PAPE-DAWSON ENGINEERS

May 29, 2018

Ms. Jennifer Cain, CCM
Capital Programs Manager
City of New Braunfels
550 Landa St
New Braunfels, TX 78130

Re: RFQ 18-016 Klein Road Phase 2

Dear Ms. Cain:

Pape-Dawson has been selected to perform preliminary engineering services in connection with the above referenced project. Based on our conversations with City staff and understanding of the project objectives, we are tasked to develop a Summary of Needs Study to serve as the basis for development of design concepts for roadway expansion and ultimately a recommended schematic layout with an associated cost estimate of proposed improvements. The recommended alternative will be subject to voter approval in the City's 2019 Bond election. Our proposed scope of base services and associated fees to accomplish these objectives, labeled Exhibits A, B, C, and D are attached. Services relevant to the schematic phase, but that can be deferred to PS&E stage, have been identified as additional services described in Exhibit B1. We recommend performing these additional services to reduce the risk of entering PS&E stage with unknowns that could be potentially detrimental to the project. Performing these additional services during schematic phase will improve the accuracy of the schