location sketch, a physical description of the point including a minimum of two reference ties, surface coordinates, a surface adjustment factor, elevation, and the horizontal and vertical datums used. A pre-formatted survey control data sheet form in Microsoft Office Word 2010 format will be provided by the State.
8. A digital and hard copy of all computer printouts of horizontal and vertical conventional traverses, GPS analysis and results, and survey control data sheets.
9. All GEOPAK GPK files and OpenRoads GEOPAK files.
10. Survey reports in a format requested by the State.

FUNCTION CODE 160(160) - ROADWAY DESIGN

ROADWAY DESIGN CONTROLS

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

160.1. Geometric Design

The Engineer shall:

A. Refine Schematic - **OMITTED**

B. Preliminary Geometric Project Layout. The Engineer shall develop a preliminary geometric project layout (Layout) and a preliminary 3D corridor model for the full length of the project to be reviewed and approved by the State prior to the Engineer proceeding with the 30% milestone submittal package.

The Layout must consist of a planimetric file of existing features and the proposed improvements within the existing and any proposed ROW. The Layout must also include the following features: existing and proposed ROW, existing and proposed horizontal and vertical alignment and profile grade line, cross culverts, lane widths, cross slopes, ditch slopes, pavement structure, clear zone, dedicated right turn lanes, corner clips, retaining walls (if applicable) guard rail (if applicable), and water surface elevations for various rainfall frequencies, etc. Existing major subsurface and surface utilities must be shown on the Layout. The Engineer shall develop the proposed alignment to avoid the relocation of existing utilities as much as possible. The Engineer shall consider Americans with Disabilities Act (ADA) requirements when developing the Layout. The Layout must be prepared in accordance with the current Roadway Design Manual. The Engineer shall provide horizontal and vertical alignment of the project layout in English units for main lanes and cross streets. Minor alignment alternatives must be considered to provide for an optimal design. The project layout must be coordinated with the State and adjacent Engineers, if any. The Engineer shall also provide proposed and existing

typical sections with the profile grade line (PGL), lane widths, cross slopes, ROW lines, ditch shapes, pavement structures and clear zones depicted, etc.

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

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

160.2. Roadway Design

The Engineer shall use Bentley's OpenRoads 3D Design technology in the design and preparation of the roadway plan sheets. The current acceptable software format is OpenRoads Designer SS10/PW. Any other version must be approved by the State prior to beginning work.

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

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

1. Calculated roadway centerlines for mainlanes, ramps, cross streets and frontage roads, as applicable. Horizontal control points must be shown. The alignments must be calculated using OpenRoads horizontal geometry tools.
2. Pavement edges for all improvements (mainlanes, direct connectors, ramps, cross streets, driveways and frontage roads, if applicable).
3. Lane and pavement width dimensions.
4. The geometrics of ramps, auxiliary and managed lanes.
5. Proposed structure locations, lengths, and widths.
6. Direction of traffic flow on all roadways. Lane lines and arrows indicating the number of lanes must also be shown.
7. Drawing scale shall be 1" =100'
8. Control of access line, ROW lines and easements.
9. Begin and end super elevation transitions and cross slope changes.
10. Limits of riprap, block sod, and seeding.
11. Existing utilities and structures.
12. Benchmark information.

13. Radii call outs, curb location, Concrete Traffic Barrier (CTB), guard fence, crash safety items and American with Disabilities Act Accessibility Guidelines (ADAAG) compliance items.

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

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

160.3. Typical Sections

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

160.4. Mainlane and Frontage Road Design – OMITTED

160.5. Interchange - OMITTED

160.6. Cross Streets - OMITTED

160.7. Cut and Fill Quantities

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

The Engineer shall submit sets of drawings at the 30%, 90%, and final submittals, respectively. The Engineer shall also submit the current OpenRoads generated 3D corridor model for each submittal.

160.8. Plan Preparation

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

160.9. Wetlands Information – OMITTED

160.10. Pavement Design

If applicable, the Engineer shall incorporate the pavement design developed by the State for this project.

160.11. Pedestrian and Bicycle Facilities

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

FUNCTION CODE 160(161) - ROADWAY DESIGN

DRAINAGE

161.1. Data Collection

The Engineer shall provide the following data collection services:

- A. Conduct field inspections to observe current conditions and the outfall channels, the cross-drainage structures, drainage easements, the tributary channel, and land development projects that contribute flow to the tributary. Document field inspections with digital photos.
- B. Collect available applicable data including GIS data and maps, site survey data, construction plans, previous reports and studies, and readily available rainfall history for the area. Particular sources of data collected must include, but are not limited to, the State, County, and Federal Emergency Management Agency (FEMA).
- C. Collect available Flood Insurance Rate Maps (FIRMs), Flood Insurance Study (FIS) study data, and models.
- D. Review survey data and coordinate any additional surveying needs with State.
- E. Present existing drainage structures in a 3D corridor MicroStation model.
- F. Meet with local government officials to obtain historical flood records. Interview local residents or local government employees to obtain additional high-water information if

available. Obtain frequency of road closure and any additional high-water information from the District Maintenance office and Area office.

- G. Submit a letter report to the State Project Manager detailing completion of data collection.

161.2. Hydrologic Studies

The Engineer shall provide the following services:

- A. Incorporate in the hydrologic study a thorough evaluation of the methodology available, comparison of the results of two or more methods, and calibration of results against measured data, if available.
- B. Calculate discharges using appropriate hydrologic methods.
- C. Consider the pre-construction and post-construction conditions in the hydrologic study, as required in this Work Authorization. The additional lanes may be accounted for by increasing percent development or by a higher curve number, as deemed appropriate for the site.
- D. Obtain the drainage area boundaries and hydrologic parameters such as impervious covered areas, and overland flow paths and slopes from appropriate sources including, but are not limited to, topographic maps, GIS modeling, construction plans, and existing hydrologic studies. The Engineer shall not use existing hydrologic studies without assessing of their validity. If necessary, obtain additional information such as local rainfall from official sites such as airports.
- E. Include, at a minimum, the “design” frequency in conformance with the *Hydraulic Design Manual* and the 1% Annual Exceedance Probability (AEP) storm frequency. The report must include the full range of frequencies (50%, 20%, 10%, 4%, 2%, 1%, and 0.2% AEP). Perform scour evaluations for both the design and check flood (i.e. 2 times the check flood) frequencies.
- F. Compare calculated discharges to the effective FEMA flows. If calculated discharges are to be used in the model instead of the effective FEMA flows, full justification must be documented.

161.3. Storm Drains – OMITTED

161.4. Cross-Drainage Structures – OMITTED

161.5. Temporary Drainage Facilities – OMITTED

161.6. Complex Hydraulic Design and Documentation

The Engineer shall provide the following services:

- A. Gather information regarding existing drainage facilities and features from existing plans and other available studies or sources.
- B. Perform hydraulic design and analysis using appropriate hydraulic methods, which may include computer models such as HEC-RAS, unsteady HEC-RAS or 2D models such as SWMM. 2D models shall not be developed without the express permission of the State.
- C. Use the current effective FEMA models, where appropriate, as a base model for the analysis. If a “best available data” model is provided by the local floodplain administrator, it must be utilized accordingly for this analysis. Review the provided base model for correctness and updated as needed. If the provided effective model is not in a HEC-RAS format, convert it to HEC-RAS for this analysis.

- D. If the appropriate hydrologic model requires storage discharge relationships, develop HEC-RAS models or other State's approved models that will compute these storage discharge relationships along the channel.
- E. Consider pre-construction, present and post-construction conditions.
- F. Quantify impacts, beneficial or adverse, in terms of increases in peak flow rates and water surface elevations for the above listed hydraulic conditions and hydrologic events. Impacts will be determined both upstream and downstream of the bridge crossings.
- G. Compute right of way corridor 1% AEP flood plain volumes for existing and proposed roadway elevations. The Engineer shall provide to offset a decrease in 1% AEP flood plain volumes.
- H. Use hydrograph calculations and peak flows to determine the storage required.
- I. If necessary, present mitigation measures along with the advantages and disadvantages of each. Each method must consider the effects on the entire area. Include approximate construction costs in the report.
- J. Provide hand calculations which quantify the cut and fill within the 1% AEP flood plain, if any.

161.7. Scour Analysis

The Engineer shall provide the following services:

- A. Perform a scour analysis for each proposed bridge structure.
- B. The Engineer shall prepare each scour analysis using a State-approved methodology listed in this Work Authorization. The Engineer shall select the methodology based on the site conditions such as the presence of cohesive or cohesion less soil, rock or depth of rock, proposed foundation type, and existing site performance. The Engineer shall follow the methodology outlined in the State Geotechnical Manual. The Engineer shall coordinate with the State prior to commencing any work on any Stream Migration Study. This coordination must include consultation with the appropriate State technical expert.
- C. Provide the State with a completed Scour Summary Form (TxDOT Form 2605, which can be accessed at: <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/bridge.html>), potential scour depths, envelope, and any recommended countermeasures including bridge design modifications and/or revetment.

161.8. Environmental Permits – OMITTED

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

The Engineer shall provide the following services:

- A. Prepare the PS&E package in accordance with the applicable requirements of the State's specifications, standards, and manuals, including the TxDOT *PS&E Preparation Manual*. Include the following sheets and documents, as appropriate:
 - 1. Hydrologic Data Sheets
 - 2. Hydraulic Data Sheets
 - 3. Scour Data Sheets
 - 4. Culvert Layout Sheets
 - 5. Storm Drain Plan/Profile Sheets
 - 6. Detention Pond Layouts
 - 7. Detention Pond Details

8. Roadway Plan & Profile Sheets including profile grade line of parallel ditches, if applicable.
9. All other relevant sheets
- B. Prepare culvert cross sections and identify each cross-section's station location.
- C. Identify areas requiring trench protection, excavation, shoring and de-watering.
- D. Prepare drainage area maps.
- E. If applicable, prepare plan and profile sheets for storm drain systems and outfall ditches.
- F. Select any necessary standard details from State or District's list of standards for items such as inlets, manholes, junction boxes and end treatments.
- G. Prepare details for non-standard inlets, manholes and junction boxes.
- H. If applicable, prepare drainage details for outlet protection, outlet structures and utility accommodation structures
- I. Identify pipe strength requirements
- J. Prepare drainage facility quantity summaries
- K. Identify potential utility conflicts and, if feasible, design to mitigate or avoid those identified conflicts.
- L. Consider pedestrian facilities, utility impacts, driveway grades, retaining wall and concrete traffic barrier drainage impacts.
- M. Identify existing ground elevation profiles at the ROW lines on storm sewer plan and profile sheets.
- N. Locate soil borings every 500 feet along the storm sewer alignment and take piezometric readings at 2000 feet intervals.
- O. Prepare Hydraulic Data Sheets for any bridge or cross drainage structures at the outfall channel and indicate site location (e.g., station and name of creek or bayou), if applicable.
- P. Develop a 3D model of the proposed drainage structures using the SUDA capabilities of the Geopak/OpenRoads Product.
- Q. Develop layouts for the following -

FUNCTION CODE 160(162) - ROADWAY DESIGN

SIGNING, PAVEMENT MARKINGS AND SIGNALIZATION (PERMANENT)

162.1. Signing

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

- A. Prepare sign detail sheets for large guide signs showing dimensions, lettering, shields, borders, corner radii, etc., and shall provide a summary of large and small signs to be removed, relocated, or replaced.
- B. Designate the shields to be attached to guide signs.
- C. Illustrate and number the proposed signs on plan sheets.
- D. Select each sign foundation from State Standards.

162.2. Pavement Marking

- A. The Engineer shall detail both permanent and temporary pavement markings and channelization devices on plan sheets. The Engineer shall coordinate with the State (and

- other Engineers as required) for overall temporary, interim, and final pavement marking strategies. The Engineer shall select Pavement markings from the latest State standards.
- B. The Engineer shall provide a 3D corridor model with the proposed pavement marking stenciled onto the model.
- C. The Engineer shall provide the following information on sign and pavement marking layouts:
1. Roadway layout.
 2. Center line with station numbering.
 3. Designation of arrow used on exit direction signs
 4. Culverts and other structures that present a hazard to traffic.
 5. Location of utilities.
 6. Existing signs to remain, to be removed, to be relocated or replaced.
 7. Proposed signs (illustrated, numbered and size).
 8. Proposed overhead sign bridges to remain, to be revised, removed, relocated, or replaced.
 9. Proposed overhead sign bridges, indicating location by plan.
 10. Proposed markings (illustrated and quantified) which include pavement markings, object markings and delineation.
 11. Quantities of existing pavement markings to be removed.
 12. Proposed delineators, object markers, and mailboxes.
 13. The location of interchanges, mainlanes, grade separations, frontage roads and ramps.
 14. The number of lanes in each section of proposed highway and the location of changes in numbers of lanes.
 15. Right-of-way limits.
 16. Direction of traffic flow on all roadways.

162.3. Traffic Warrant Studies - OMITTED

162.4. Traffic Signals - OMITTED

FUNCTION CODE 160(163) - ROADWAY DESIGN

MISCELLANEOUS (ROADWAY)

163.1. Utility engineering investigation (currently subsurface utility engineering):

Utility Engineering Investigation include utility investigations subsurface and above ground prepared in accordance with AASHTO standards [ASCE C-1 38-02 (<http://www.fhwa.dot.gov/programadmin/asce.cfm>)] and Utility Quality Levels as follows.

- A. Utility Quality Levels are defined in cumulative order (least to greatest) as follows:
1. Quality Level D - Existing Records: Utilities are plotted from review of available existing records.
 2. Quality Level C - Surface Visible Feature Survey: Quality level "D" information from existing records is correlated with surveyed surface-visible features. Includes Quality Level D information. If there are variances in the designated work area of Level D, a new schematic or plan layout will be necessary to identify the limits of the proposed project and the limits of the work area required for this work authorization; including highway stations, limits within existing or proposed right of way, additional areas

outside the proposed right of way, and distances or areas to be included along existing intersecting roadways.

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

B. Designate (Quality Level B)

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

The Engineer shall:

1. As requested by the State compile "As Built" information from plans, plats and other location data as provided by the utility owners.
2. Coordinate with utility owner when utility owner's policy is to designate their own facilities at no cost for preliminary survey purposes. The Engineer shall examine utility owner's work to ensure accuracy and completeness.
3. Designate, record, and mark the horizontal location of the existing utility facilities and their service laterals to existing buildings using non-destructive surface geophysical techniques. No storm drain facilities are to be designated unless authorized by the State. A non-water base paint, utilizing the APWA color code scheme, must be used on all surface markings of underground utilities.
4. Correlate utility owner records with designating data and resolve discrepancies using professional judgment. A color-coded composite utility facility plan with utility owner names, quality levels, line sizes and subsurface utility locate (test hole) locations, shall be prepared and delivered to the State. It is understood by both the Engineer and the State that the line sizes of designated utility facilities detailed on the deliverable are from the best available records and that an actual line size is normally determined from a test hole vacuum excavation. A note must be placed on the designate deliverable only that states "lines sizes are from best available records". All above ground appurtenance locations must be included in the deliverable to the State. This information shall be provided in the latest version of Micro Station or Geopak used by the State. The electronic file will be delivered on CD or DVD, as required by the State. A hard copy is required and must be signed, sealed, and dated by the Engineer. When requested by the State, the designated utility information must be over laid on the State's design plans.

5. Determine and inform the State of the approximate utility depths at critical locations as determined by the State. This depth indication is understood by both the Engineer and the State to be approximate only and is not intended to be used preparing the right of way and construction plans.
 6. Provide a monthly summary of work completed and in process with adequate detail to verify compliance with agreed work schedule.
 7. Close-out permits as required.
 8. Clearly identify all utilities that were discovered from quality levels C and D investigation, but cannot be depicted in quality level B standards. These utilities must have a unique line style and symbology in the designate (Quality Level B) deliverable.
 9. Comply with all applicable State policy and procedural manuals.
- C. Subsurface Utility Locate (Test Hole) Service (Quality Level A)
- Locate means to obtain precise horizontal and vertical position, material type, condition, size and other data that may be obtainable about the utility facility and its surrounding environment through exposure by non-destructive excavation techniques that ensures the integrity of the utility facility. Subsurface Utility Locate (Test Hole) Services (Quality Level A) are inclusive of Quality Levels B, C, and D.
- The Engineer shall:
1. Review requested test hole locations and advise the State in the development of an appropriate locate (test hole) work plan relative to the existing utility infrastructure and proposed highway design elements.
 2. Coordinate with utility owner inspectors as may be required by law or utility owner policy.
 3. Neatly cut and remove existing pavement material, such that the cut not to exceed 0.10 square meters (1.076 square feet) unless unusual circumstances exist.
 4. Measure and record the following data on an appropriately formatted test hole data sheet that has been sealed and dated by the Engineer:
 - a. Elevation of top and/or bottom of utility tied to the datum of the furnished plan.
 - b. Identify a minimum of two benchmarks utilized. Elevations shall be within an accuracy of 15mm (.591 inches) of utilized benchmarks.
 - c. Elevation of existing grade over utility at test hole location.
 - d. Horizontal location referenced to project coordinate datum.
 - e. Outside diameter of pipe or width of duct banks and configuration of nonencased multi-conduit systems.
 - f. Utility facility material(s).
 - g. Utility facility condition.
 - h. Pavement thickness and type.
 - i. Coating/Wrapping information and condition.
 - j. Unusual circumstances or field conditions.
 5. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, cathodic protection or other protective coverings and features. Water excavation can only be utilized with written approval from the appropriate State District Office.
 6. Be responsible for any damage to the utility during the locating process. In the event of damage, the Engineer shall stop work, notify the appropriate utility facility owner, the State and appropriate regulatory agencies. The regulatory agencies include, but are not limited to the Railroad Commission of Texas and the Texas Commission on

Environmental Quality. The Engineer shall not resume work until the utility facility owner has determined the corrective action to be taken. The Engineer shall be liable for all costs involved in the repair or replacement of the utility facility.

7. Back fill all excavations with appropriate material, compact backfill by mechanical means, and restore pavement and surface material. The Engineer shall be responsible for the integrity of the backfill and surface restoration for a period of three years. Install a marker ribbon throughout the backfill.

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

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

10. Plot utility location position information to scale and provide a comprehensive utility plan sign and sealed by the responsible Engineer. This information shall be provided in the latest version of Micro Station or Geopak format used by the State. The electronic file will be delivered on C.D or DVD. When requested by the State, the Locate information must be over laid on the State's design plans.

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

12. Close-out permits as required.

163.2. Retaining Walls and Miscellaneous Structures

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

B. For projects with retaining walls, the Engineer shall develop the retaining wall layouts in the 3D corridor model.

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

1. Spread Footing Walls (High Footing Pressure Design and Low Footing Pressure Design). The Engineer shall select a spread footing wall for fill situation when considerable room behind the walls is available for forming, constructing, and backfilling the footings and stem. The Engineer shall notify the State when the quantity is less than 1000 square feet to have an option in the plans to cast in place a spread footing wall design. This selection has to be approved to State.

2. Mechanically Stabilized Earth (MSE) Walls. The Engineer shall prepare the retaining wall layouts showing plan and profile of the retaining wall(s) for design by a State

approved vendor. The Engineer is responsible for design of geometry and wall stability. The Engineer shall incorporate a slope of 4:1 or flatter from the finished ground line elevation to the face of the retaining wall.

3. Concrete Block Walls (Structural and Landscape).
4. Tied Back Walls.
5. Soil Nailed Walls.
6. Rock Nailed Walls.
7. Drilled Shaft Walls.
8. Temporary MSE Walls.

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

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

1. Layout Plan
 - 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 boring locations
 - i. Drainage, signing, lightning, etc. that is mounted on or passing through the wall.
 - j. Subsurface drainage structures or utilities which could be impacted by wall construction.
2. Elevation:
 - a. Top of wall elevations
 - b. Existing and finished ground line elevations
 - c. Vertical limits of measurement for payment
 - d. Type, limits and anchorage details of railing (only if Traffic Railing foundation standard is not being used on this project)
 - e. Top and bottom of wall profiles plotted at correct station & elevation.
 - f. Underdrains
 - g. Any soil improvements, if applicable.
 - h. Drainage, signing, lighting etc. as noted above
 - i. Drainage structures and utilities as noted above
3. Sectional View:
 - a. Reinforced volume
 - b. Underdrain location
 - c. Soil improvements, if applicable.
4. General Guidelines for Retaining Walls

a. The Engineer shall perform design calculations to check the external stability of the walls including slope stability, bearing, sliding and overturning and detail drawings in accordance with the standard requirements of the State.

b. For retaining wall submittals, the Engineer shall check State's Bridge Division website for current requirements.

163.3. Traffic Control Plan, Detours, Sequence of Construction. The Engineer shall prepare Traffic Control Plans (TCP) including TCP typical sections, for the project. If requested by the State, the Engineer shall complete Form 2229-Significant Project Procedures along with Page 4 of Form 1002, specifically titled Accelerated Construction Procedures. A detailed TCP must be developed in accordance with the latest edition of the TMUTCD. The Engineer shall implement the current Barricade and Construction (BC) standards and TCP standards as applicable. The Engineer shall interface and coordinate phases of work, including the TCP, with adjacent Engineers.

The Engineer shall:

- A. Provide a written narrative of the construction sequencing and work activities per phase and determine the existing and proposed traffic control devices (regulatory signs, warning signs, guide signs, route markers, construction pavement markings, barricades, flag personnel, temporary traffic signals, etc.) to be used to handle traffic during each construction sequence. The Engineer shall show proposed traffic control devices at grade intersections during each construction phase (stop signs, flagperson, signals, etc.). The Engineer shall show temporary roadways, ramps, structures (including railroad shoo-fly) and detours required to maintain lane continuity throughout the construction phasing. If temporary shoring is required, prepare layouts and show the limits on the applicable TCP.
- B. If applicable, the Engineer shall assist the State in coordinating mitigation of impacts to adjacent schools, emergency vehicles, pedestrians, bicyclists and neighborhoods.
- C. Develop each TCP to provide continuous, safe access to each adjacent property during all phases of construction and to preserve existing access. The Engineer shall notify the State in the event existing access must be eliminated, and must receive approval from the State prior to any elimination of existing access.
- D. Design temporary drainage to replace existing drainage disturbed by construction activities or to drain detour pavement. The Engineer shall show horizontal and vertical location of culverts and required cross sectional area of culverts.
- E. Prepare each TCP in coordination with the State.

163.4. Temporary Traffic Signals and Illumination - OMITTED

163.5. Illumination The Engineer shall refer to TxDOT's *Highway Illumination Manual* and other deemed necessary State approved manuals for design of continuous lighting and safety lighting for all conventional, high-mast, and underpass lighting. The Engineer shall include safety lighting as part of each design on each flashing beacon and traffic signal. The Engineer shall provide a preliminary layout for initial review and approval by the State. The Engineer shall prepare circuit wiring diagrams showing the number of luminaries on each circuit, electrical conductors, length of runs, service pole assemblies. Underpass lighting shall be used on all structures within each project. The Engineer shall integrate existing illumination within the project limits into the proposed design. The Engineer shall coordinate

with the State to determine the location of proposed high-mast, conventional, and underpass lighting.

- 163.6. Storm Water Pollution Prevention Plans (SWP3).** The Engineer shall develop SWP3, on separate sheets from (but in conformance with) the TCP, to minimize potential impact to receiving waterways. The SWP3 shall include text describing the plan, quantities, type, phase and locations of erosion control devices and any required permanent erosion control.
- 163.7. Compute and Tabulate Quantities.** The Engineer shall provide the summaries and quantities within all formal submittals.
- 163.8. Special Utility Details (Water, Sanitary Sewer, etc.) - OMITTED**
- 163.9. Miscellaneous Structural Details- OMITTED**
- 163.10. Agreements (Railroad, etc.) and Layouts - OMITTED**
- 163.11. Estimate.** The Engineer shall independently develop and report quantities necessary to construct the contract in standard State bid format at the specified milestones and Final PS&E submittals. The Engineer shall prepare each construction cost estimates using Estimator or any approved method. The estimate shall be provided at each milestone submittal or in electronic format at the 95% and Final PS&E submittals per State's District requirement.
- 163.12. Contract time determination.** The Engineer shall prepare a detailed contract time estimate to determine the approximate time required for construction of the project in calendar and working days (based on the State standard definitions of calendar and working days) at the 95% and Final PS&E milestone. The schedule shall include tasks, subtasks, critical dates, milestones, deliverables, and review requirements in a format which depicts the interdependence of the various items and adjacent construction packages. The Engineer shall provide assistance to the State in interpreting the schedule.
- 163.13. Specifications and General Notes.** The Engineer shall identify necessary standard specifications, special specifications, special provisions and the appropriate reference items. The Engineer shall prepare General Notes from the District's *Master List of General Notes*, Special Specifications and Special Provisions for inclusion in the plans and bidding documents. The Engineer shall provide General Notes, Special Specifications and Special Provisions in the required format.
- 163.14. Constructability Review.** The Engineer shall provide Independent Quality Review of the constructability PS&E sets.

The Engineer shall perform constructability reviews at major project design milestones (e.g. 30%, 60%, 90%, and final plan) to identify potential constructability issues and options that would provide substantial time savings during construction. The constructability review must be performed for all roadway and structural elements such as Sequence of Work/Traffic Control, Drainage (Temporary and Permanent), Storm Water Pollution Prevention Plan (SWP3), Environmental Permits, Issues and Commitments (EPIC) addressed, identify Utility

conflicts; ensuring accuracy and appropriate use of Items, Quantities, General Notes, Standard and Special Specifications, Special Provisions, Contract Time/Schedule, Standards; and providing detailed comments in an approved format. Reviews must be captured in a Constructability Log identifying areas of concern and potential conflict. The Engineer shall provide the results of all Constructability reviews and recommendations to the State at major project design milestone submittals.

FUNCTION CODE 160(170) – ROADWAY DESIGN

BRIDGE DESIGN

170.1. Bridge Layout

- A. The Engineer shall prepare a bridge layout plan sheet for each bridge and bridge class culvert. The Engineer shall determine the location of each soil boring needed for foundation design in accordance with the *Geotechnical Manual*.
- B. Prior to preparation of each bridge layout, the Engineer shall prepare a comparative cost analysis of bridge structures to determine: (1) the optimum bridge beams for vertical clearance over railroads, roadway, or waterways, (2) the optimum bridge structure versus roadway embankment, pavement, soil stabilization, and retaining walls, and (3) to determine optimum in bridge beams for the direct connectors.
- C. The Engineer shall conduct preliminary studies as necessary prior to producing the bridge layout. Preliminary studies will include the following:
 1. Locate utilities. Determine the locations of utilities that affect placement of bridge substructure elements.
 2. Determine extents of right of way.
 3. If necessary, review existing documentation and information for rehabilitation, widening, or replacement of existing structures. Available information may include:
 - a. Original plans and shop drawings.
 - b. Existing specifications.
 - c. Documentation of previous repairs.
 - d. Routine Bridge Inspection Report.
 - e. Inspection reports/condition surveys. Conduct additional inspections as required to fully determine extent of repairs, structural adequacy, and existing condition of structure. Coordinate with the State project manager to arrange any necessary inspections.
 - f. Load rating reports.
 - g. Soil borings and pile driving record.
- D. The Engineer shall submit each preliminary bridge layout early in the plan preparation process to obtain approval from the State. The Engineer shall comply with all relevant sections of the latest edition of the State's *LRFD Bridge Design Manual*, *Bridge Project Development Manual*, *Bridge Detailing Guide*, and *AASHTO LRFD Bridge Design Specifications*. Each bridge layout sheet must include bridge typical sections, structural dimensions, abutment and bent locations, superstructure and substructure types, and any pertinent information from the Bridge Detailing Guide layout checklists. The Engineer shall locate and plot all soil borings and utilities, show proposed retaining walls, and, for staged construction, indicate limits of existing bridge for removal and reconstruction.

Bridge layout must include the following:

1. Plan View
 - a. Horizontal Curve data
 - b. Bearing of alignment
 - c. Bridge and Culvert skew angles
 - d. Control Stations at the beginning and end of structures
 - e. Dimensioned widths of bridge or culvert, roadway, rail, and shoulders
 - f. Type and limits of riprap
 - g. Location of profile grade line
 - h. Direction of flow
 - i. North arrow
 - j. Roadway functional class
 - k. Design Speed
 - l. Traffic data
 - m. Existing and proposed structure numbers
 - n. Cross-slope and superelevation data
 - o. Traffic flow directional arrows
 - p. Railing type
 - q. Bent stations and bearings
 - r. Retaining wall locations
 - s. Approach pavement crown width
 - t. Typical bridge section showing beam type and spacing
 - u. Joint and seal type and spacing
 - v. Locations of soil borings
 - w. Phased construction
 - x. Any other information required in the State's Bridges and Structures Operation and Planning Manual, Bridge Design Manual, and Bridge Detailing Guide.
2. Profile View
 - a. Profile grade
 - b. Vertical curve data
 - c. Finished roadway elevation at beginning and end of bridge
 - d. Overall structure length
 - e. Type and overall length of railing
 - f. Existing and proposed ground lines clearly labeled
 - g. Profile view grid elevations and stations
 - h. Station of structure compatible with grid stations
 - i. Applicable standard titles
 - j. Type of riprap
 - k. Type of foundation; number, size, and length of foundation elements
 - l. Length and type of span unit
 - m. Flow rate, tail-water, headwater, and velocity for the design year and 100-year discharge
 - n. Bent numbers
 - o. Bearing seat elevations
 - p. Soil bore data
 - q. Fixed or expansion condition at each beam end
 - r. Column heights

- s. Any other information required in the State's Bridges and Structures Operation and Planning Manual, Bridge Design Manual, and Bridge Detailing Manual.

170.2. Bridge Detail Summary

The Engineer shall prepare total bridge quantities, estimates, specifications, and summary sheets for each bridge replacement, bridge widening, or bridge class culvert.

170.3. Bridge Replacement, Bridge Widening, and Bridge Class Culvert Structural Details

- A. The Engineer shall prepare each structural design and develop detailed structural drawings of all required details in compliance with the State's *LRFD Bridge Design Manual*, *Bridge Detailing Guide*, *TxDOT Preferred Practices for Steel Bridge Design, Fabrication, and Erection*, and *AASHTO LRFD Bridge Design Specifications*. The Engineer shall prepare any project-specific modified standards necessary for inclusion in the PS&E package. The Engineer shall sign, seal, and date all project-specific modified standards.
- B. If TxDOT determines that the bridge needs to be widened, the Engineer shall provide an inventory and operating load rating of the existing structure. Load ratings of existing structures shall be in accordance with the TxDOT Bridge Inspection Manual and AASHTO's *Manual for Bridge Evaluation*. The Engineer shall submit load rating results in a signed, sealed, and dated Bridge Load Rating Report.
- C. Additionally, the Engineer shall:
 - 1. Perform calculations for design of the substructure.
 - 2. Perform calculations for bridge slab design if required.
 - 3. Perform calculations to determine elevations of bridge substructure and superstructure elements.
 - 4. Perform calculations for bridge superstructure design.
 - 5. Prepare necessary foundation details and plan sheets.
 - 6. Prepare plan sheets for abutment and bent design and additional details.
 - 7. Prepare framing plan and slab plan sheets.
 - 8. Compute and prepare tables for slab and bearing seat elevations, dead load deflections, etc.
 - 9. For prestressed concrete superstructure, design beams and prepare beam design tables.
 - 10. Prepare special provisions and special specifications in accordance to the above-listed manuals and guidelines.
 - 11. Prepare any additional required details specific to the project.

170.4. Bridge Rail Retrofit Structural Details - OMITTED

170.5. Seismic Analysis of Bridge Projects – OMITTED

170.6. Bridge Repair Structural Details - OMITTED

170.7. Bridge Specifications

The Engineer shall prepare any special provisions and special specifications necessary for inclusion in the PS&E package. Whenever possible, the Engineer shall use the State's

standard drawings, standard specifications, or previously approved special provisions and special specifications. The Engineer shall submit any specifications developed by the Engineer to the State for approval prior to inclusion in the PS&E package.

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

CONSTRUCTION PHASE SERVICES

351.1 Construction Phase Services

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

- A. Attend preconstruction meeting
- B. Attend partnering meeting
- C. Attend field meetings and make visits to site
- D. Calculate quantities and assist the area engineer in preparing change orders
- E. Review and approval of shop drawings
- F. Review and approval of forming details
- G. Responding to requests for information (RFIs)
- H. Providing minor redesign (major redesign should be handled with a contract supplement), which will include changes to the affected plan sheets and an updated copy of the 3D corridor model.
- I. Answering general questions
- J. Providing clarification
- K. Other project related tasks in support of the State during construction

DELIVERABLES

The Engineer shall submit the following deliverables to the State:

A. Reports

1. Letter Report

The Engineer shall prepare a letter report which includes the preliminary findings. The report must also include conceptual and generic discussions of the alternatives considered, along with a comparative cost associated with each alternative and a recommended solution.

Recommendations at this point must be generic and conceptual in nature, mainly for discussions with the State and the local government entities. The recommended solution must be analyzed in detail to reflect the mitigation requirements for the roadway development. Cross-Drainage Structure reports must include existing hydraulic conditions, FEMA floodplain status, proposed structure design, and proposed hydraulic conditions, preliminary detention storage volumes (if required) based on hydrograph and initial recommendations on how to mitigate the storm impact on the receiving streams.

2. Draft Hydraulic Report

The Engineer shall submit three copies of a draft Hydraulic Report for review and comment. The report must document and justify all data, boundary conditions, assumptions, methodologies, and results. The text, tables, exhibits, and appendices must document clearly and concisely the work performed and results found. The report must provide recommendations for critical review by the State. Such recommendations may include corrective actions by the State, corrective actions by others, or need for further detailed analysis such as an unsteady model analysis or the development of mitigation measures. The text, tables, exhibits, and appendices (including computer models) must be saved on a compact disc and included with each report.

3. Assume one round of comments will be provided by the State for draft reports. The Engineer shall address all State comments.
4. Final Hydraulic Report
The Engineer shall submit an electronic copy of the finalized Hydraulic Report upon final approval and included in the 100% submission. The final report must be signed and sealed by a Professional Engineer.

B. Plans

The Engineer shall provide the following information at each submittal:

1. 30% Plans Submittal
 - a. Estimate of construction cost.
 - b. Engineer's internal QA and QC markup set.
 - c. Form 1002 and Design Exceptions with existing and proposed typical sections, location map and design exception exhibits.
 - d. Preliminary 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 30% plan sheets.
 - e. Bridge and retaining wall layouts in PDF format for the State District review.
 - f. External stability analysis for retaining walls.
 - g. Engineer's internal QA and QC marked up set.
 - h. OMITTED**
 - i. For Division Hydraulic Review of existing Bridge Class Culverts, Bridge Class Culvert Plan and Profile sheets and Hydrology & Hydraulics sheets, include project title sheet and project layout sheet.
 - j. Preliminary Title Sheet
 - k. Existing and Proposed Typical Sections
 - l. Preliminary Summary Sheets
 - m. Control Data Sheets
 - n. Preliminary Plan & Profile Sheets for all Alignments
 - o. Preliminary Intersection Layouts
 - p. Preliminary Grading Sheets
 - q. Preliminary Drainage Area Maps
 - r. Preliminary Bridge Layouts
 - s. Comprehensive Map of all Utilities within the Project Area
2. PBLR Plans Submittal
Provide the State with a review set of plans that includes the items listed below in the format specified in this Work Authorization:

- a. Estimate of construction cost.
 - b. Engineer's internal QA and QC marked up set.
 - c. Updated Title Sheet with Index of Sheets including Standards
 - d. Final Existing and Proposed Typical Sections
 - e. Updated Summary Sheets
 - f. Preliminary Traffic Control Plan Sheets
 - g. Final Plan & Profile Sheets for all Alignments
 - h. Final Intersection Layouts
 - i. Final Drainage Area Maps
 - j. Preliminary Hydraulic Computations
 - k. Soil Borings
 - l. Approved Bridge Layouts
 - m. Roadway Cross-Sections (scale 1"=20' horizontally and vertically)
 - n. Updated Estimate
3. 90% Review Submittal Provide the State with a review set of plans that includes the items listed below in the format specified in this Work Authorization:
- a. Estimate of construction cost.
 - b. Marked up general notes
 - c. Construction schedule.
 - d. New Special Specifications and Special Provisions with Form 1814, if applicable.
 - e. Engineer's internal QA and QC marked up set.
 - f. Other supporting documents.
 - g. A detailed 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 90% plan sheets. The level of detail of the surface and subsurface features will be at the direction of the State.
 - h. New Special Specifications and Special Provisions with Form 1814, if applicable.
 - i. Other supporting documents.
 - j. Address 30% Comments
 - k. Updated Title Sheet with Index of Sheets
 - l. Final Existing and Proposed Typical Sections
 - m. Final Summary Sheets
 - n. Final Traffic Control Plan Sheets
 - o. Final Control Data Sheets
 - p. Final Plan & Profile Sheets
 - q. Final Intersection Layouts
 - r. Final Miscellaneous Roadway Details
 - s. Final Drainage Area Maps
 - t. Final Utility Exhibits
 - u. Final Bridge Sheets
 - v. Final Signing Layouts
 - w. Final Pavement Marking Layouts and Delineation
 - x. Final SWP3 Layouts
 - y. Final Roadway Cross-Sections (scale 1"=20) if changed

- z. Final construction cost Estimate, General Notes, Specification Data Sheet, Special Provisions, Special Specifications
- aa. Final Contract Time Determination
- 4. District Review Submittal (95%): Provide the State with a review set of plans of the items below in the format specified in this Work Authorization:
 - a. List of governing Specifications and Special Provisions in addition to those required.
 - b. Marked up general notes.
 - c. Plans estimate.
 - d. New Special Specifications and Special Provisions with Form 1814, if applicable.
 - e. Triple Zero Special Provisions.
 - f. Engineer sign, seal and date supplemental sheets (8 ½" x 11").
 - g. Contract time determination summary.
 - h. Significant project procedures form.
 - i. Right-of-Way and utilities certification, if applicable.
 - j. Temporary road closure letters.
 - k. Construction speed zone request, if applicable.
 - l. Engineer's internal QA and QC marked-up set.
 - m. Other supporting documents.
 - n. A detailed 3D corridor model, in the most current format, created using Bentley's OpenRoads tools, and with detail to verify the design of the 95% plan sheets. The level of detail of the surface and subsurface features will be at the direction of the State.
- 5. Final submittal (100%).
 - a. Revised supporting documents from 95% review comments.
 - b. A final 3D corridor model, in the most current format, created using Bentley's OpenRoads tools. The level of detail of the surface and subsurface features will be at the direction of the State.
 - c. A final 3D earthwork model, if applicable, in either .XML or .ICM format (as directed by the State) created using Bentley's OpenRoads tools. The level of detail of the surface and subsurface features will be at the direction of the State.
- C. Electronic Copies
 - 1. The Engineer shall furnish the State with a USB flash drive of the final plans in the current graphics format used by the State, .pdf format, and in the District's File Management System (FMS) format.
 - 2. The Engineer shall also provide separate USB flash drive containing cross section information (in dgn, XLR, & ASCII formats) for the contractor's use.
 - 3. The Engineer shall provide the Primavera (P3) file or the latest scheduling program used by the State for construction time estimate.
- D. Calculations

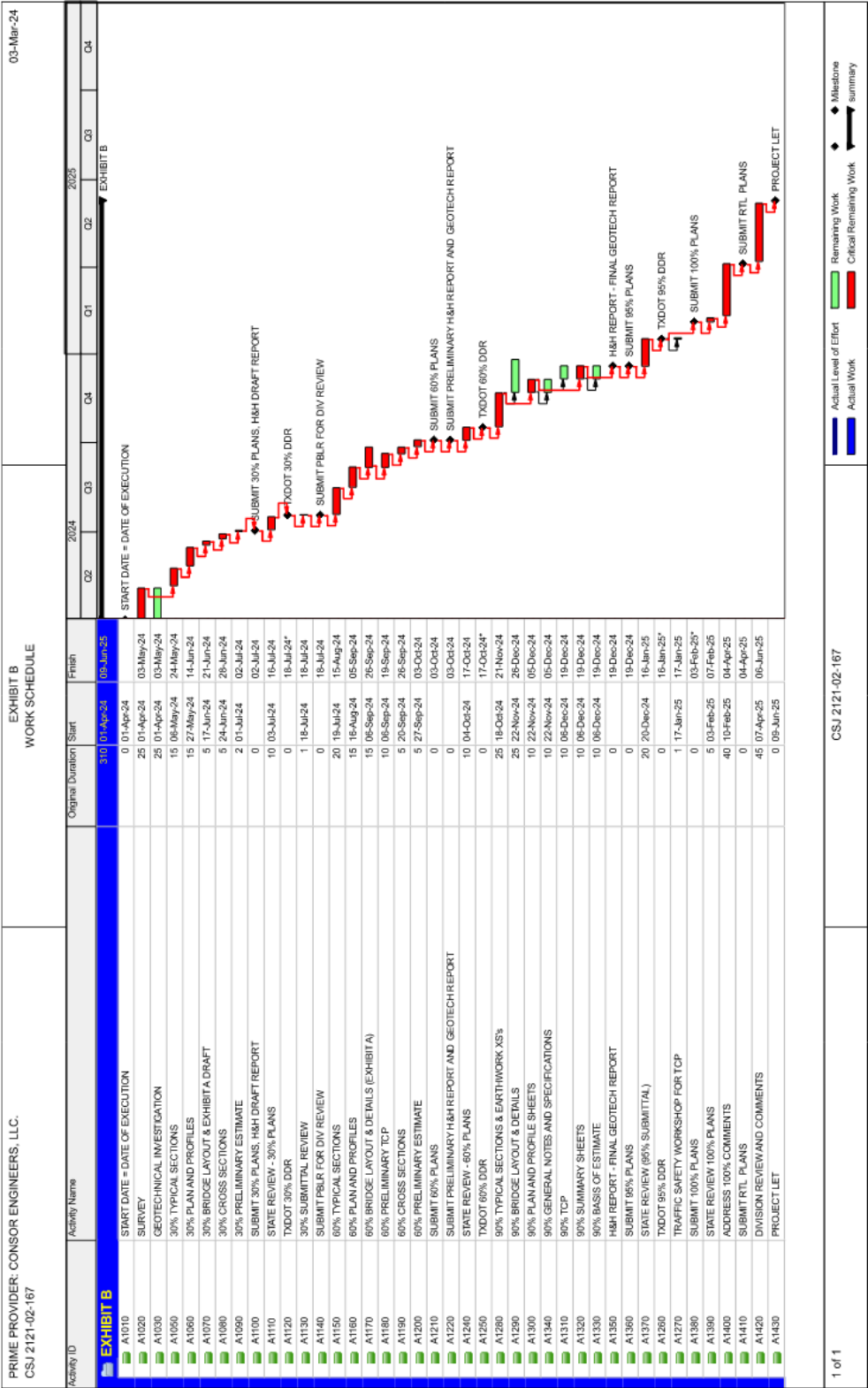
The Engineer shall provide the following:

 - 1. All quantity and non-structural design calculations.

2. Engineering design calculations, load rating calculations, analysis, input calculations, quantities, geometric designs (GEOPAK GPK files), etc. relating to the project's structural elements. Project structural elements include: bridges, retaining walls, overhead sign foundations, high-mast illumination foundations, non-standard culverts, custom headwalls and drainage appurtenances.
 3. Working copies of all spreadsheets and output from any programs utilized on a CD/DVD in a universally reliable format.
 4. Submit element normally bound using a .pdf format.
- E. Archiving File for Bridge Design Calculations and Notes
1. The Engineer shall scan the design notes (or convert electronic files) and submit a single PDF file for each bridge. In the case of a single design done for twin structures, submit the same notes under two separate NBI numbers.
 - a. Refer to *Figure 6: Guidance for Calculation Retention* in the Bridge Division's *Quality Control and Quality Assurance Guide* at http://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/qa_qc_guide.pdf for the design elements that are required and how to assemble the PDF file.
 - b. Additionally, the file should contain:
 - (1) Completed Quality Control Cover Sheet from the *Quality Control and Quality Assurance Guide* at http://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/qa_qc_guide.pdf
The Engineer is allowed to use their own cover sheet if it is similar to the Quality Control Coversheet from the *Quality Control and Quality Assurance Guide*.
 - (2) Bridge layout at the time of the original design
 - (3) Load rating calculations.
 - (4) Communication directly related to the included elements
 - c. Do not include bridge geometry runs (BGS, Geomath, spreadsheets, etc.).
 2. Name the file using the following naming convention:
 - a. Design notes: NBI_DN_yyyy—mm, with yyyy-mm being the year and month the PDF file is submitted (ex. 1234567890abcde_DN_2015-06)
 - b. Change Orders: NBI_CO_yyyy—mm, with yyyy-mm being the year and month the PDF file is submitted (ex. 1234567890abcde_CO_2015-06)
 3. Send the Archiving File PDF of bridge design notes to the State's project manager, who will submit to the State's Bridge Management Group. The files will become part of the permanent bridge file in the State's bridge inspection database management system.

[END OF EXHIBIT]

EXHIBIT B



1 of 1

CSJ 2121-02-167

[END OF EXHIBIT]

EXHIBIT C

Prime Provider: Consor Engineers, LLC. Highway: IH-10 WB Frontage Road		SUBTOTALS	CONSOR Engineers, LLC	HVJ	GRV	Cobb Fendley
CSJ: 2121-02-167			PRIME	Geotechnical	Survey	SUE
FC 102 (110): Feasibility Studies	Total Labor Cost (Specified Rate)	\$ 93,594.32	\$ 46,062.60	\$ 47,531.72		
	Total Labor Cost (Unit Cost)	\$ 102,735.50		\$ 102,735.50		
	Other Direct Expenses	\$ 8,092.35		\$ 8,092.35		
FC 145 (164): Managing Contracted/Donated PS&E	Total Labor Cost (Specified Rate)	\$ 98,658.76	\$ 80,445.96		\$ 18,212.80	
	Other Direct Expenses	\$ -				
FC 160 (150)Roadway Design Design Surveys and Construction Surveys	Total Labor Cost (Specified Rate)	\$ 133,638.48			\$ 133,638.48	
	Total Labor Cost (Unit Cost)	\$ -				
	Other Direct Expenses	\$ 46,430.00			\$ 46,430.00	
FC 160 (160)Roadway Design Roadway Design Controls	Total Labor Cost (Specified Rate)	\$ 600,321.18	\$ 590,971.40	\$ 9,349.78		
	Other Direct Expenses	\$ -				
FC 160 (161): Roadway Design Drainage	Total Labor Cost (Specified Rate)	\$ 249,511.78	\$ 249,511.78			
	Other Direct Expenses	\$ -				
FC 160 (162): Roadway Design Signing, Pavement Markings and Signalization (Permanent)	Total Labor Cost (Specified Rate)	\$ 47,448.40	\$ 47,448.40			
	Other Direct Expenses	\$ -				
FC 160 (163): Roadway Design Miscellaneous (Roadway)	Total Labor Cost (Specified Rate)	\$ 454,242.50	\$ 438,707.08			\$ 15,535.42
	Total Labor Cost (Unit Cost)	\$ 26,008.18				\$ 26,008.18
	Other Direct Expenses	\$ 36,086.81				\$ 36,086.81
FC 160 (170): Roadway Design Bridge Design	Total Labor Cost (Specified Rate)	\$ 410,699.08	\$ 410,699.08			
	Other Direct Expenses	\$ -				
FC 300 (351): Design Verif/Changes/Alter Construction Phase Services	Total Labor Cost (Specified Rate)	\$ 103,269.50	\$ 103,269.50			
	Other Direct Expenses	\$ -				
GRAND TOTAL		\$ 2,410,736.84	\$ 1,967,115.80	\$ 167,709.35	\$ 198,281.28	\$ 77,630.41
DBE%		15.18%		6.96%	8.22%	

Exhibit C
WA#2

III-10 WB Frontage Road CSJ: 2121-02-167 Prime Provider: CONSOR Engineers, LLC														
	No. of Sheets	Senior Project Manager	Deputy Project Manager	Senior Engr.	Sr. Structural Engr.	Project Engr.	Design Engr.	Engineer In Training II	Utilities Coordinator	Senior CADD Op	CADD Operator	Admin/ Clerical	Total Hours	Total Labor Cost
FC 102(110): Feasibility Studies														
Route and Design Studies														
110.1 Data Collection and Field Reconnaissance		2	4	8		8	8	8					38	\$8,014.64
110.2 Design Criteria		2		2	2	4	4	8					22	\$4,304.50
110.3 Preliminary Cost Estimates		4	4	4	8	8	8	8					44	\$9,433.64
110.4 Design Concept Conference													0	\$0.00
Prepare for DCC		4	4	4	4	4	4	8			16		48	\$8,628.32
Conduct DCC		2	2		2								6	\$1,538.30
110.5 Geotechnical Borings and Investigations (coordination, review, incorporate)		4	4	8	16	8	8	8			16		72	\$14,073.00
Labor Hours - Subtotal		18	18	26	32	32	32	40	0	0	32	0	230	\$46,062.60
Labor Hour Cost		\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$129.83	\$138.48	\$132.71	\$106.75	\$72.13		
FC 110 - Subtotal		\$5,912.04	\$4,258.26	\$7,050.34	\$7,395.60	\$6,324.16	\$5,862.40	\$5,193.20	\$0.00	\$0.00	\$3,416.00	\$0.00		\$46,062.60
FC 145 (164): Managing Contracted/Donated PS&E														
145.1 Contract Management and Administration														
Coordination with the State/CRRMA		40	40										80	\$22,734.00
Prepare monthly written progress reports		12	6									12	30	\$5,266.34
Develop and maintain detailed project schedule		8	12	8									28	\$7,652.60
Prepare, distribute and file written and electronic correspondence		12	24	12									48	\$12,313.32
Sub contracts, monitor sub consultant activities, invoices		40	40	30									110	\$30,863.70
Labor Hours - Subtotal		112	122	50	0	0	0	0	0	0	0	12	236	\$80,445.36
Labor Hour Cost		\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$129.83	\$138.48	\$132.71	\$106.75	\$72.13		
FC 145 - Subtotal		\$37,153.36	\$28,861.54	\$13,559.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$865.56		\$80,445.36
FC 160(160): Roadway Design														
Roadway Design Controls														
160.1 Geometric Design													0	\$0.00
Preliminary Geometric Layout		2		8		10	16	20		30			86	\$14,505.88
Preliminary 3D Corridor Model		2		40	20	80	80						222	\$48,033.56
160.2 Roadway Design													0	\$0.00
Horizontal Geometry Design		2	4			30	32	48		40			156	\$25,503.88
Vertical Geometry Design		2	4			30	32	48		40			156	\$25,503.88
Prepare Plan & Profile Sheets		2	4			40	80	80		80			286	\$45,324.24
160.3 Typical Sections													0	\$0.00
Existing Typical Section		2				12		32		40			86	\$12,723.08
Proposed Typical Section		2				12		32		40			86	\$12,723.08
160.4 Cut and Fill Quantities													0	\$0.00
Refine Preliminary 3D Corridor Model		2		30	20	60	60						172	\$37,330.06
Update Templates		1		20	16	40	40						117	\$25,431.58
Horizontal Feature Constraints		1		16	20	32	40						103	\$23,538.98
End Conditions		1		8	12	16	40						77	\$16,060.38
Point Controls		1		8	12	16	40						77	\$16,060.38
Corridor Cross Section Sheets (Est. 10 Cross Sections @ 50-ft)		2		30		40		60		80			212	\$35,861.06
Earthwork Calculations		2				40	40	80					162	\$27,033.16
160.8 Plan Preparation													0	\$0.00
Title Sheets		2				8		16		16			42	\$6,535.24
Index of Sheets		1				8		24		32			65	\$9,425.46
General Note Sheets		2		20		32		24		12			30	\$17,113.36
Estimate & Quantity Sheets (EQS)		1				8							3	\$2,062.82
Alignment Data Sheets		1		8		24		32		32			97	\$16,035.70
Removal Sheets		2	2	16		32	60	40		60			212	\$36,547.70
EPIC Sheet		1		8		8				12			23	\$5,824.86
State Standards		1				4		6					11	\$1,976.88
Design Forms and Supporting Documents (4 submittals)		2		20		20				40			82	\$15,723.36
Plan Review (30%, 60%, 90%, Final)		80		160	80								320	\$86,936.80

Exhibit C
WA#2

160.10. Pavement Design			2		2		4		4		8		20	\$3,632.46
160.11 Pedestrian and Bicycle Facilities			1		3		32		32		40		113	\$20,536.26
		Labor Hours - Subtotal	120	14	402	180	638	592	546	0	602	0	0	3034
		Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$123.83	\$138.48	\$132.71	\$106.75	\$12.13	
		FC 160 - Subtotal	\$39,813.60	\$3,311.38	\$103,018.38	\$41,544.00	\$158,050.44	\$108,454.40	\$70,887.18	\$0.00	\$73,891.42	\$0.00	\$0.00	\$530,371.40
FC 160(161). Roadway Design Drainage		Senior Project Manager			Senior Engr.	Sr. Structural Engr.	Project Engr.	Design Engr.	Engineer In Training II	Utilities Coordinator	Senior CADD Op.	CADD Operator	Admin/ Clerical	
161.1 Data Collection														
		Collection of available data from State, County, and Federal Emergency Management Agency	2				12		24		8			46
		Collection of Flood Insurance Rate Maps and Flood Insurance Data			1		4		16		8			29
		Review of Survey Data			2		16		16		16			21
		Notification of Completion of Data Collection	1		2		8		4				2	17
161.2 Hydrologic Studies - Incl. Hrt. Tidal Research														
		Delineate Drainage Areas and Determine Hydrologic Parameters	2		4		12		32		8			58
		Compute Peak Flows for Existing and Proposed Conditions	2		4				12					18
161.6. Complex Hydraulic Design and Documentation														
		Review As-Built Plans for Existing Bridges			2		4		12					18
		Create Existing Conditions HEC-RAS Model (5)			4		24		120		8			156
		Create Proposed Conditions HEC-RAS Model (5)	2				16		80					98
		Create Existing Conditions HY-8 Model (5)			4		10		40		4			58
		Create Proposed Conditions HY-8 Model (5)	2		2		4		24					30
		Determine WSE and Peak Flow Impacts			4		2		16					22
		Develop Mitigation Measures	2		4		32		48					98
		Ditch Capacity Analysis			12		48		96		12			180
161.7. Scour Analysis														
		Perform scour analysis	1		2		60		16					79
		Provide recommended countermeasures	1		2		16				12			35
161.8. PS&E Development for Hydraulic Sheets														
		Hydrologic data sheets	1		2		16		12		32			63
		Ditch capacity data sheets			1		8		16		12			41
		Bridge Hydraulic data sheets	2		4		20		16		32			74
		Collect Hydraulic data sheets (2 per sheet)			2		2		8		24			48
		Collect Layout Sheets	1		8		40		32		80			161
		Drainage Area sheets	1		4		16		32		64			133
		Scour data sheets	1		4		24		8		16			53
		Labor Hours - Subtotal	0	24	0	72	0	334	0	668	0	376	0	1536
		Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$123.83	\$138.48	\$132.71	\$106.75	\$12.13	
		FC 161 - Subtotal	\$7,952.72	\$0.00	\$19,525.68	\$0.00	\$75,253.72	\$0.00	\$26,726.44	\$0.00	\$43,898.36	\$0.00	\$144.26	\$243,511.78
FC 160(162). Roadway Design Signing, Pavement Markings and Signalization (Permanent)		Senior Project Manager			Deputy Project Manager	Senior Engr.	Sr. Structural Engr.	Project Engr.	Design Engr.	Engineer In Training II	Utilities Coordinator	Senior CADD Op.	CADD Operator	Admin/ Clerical
162.1. Signaling														
		Sign Structures Elevation	2	1	4			16	24			40		85
		Large Sign Details	1	1	2			4	16			8		31
		Summary of Small Signs	1	1	1			4	8			16		30
		Summary of Large Signs	1	1	1			4	8			16		30
162.2. Pavement Marking														
		SPM Layouts	7	4		4						120		188
		Labor Hours - Subtotal	0	8	0	12	0	0	28	116	0	0	200	0
		Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$123.83	\$138.48	\$132.71	\$106.75	\$12.13	
		FC 162 - Subtotal	\$2,654.24	\$0.00	\$3,254.28	\$0.00	\$0.00	\$5,129.60	\$15,060.28	\$0.00	\$0.00	\$21,350.00	\$0.00	\$47,448.40
FC 160(163). Roadway Design Miscellaneous (Roadway)		Senior Project Manager			Deputy Project Manager	Senior Engr.	Sr. Structural Engr.	Project Engr.	Design Engr.	Engineer In Training II	Utilities Coordinator	Senior CADD Op.	CADD Operator	Admin/ Clerical
163.1. Utility Engineering and Coordination														
		1. Provide written narrative	4	4	8			32			80			128
163.2. Retaining Walls and Miscellaneous Structures (MSE (fill) & Soil Nail (cut) walls)														
		Soil Nail Wall Location 561+00 to 569+75 Layout Plan L = 175'	2	2		8	12		18			32		72
		Soil Nail Wall Details 521+00 to 528+75 Layout Plan L = 175'	2	2		8	12		20			40		86
		Soil Nail Wall Location 535+50 to 541+50 Layout Plan L = 600'	2	2		8	12		18			32		72
		Soil Nail Wall Details 535+50 to 541+50 Layout Plan L = 600'	2	2		8	16					40		86
		Soil Nail Wall Location 567+50 to 569+50 Layout Plan L = 200'	1	2		6	10		14			28		60
		Soil Nail Wall Details 567+50 to 569+50 Layout Plan L = 200'	1	2		4	10		16			30		62
		Soil Nail Wall Location 637+00 to 640+00 Layout Plan L = 300'	1	2		6	10		14			28		60
		Soil Nail Wall Details 637+00 to 640+00 Layout Plan L = 300'	1	2		4	10		16			30		62
		MSE Wall Location 528+25 to 534+00 Layout Plan L = 475'	1	2		10	12		20			12		50
		MSE Wall Location 535+50 to 541+50 Layout Plan L = 600'	2	2		10	16		20			34		82
		MSE Wall Location 545+50 to 552+75 Layout Plan L = 725'	2	2		10	16		20			34		82
		MSE Wall Location 634+50 to 635+75 Layout Plan L = 125'	1	2		6	10		12			20		50
		Calculations for Global Stability & Miscellaneous Details	1	2		20	40		40					102
163.3. Traffic Control Plan, Detours, Sequence of Construction														
		1. Provide written narrative	2	4	12		20	30	30			40		138
		2. Coordinate with State for TCP approval to SRT Meeting	4	4	8		32	24	24			40		112
		3. Develop TCP plans - (Typical sections and plan layouts)	2	4	30		40	60	80			100		316
163.5. Illumination														
		Review Photometrics	1						2		12			15
		Review Existing Infrastructure (conduit, conductor, etc.)	1						2		8			13
		Illumination Layouts	1						2		16			31
163.6. Storm Water Pollution Prevention Plans (SW/3P)														
		1. Develop SW/3P Layouts		2	8		32	60	60			80		242
		2. Complete District SW/3P Index Sheets	2	1	2		8					8		47
		3. Calculate Quantities for SW/3P/Products Summary Tables	1		2		4		12		40			76
163.7. Computations and Tabulations (Quantities & Submittals)														
		TCP Quantities			8		8		16					36
		Roadway Quantities			4		8		16					36
		SW/3P Quantities			4		8		16					36
163.11. Estimate														
		30% Submittal	1		4	8	12		20					45
		60% Submittal	1		4	8	12		20					45
		90% Submittal	1		4	8	12		20					45
		Final Submittal	1		4	8	12		20					45
163.12. Contract Time Determination														
		60% Submittal	1		4	8	8							13
		90% Submittal	1		6	8								15
		Final Submittal	1		8	8								17
163.13. Specifications and General Notes														
		30% Submittal	1		4	16	4		8		10			27
		Final Submittal	1		4	16	4		8		10			27
163.14. Constructability Review														
			8		40	20								68
		Labor Hours - Subtotal	0	71	22	268	240	272	454	386	80	0	686	0
		Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$123.83	\$138.48	\$132.71	\$106.75	\$12.13	
		FC 163 - Subtotal	\$23,556.38	\$5,204.54	\$78,102.72	\$55,392.00	\$58,855.36	\$53,172.80	\$50,114.38	\$1,078.40	\$0.00	\$13,230.50	\$0.00	\$438,707.08
FC 160(170). Roadway Design Bridge Design		Senior Project Manager			Deputy Project Manager	Senior Engr.	Sr. Structural Engr.	Project Engr.	Design Engr.	Engineer In Training II	Utilities Coordinator	Senior CADD Op.	CADD Operator	Admin/ Clerical
170.1. Bridge Layout														
		Bridge Layout (Including Typical Section)	1	2		2	4		16		20		40	84
170.2. Bridge Detail Summary														
		Estimated Quantities & Summary Sheets		4	2	4	8		10		16		20	64
170.3. Bridge Structural Details														
		Foundation Design, Foundation Layout & Details	2	2		4	10		12		20		30	78
		Abutment Design & Details	3	2		4	12		30		20		40	108
		Box Design & Details	3	2		4	12		20		30		40	108
		Analyze & Determine elevations for substructure/superstructure elements	2	2		4	8		16		20		16	66
		Framing Plan & Unit Span Details/Layouts	1	2		2	4		10		16		8	42
		Calculate bearing seat elevations, deadload deflections			4	8			10		12		8	44
		Miscellaneous Structural Details	1		2	4			6		8		6	27
		RIP of Bridge Calculations			2	8			16					26
170.7. Bridge Specifications														
		Subtotal	1		2	2			4		4			

Exhibit C
WA#2

Bridge @ Mesa Park (Length = 1805')												
170.1 Bridge Layout												
Bridge Layout (Including Typical Section)	6	4		8	16		30	48		60		166
170.2 Bridge Detail Summary												\$26,879.88
Estimated Quantities & Summary Sheets		4	4	8	16		20	32		30		114
170.3 Bridge Structural Details												\$19,935.58
Foundation Design, Foundation Layout & Details	5	2		8	16		20	30		40		116
Abutment Design & Details	3	2		4	12		20	30		40		108
Bent Design & Details	5	2		12	36		40	50		60		200
Analyze & Determine elevations for substructure/superstructure elements		2		8	16		32	40		30		128
Framing Plan & Unit Span Details/Layouts	5	2		4	20		24	40		50		140
Calculate bearing seat elevations, deadload deflections		2		8	16		24	30		16		96
Miscellaneous Structural Details		1		2	4		6	8		6		27
PDF of Bridge Calculations		2			16		32					50
Subtotal												\$193,646.36
Bridge near Executive (Length = 360')												
170.1 Bridge Layout												
Bridge Layout (Including Typical Section)	1	2		2	4		12	20		30		70
170.2 Bridge Detail Summary												\$10,905.44
Estimated Quantities & Summary Sheets		3	2	4	8		10	16		20		63
170.3 Bridge Structural Details												\$10,963.12
Foundation Design, Foundation Layout & Details	2	2		4	10		12	20		30		78
Abutment Design & Details	3	2		4	12		20	30		40		108
Bent Design & Details	3	2		4	12		20	30		40		108
Analyze & Determine elevations for substructure/superstructure elements		2		4	8		16	20		16		68
Framing Plan & Unit Span Details/Layouts	1	2		2	4		10	16		8		42
Calculate bearing seat elevations, deadload deflections		2		4	8		10	12		8		44
Miscellaneous Structural Details		1		2	4		6	8		6		27
PDF of Bridge Calculations		2			8		16					50
Subtotal												\$106,036.58
Labor Hours - Subtotal	65	8	124	328	0	620	656	0	738	0	0	2398
Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$129.83	\$138.48	\$132.71	\$106.75	\$72.13	
FC 170 - Subtotal	\$21,565.70	\$1,892.56	\$33,627.56	\$75,240.80	\$0.00	\$95,264.00	\$85,968.48	\$0.00	\$97,339.98	\$0.00	\$0.00	\$410,699.08
FC 300(351): Design Verify/Changes/Alter												
Senior Project Manager												
Deputy Project Manager												
Senior Engr.												
Sr. Structural Engr.												
Project Engr.												
Design Engr.												
Engineer In Training II												
Utilities Coordinator												
Senior CADD Op												
CADD Operator												
Admin/ Clerical												
Attend preconstruction meeting	4	4		4								12
Make field visit (one site visit)	4		4	4								16
Review and approval of shop drawings	2		16	40	40	40						138
Responding to requests for information (RFIs)	8	4	30	30	30	30						132
Providing minor redesign	4		20	16	30				40			110
Answer general questions	4	4	8	8	16	16						56
												\$0.00
Labor Hours - Subtotal	0	26	16	78	102	116	88	0	0	40	0	464
Labor Hour Cost	\$331.78	\$236.57	\$271.19	\$230.80	\$216.38	\$183.20	\$129.83	\$138.48	\$132.71	\$106.75	\$72.13	
FC 300 - Subtotal	\$0.00	\$3,785.12	\$21,152.82	\$23,541.60	\$25,100.08	\$15,755.20	\$0.00	\$0.00	\$5,308.40	\$0.00	\$0.00	\$103,269.50
Labor Hours Cost - Lump Sum Subtotal	\$147,310.32	\$47,314.00	\$285,291.88	\$314,183.76	\$314,183.76	\$313,638.40	\$313,543.36	\$11,078.40	\$233,038.76	\$97,936.50	\$1,009.62	\$1,967,115.80
Other Direct Expenses - Subtotal												
TOTAL												\$1,967,115.80

IH-10 WB Frontage Road					
CSJ: 2121-02-167					
Sub Provider: HVJ Associates					
COST BREAKDOWN FOR GEOTECHNICAL INVESTIGATION					
FC 102(110) - Feasibility Studies (Geotechnical Borings & Investigation)					
110.5 Labor					
Senior Engineer, PE	20	hr @	\$269.36	per hour	\$5,387.20
Design Engineer, PE	80	hr @	\$164.79	per hour	\$13,183.20
Engineer in Training I	110	hr @	\$119.47	per hour	\$13,141.70
Engineer Technician (logging, staking, one call, and field coordination)	140	hr @	\$108.76	per hour	\$15,226.40
Administrative Assistant	6	hr @	\$98.87	per hour	\$593.22
				Subtotal	\$47,531.72
110.5 Other Direct Expenses					
Lodging/Hotel (Taxes/fees not included) (Current State Rate)	28	@	\$107.00	per night	\$2,996.00
Lodging/Hotel Taxes/fees (City/State Tax Rate + Venue tax)	28	@	\$14.70	per night	\$411.60
Meals (overnight stay required) (Excluding alcohol)	28	@	\$59.00	per day	\$1,652.00
Mileage (Pickup truck for staking, logging)	30 miles	@	\$0.655	mile	\$32.75
Traffic Control Services (signs, cones, arrowboard etc.)	2	day @	\$1,500.00	per day	\$3,000.00
				Subtotal	\$8,092.35
110.5 UC - Geotechnical/Materials					
Mobilization of ATV Buggy/Track Drilling Equipment more than 100 miles	1500 miles	@	\$18.00	mile	\$27,000.00
ATV Surcharge (for rig installed on ATV)	930	ft @	\$5.00	per foot	\$4,650.00
Soil Boring/Rock Coring with TCP (< 60 ft.)	800	ft @	\$32.00	per foot	\$25,600.00
Soil Boring/Rock Coring with TCP (> 60 ft.)	130	ft @	\$35.50	per foot	\$4,615.00
Borehole Backfill	930	ft @	\$14.00	each	\$13,020.00
AC Patch	2	@ \$	49.50	each	\$99.00
Determining Moisture Content in Materials	190	@ \$	17.60	each	\$3,344.00
Determining Liquid Limits of Soils	75	@ \$	41.80	each	\$3,135.00
Determining Plastic Soil Limits	75	@ \$	41.80	each	\$3,135.00
Calculating the Plasticity Index of Soils	75	@ \$	16.50	each	\$1,237.50
Determining the Amount of Material in Soils Finer than the 75 micrometer	190	@ \$	66.00	each	\$12,540.00
Particle Size Analysis of Soils	20	@ \$	130.00	each	\$2,600.00
Consolidated Undrained (CU) Triaxial Compression Test - Multi Stage	1	@ \$	1,760.00	each	\$1,760.00
				Subtotal	\$102,735.50
FC 160(160) - Roadway Design (Pavement Design)					
160.10 Labor					
Senior Engineer, PE	4	hr @	\$269.36	per hour	\$1,077.44
Design Engineer, PE	20	hr @	\$164.79	per hour	\$3,295.80
Engineer in Training I	40	hr @	\$119.47	per hour	\$4,778.80
Administrative Assistant	2	hr @	\$98.87	per hour	\$197.74
				Subtotal	\$9,349.78
TOTAL GEOTECHNICAL & PAVEMENT SERVICES					\$167,709.35
*Note: The number and type of tests performed will depend on the actual soil conditions encountered.					

Exhibit C
WA#2

IH-10 WB Frontage Road CSJ: 2121-02-167 SUB PROVIDER: GRV Integrated Engineering Solutions LLC											
	No. of Sheets	Support Manager	Senior Engr.	Eff I	Sr. Engr. Tech	Engr. Tech	Survey Tech	Engineer Technician	Admin/ Clerical	Total Hours	Total Labor Cost
FC 145 (145,164): Managing Contracted/Donated PS&E											
145.1 Contract Management and Administration											
Coordination with the State/Engineer			12	12						24	\$3,356.64
Prepare monthly written progress reports			12						12		\$3,441.36
Prepare, distribute and file written and electronic correspondence			12						12	24	\$3,441.36
Perform internal QA/QC at each milestone submittals		24		24						48	\$6,826.32
Setup Contract, Prepare Invoices and Montly Reports			4						4	8	\$1,147.12
											\$0.00
Labor Hours - Subtotal	0	24	40	36	0	0	0	0	28	104	\$18,212.80
Labor Hour Cost		\$197.46	\$192.75	\$86.97	\$98.73	\$77.57	\$70.52	\$77.57	\$94.03		
FC 145 - Subtotal		\$4,739.04	\$7,710.00	\$3,130.92	\$0.00	\$0.00	\$0.00	\$0.00	\$2,632.84		\$18,212.80
FC 160(160): Roadway Design											
Design Surveys and Construction Surveys											
160.1 Design Surveys											
Obtain/collect data - Review and Existing Topographic Survey			4	24				24		52	\$4,719.96
Locate existing utilities				12			48		12	72	\$5,556.96
Locate topographical features			24	40			240			304	\$25,029.60
Provide details of existing bridge structures			40	80			180			300	\$27,361.20
Provide details of existing drainage features			4	24			48			76	\$6,243.24
Establish additional and verify existing control points			12	12			24			48	\$5,049.12
Review right-of-way maps			4	4	12	12			8	40	\$3,986.72
Perform hydrographic survey (Channel Cross Sections - up to 3)							20	20		40	\$2,961.80
Prepare control data and prepare survey control data sheets			24	80	120	40			12	276	\$27,662.36
Prepare and Submit Topographic Survey Base Map			12	40	160	40			4	256	\$25,067.52
Labor Hours - Subtotal	0	124	316	292	92	560	44	36	1464		\$133,638.48
Labor Hour Cost		\$197.46	\$192.75	\$86.97	\$98.73	\$77.57	\$70.52	\$77.57	\$94.03		
FC 160 - Subtotal		\$0.00	\$23,901.00	\$27,482.52	\$28,829.16	\$7,136.44	\$39,491.20	\$3,413.08	\$3,385.08		\$133,638.48
Labor Hours Cost - Grand Total		\$4,739.04	\$31,611.00	\$30,613.44	\$28,829.16	\$7,136.44	\$39,491.20	\$3,413.08	\$6,017.92		\$151,851.28
Other Direct Expenses - Grand Total											\$ 46,430.00
Grand Total											\$198,281.28
OTHER DIRECT EXPENSES											
81/2X11 B/W		300	\$ 0.15	\$ 45.00							
11X17 B/W		300	\$ 0.25	\$ 75.00							
MILEAGE		2000	\$ 0.66	\$ 1,310.00							
TMA		30	\$1,500.00	\$ 45,000.00							
SUBTOTAL OTHER DIRECT EXPENSES											\$ 46,430.00

Worksheet - CONSOR - SUE - Test Holes CobbFendley 2023 Standard Rate Schedule				
FC 163: Roadway Design				
Miscellaneous (Roadway)				
Direct Labor Classification	Rate	Unit	Quantity	Cost
Project Manager II	\$237.99	Hour	24	\$5,711.70
Engineer II	\$162.99	Hour	32	\$5,215.52
Registered Professional Land Surveyor	\$184.00	Hour	8	\$1,472.03
2 Person Survey Crew	\$156.01	Hour	16	\$2,496.16
Field Data Device	\$40.00	Hour/Unit	16	\$640.00
Designating (Level B)	Rate	Unit	Quantity	Cost
Two-Man Designating Crew (4-Hour Minimum)	\$184.00	Hour	24	\$4,416.00
Ground Penetrating Radar with 1 Technician (4-Hour Minimum)	\$281.00	Hour	24	\$6,744.00
Test Holes (Level A)	Rate	Unit	Quantity	Cost
Vacuum Excavation Truck with 2 Technicians (Vac 6000) (4-Hour Minimum)	\$341.00	Hour	32	\$10,912.00
Reimbursable Expenses	Rate	Unit	Quantity	Cost
Consultant or Specialty Contractor (Outside Firm)	\$36,086.81	@ Cost + 10%	0.1	\$3,608.68
Mileage (Standard Car or Truck)	\$0.655	\$ Approved F	500	\$327.50
Subtotal for Direct Labor				\$15,535.42
Subtotal for SUE LVL B				\$11,160.00
Subtotal for SUE LVL A				\$10,912.00
Subtotal for Reimbursables				\$3,936.18
Specialty Contractor's Fee				\$36,086.81
TOTAL				\$77,630.41
*Rates shown include personnel, vehicles & standard equipment necessary to complete the task.				

POTHOLE
Cost Proposal for Pothole
Friday, October 27, 2023

OWNER: CobbFendley
11427 Rojas Drive Ste B
EL PASO, TX 79936

ENGINEER:

Small Pipe Crew
1 day to mob, 3 days to pothole, 1 day to demob

CONTRACTOR: Lesna Construction, Inc
8805 Yermoland
EL PASO, TX 79907

I-10

[illegible]

LESNA CONSTRUCTION, INC.

Check No. 0001775288
Pay Date 10-27-2023

OffsiteHR, LLC
1475 S PRICE RD
CHANDLER, AZ 85286

Pay	Non-negotiable
------------	----------------

\$0.00

To The
Order
Of

Rogelio C. Meraz
13798 Paseo De Vida Dr
Horizon City, TX 79928

*** *Non-Negotiable* ***

Rogelio C. Meraz

LESNA CONSTRUCTION, INC. - MAIN (351014)

SSN# XXX-XX-8881

Period Start Date 10-15-2023

Check Date

10-27-2023 Federal Filing Status MJMarried Filing Joint

EMP# V19748

Period End Date 10-21-2023

Check Number

0001775288 State Filing Status NONE/NONE

Earnings - Current					Deductions / Taxes		
Date	Pay Description	Pay Rate	Hrs/Units	Pay Amount	Description	Amount	YTD
10-21-2023	SALARY			1500.00	DENTAL INS	24.29	971.60
					VISION INS	6.57	262.80
					FEDERAL TAX	105.91	4479.20
					MEDICARE	21.30	917.30
					SOC SECURITY	91.09	3822.40

Exhibit C
WA#2

TOTAL		1,500.00	
Earnings - Year To Date		Net Pay Distribution	
Description	YTD	Type	Amount
SALARY	64530.00	CHECK	\$0.00
		DIRECT DEPOSIT	\$1,252.84
		TOTAL NET PAY	\$1,252.84
		TOTAL NET PAY YTD	\$53,946.52
TOTAL	\$64,500.00		
Paid Time Off		Direct Deposit Detail	
Description	Balance	Account	Type
		95894	CHECKING
		Amount	1,252.84
		Employer Contributions	
Description	Amount	YTD	
COMP LIFE BASIC	0.30	12.00	
		TOTAL	
		0.30	
		12.00	
TOTAL DEPOSITED			
		\$1,252.84	
TOTAL			
		0.30	
		12.00	
Line One Message			
Line Two Message			
Line Three Message			
Line Four Message			
Voucher #: 070671 Sort Order: 63			

LESNA CONSTRUCTION, INC.

OffsiteHR, LLC
1475 S PRICE RD
CHANDLER, AZ 85286

Check No. 0001775274
Pay Date 10-27-2023

Pay Non-negotiable

\$0.00

To The
Order
Of

Lazaro Magalde Ortiz
13016 Yvette Rd
SAN ELIZARIO, TX 79849

*** Non-Negotiable ***

Lazaro Magalde Ortiz

LESNA CONSTRUCTION, INC. - MAIN (351014)

SSN# XXX-XX-8785 Period Start Date 10-15-2023 Check Date 10-27-2023 Federal Filing Status M/5
EMP# Z01296 Period End Date 10-21-2023 Check Number 0001775274 State Filing Status NONE/5

Earnings - Current					Deductions / Taxes		
Date	Pay Description	Pay Rate	Hrs/Units	Pay Amount	Description	Amount	YTD
10-16-2023	REGULAR PAY	24.0000	8.00	192.00	FEDERAL TAX	38.19	1306.96
10-16-2023	Drive	24.0000	1.00	24.00	MEDICARE	15.66	611.71
10-17-2023	REGULAR PAY	24.0000	8.00	192.00	SOC SECURITY	66.96	2615.59
10-17-2023	Drive	24.0000	1.00	24.00			
10-18-2023	REGULAR PAY	24.0000	8.00	192.00			
10-18-2023	Drive	24.0000	1.00	24.00			
10-19-2023	REGULAR PAY	24.0000	8.00	192.00			
10-19-2023	Drive	24.0000	1.00	24.00			
10-20-2023	REGULAR PAY	24.0000	8.00	192.00			
10-20-2023	Drive	24.0000	1.00	24.00			
TOTAL			45.00	1,080.00			

Earnings - Year To Date		Net Pay Distribution					
Description	YTD	Type	Amount				
REGULAR PAY	35578.00	CHECK	\$0.00				
Drive	5808.00						
OVERTIME	801.00	DIRECT DEPOSIT	\$959.19				
		TOTAL NET PAY	\$959.19				
		TOTAL NET PAY YTD	\$37,652.74				
TOTAL	\$42,187.00						
Paid Time Off		Direct Deposit Detail		Employer Contributions			
Description	Balance	Account	Type	Amount	Description	Amount	YTD
		21389	CHECKING	959.19			
		TOTAL DEPOSITED		\$959.19	TOTAL	0.00	0.00
Line One Message							
Line Two Message							
Line Three Message							
Line Four Message							
Voucher #: 070686 Sort Order: 49							

Voucher #: 070686 Sort Order: 49

Exhibit C
WA#2

LESNA CONSTRUCTION, INC.
OffsiteHR, LLC
1475 S PRICE RD
CHANDLER, AZ 85286

Check No. 0001775331
Pay Date 10-27-2023

Pay Non-negotiable

\$0.00

To The
Order
Of

Luis Villalobos
4600 Lorenzo Ponce Dr
El Paso, TX 79938

*** *Non-Negotiable* ***

Luis Villalobos

LESNA CONSTRUCTION, INC. - MAIN (351014)

SSN# XXX-XX-4422 Period Start Date 10-15-2023 Check Date 10-27-2023 Federal Filing Status MJ/Married Filing Joint Add'l
EMP# M28861 Period End Date 10-21-2023 Check Number 0001775331 State Filing Status NONE/NONE

Earnings - Current					Deductions / Taxes		
Date	Pay Description	Pay Rate	Hrs/Units	Pay Amount	Description	Amount	YTD
10-16-2023	REGULAR PAY	23.0000	8.00	184.00	FEDERAL TAX	118.73	1510.65
10-17-2023	REGULAR PAY	23.0000	8.00	184.00	MEDICARE	13.34	358.18
10-18-2023	REGULAR PAY	23.0000	8.00	184.00	SOC SECURITY	57.04	1531.52
10-19-2023	REGULAR PAY	23.0000	8.00	184.00			
10-20-2023	REGULAR PAY	23.0000	8.00	184.00			
TOTAL			40.00	920.00			

Exhibit C
WA#2

Earnings - Year To Date		Net Pay Distribution					
Description	YTD	Type	Amount				
REGULAR PAY	23034.50	CHECK	\$0.00				
OVERTIME	586.50						
Drive	1081.00	DIRECT DEPOSIT	\$730.89				
		TOTAL NET PAY	\$730.89				
		TOTAL NET PAY YTD	\$21,301.65				
TOTAL	\$24,702.00						
Paid Time Off		Direct Deposit Detail		Employer Contributions			
Description	Balance	Account	Type	Amount	Description	Amount	YTD
		62183	CHECKING	730.89			
TOTAL DEPOSITED				\$730.89	TOTAL	0.00	0.00
Line One Message							
Line Two Message							
Line Three Message							
Line Four Message							
Voucher #: 070644 Sort Order: 106							

Voucher #: 070644 Sort Order: 106

Exhibit C
WA#2

LESNA CONSTRUCTION, INC.
OffsiteHR, LLC
1475 S PRICE RD
CHANDLER, AZ 85286

Check No. 0001775226
Pay Date 10-27-2023

Pay Non-negotiable

\$0.00

To The
Order
Of

Marco Antonio Aguilar
1679 Dryden Pl
El Paso, TX 79928

*** *Non-Negotiable* ***

Marco Antonio Aguilar

LESNA CONSTRUCTION, INC. - MAIN (351014)

SSN# XXX-XX-9895
EMP# E28853

Period Start Date 10-15-2023
Period End Date 10-21-2023

Check Date
Check Number

10-27-2023
0001775226

Federal Filing Status SS/Single
State Filing Status NONE/NONE

Earnings - Current					Deductions / Taxes		
Date	Pay Description	Pay Rate	Hrs/Units	Pay Amount	Description	Amount	YTD
10-16-2023	REGULAR PAY	20.0000	8.00	160.00	FEDERAL TAX	59.81	1388.58
10-17-2023	REGULAR PAY	20.0000	8.00	160.00	MEDICARE	11.60	261.51
10-18-2023	REGULAR PAY	20.0000	8.00	160.00	SOC SECURITY	49.60	1118.17
10-19-2023	REGULAR PAY	20.0000	8.00	160.00			
10-20-2023	REGULAR PAY	20.0000	8.00	160.00			
TOTAL			40.00	800.00			

Exhibit C
WA#2

Earnings - Year To Date			Net Pay Distribution				
Description	YTD	Type	Amount				
REGULAR PAY	16750.00	CHECK	\$0.00				
OVERTIME	1125.00						
RETRO PAY	160.00	DIRECT DEPOSIT	\$678.99				
		TOTAL NET PAY	\$678.99				
		TOTAL NET PAY YTD	\$15,266.74				
TOTAL	\$18,035.00		TOTAL	121.01	2,768.26		
Paid Time Off		Direct Deposit Detail			Employer Contributions		
Description	Balance	Account	Type	Amount	Description	Amount	YTD
		53000	SAVINGS	678.99			
		TOTAL DEPOSITED		\$678.99	TOTAL	0.00	0.00
Line One Message							
Line Two Message							
Line Three Message							
Line Four Message							
Voucher #: 070609 Sort Order:							



www.equipmentwatch.com

All prices shown in US dollars (\$)

Rental Rate Blue Book®

December 22, 2021

Caterpillar 329D L (disc. 2014)
Crawler Mounted Hydraulic Excavators



Size Class:
28.1 - 33.0 MTons
Weight:
64460 lbs

Configuration for 329D L (disc. 2014)

Operating Weight 29.2 mt Power Mode Diesel

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	USD \$16,740.00	USD \$4,690.00	USD \$1,175.00	USD \$175.00	USD \$74.71	USD \$169.82
Adjustments						
Region (Texas: 93.3%)	(USD \$1,121.56)	(USD \$314.23)	(USD \$78.72)	(USD \$11.73)		
Model Year (2014: 100%)	-	-	-	-		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	USD \$15,618.42	USD \$4,375.77	USD \$1,096.28	USD \$163.27	USD \$74.71	USD \$163.45

Non-Active Use Rates

	Hourly
Standby Rate	USD \$44.37
Idling Rate	USD \$102.10

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	36%	USD \$6,026.40/mo
Overhaul (ownership)	53%	USD \$8,872.20/mo
CFC (ownership)	3%	USD \$502.20/mo
Indirect (ownership)	8%	USD \$1,339.20/mo
Fuel (operating) @ USD 3.37	18%	USD \$13.36/hr

Revised Date: 4th quarter 2021

These are the most accurate rates for the selected Revision Date(s). However, due to more frequent online updates, these rates may not match Rental Rate Blue Book Print. Visit the Cost Recovery Product Guide on our Help page for more information.

The equipment represented in this report has been exclusively prepared for JOSE PINON (jpinon@lesnainc.com)

Exhibit C
WA#2



www.equipmentwatch.com
All prices shown in US dollars (\$)

Rental Rate Blue Book®

May 3, 2023

Deere 310SL HL
Tractor-Loader-Backhoes

Size Class:
13.5 - 14.4 ft
Weight:
N/A



Configuration for 310SL HL

Drive: 4WD Diesel Operator Protection EROPS

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	USD \$9,135.00	USD \$2,560.00	USD \$640.00	USD \$96.00	USD \$38.88	USD \$90.78
Adjustments						
Region (Texas: 100.1%)	USD \$9.14	USD \$2.56	USD \$0.64	USD \$0.10		
Model Year (2023: 100%)	-	-	-	-		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	USD \$9,144.13	USD \$2,562.56	USD \$640.64	USD \$96.10	USD \$38.88	USD \$90.84

Non-Active Use Rates

	Hourly
Standby Rate	USD \$25.98
Idling Rate	USD \$70.63

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	24%	USD \$2,192.40/mo
Overhaul (ownership)	45%	USD \$4,110.75/mo
CFC (ownership)	17%	USD \$1,552.95/mo
Indirect (ownership)	14%	USD \$1,278.90/mo
Fuel (operating) @ USD 4.25	48%	USD \$18.67/hr

Revised Date: 2nd quarter 2023

These are the most accurate rates for the selected Revision Date(s). However, due to more frequent online updates, these rates may not match Rental Rate Blue Book Print. Visit the Cost Recovery Product Guide on our Help page for more information.

The equipment represented in this report has been exclusively prepared for JOSE PINON (jpinon@lesnainc.com)



www.equipmentwatch.com

All prices shown in US Dollars (\$)

AED Green Book®

October 5, 2023

Multiquip WT5HP
Water Trailers

Size Class:
To 4,500 gal
Weight:
N/A



Configuration for WT5HP

Pump Capacity	106 gal/min	Tank Capacity	525 gal
Power Mode	Gasoline		

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD \$1,132.00	USD \$506.00	USD \$178.00
Adjustments			
Region (: 100%)	-	-	-
User Defined			
Rental Rates (100%)	-	-	-
Total:	USD \$1,132.00	USD \$506.00	USD \$178.00
Date Last Updated: Sep 01, 2023			

The equipment represented in this report has been exclusively prepared for JOSE PINON (jpinon@lesnainc.com)



www.equipmentwatch.com

All prices shown in US dollars (\$)

Rental Rate Blue Book®

March 2, 2023

Ford F-250 SD
On-Highway Light Duty Trucks

Size Class:
300 hp & Over
Weight:
N/A



Configuration for F-250 SD

Axle Configuration	4.0 X 4.0	Cab Type	Crew
Horsepower	300.0 hp	Power Mode	Gasoline
Ton Rating	3.0 / 4.0		

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	USD \$840.00	USD \$235.00	USD \$59.00	USD \$9.00	USD \$24.12	USD \$28.89
Adjustments						
Region (Texas: 1.01%)	USD \$8.40	USD \$2.35	USD \$0.59	USD \$0.09		
Model Year (2017: 99.29%)	(USD \$6.03)	(USD \$1.69)	(USD \$0.42)	(USD \$0.06)		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	USD \$842.37	USD \$235.66	USD \$59.17	USD \$9.03	USD \$24.12	USD \$28.91

Non-Active Use Rates

	Hourly
Standby Rate	USD \$2.39
Idling Rate	USD \$24.93

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	57%	USD \$478.80/mo
Overhaul (ownership)	23%	USD \$193.20/mo
CFC (ownership)	8%	USD \$67.20/mo
Indirect (ownership)	12%	USD \$100.80/mo
Fuel (operating) @ USD 3.53	83%	USD \$20.14/hr

Revised Date: 1st quarter 2023

These are the most accurate rates for the selected Revision Date(s). However, due to more frequent online updates, these rates may not match Rental Rate Blue Book Print. Visit the Cost Recovery Product Guide on our Help page for more information.

[END OF EXHIBIT]

EXHIBIT D
INVOICE REIMBURSEMENT CHECKLIST

Direct Labor/Timesheets: The invoice must clearly identify each employee name, title, hours worked, date of performance, task or project description, rate per hour and/or cost, and office/company location.

Transportation Costs and Reimbursable Limits: Efforts must be made to secure a *reasonable* and/or lowest rate available in the marketplace.

Airline Costs: Authority will only reimburse for airline costs at the Economy or Coach Class rate. Extra insurance and luggage costs are unallowable. Airline ticket “reissue fee” is reimbursable only if the change was at Authority’s request or change in meeting because of Authority.

Personal Automobile Mileage: Up to the state approved rate of **65.5 cents** per mile or the **current state rate** applicable at the time cost is incurred. Expense report must clearly identify the departure/arrival time, To/From destinations and purpose of trip.

Automobile Rentals: Not to exceed **\$50.00 per day** plus applicable taxes or **current state rate**. Extra optional insurance or rental company gasoline costs are unallowable. Weekly or Monthly rates should be used when applicable. Upgrades beyond economy-sized require an explanation. Use of automobile rental not related to the project is unallowable.

Hotel Rates: Weekly and Monthly rates are encouraged and expected when applicable. Reimbursable costs shall not exceed **\$98.00 per day** plus applicable city/state/county taxes or **current state rate** applicable at the time cost is incurred.

Meals (Food Costs): Meal receipts are not required. Actual costs are allowable up to a maximum Per Diem allowance of **\$59.00 per day or current state rate** applicable at the time cost is incurred. Meals are only reimbursable with overnight lodging away from headquarters. *Tips and alcohol are not reimbursable. Per meal maximums for partial day travel are as follows: **Breakfast \$13.00, Lunch \$15.00, Dinner \$26.00 & \$5.00 incidental expenses and are adjusted proportionately to a change in the current state rate.***

Other - Taxi, Bus, Limousine, Subway, etc.: Only reasonable and prudent costs (with explanations) are reimbursable. *Tips are not reimbursable.*

Entertainment Costs: Entertainment costs are not reimbursable, including: 1. Movie costs for “Pay for View” or Cable service. 2. Alcohol costs. 3. Monetary Tips (tipping) for any and all services related to all forms of travel (and/or entertainment).

Communication Costs: Long Distance telephone calls need to be identified and strictly related to work performed under this Agreement in order to be reimbursable by Authority. A log is preferred showing the date, person’s name called, and explanation. Cell phone monthly charges are reimbursable if usage is strictly related to work performed under this Agreement. Legible itemized cell phone records are required.

Receipts: Legible itemized receipts are required for the following: 1. Hotel (lodging) costs. 2. Airfare travel costs. 3. Parking costs. 4. Automobile or Equipment Rental costs. 5. Taxi, Limousine, Bus, Subway, or other travel costs. 6. Reproduction. 7. Shipping and Handling. 8. Local Postage/Deliveries (courier services). 9. Communication Costs. *Tips and alcohol are not reimbursable.*

[END OF EXHIBIT]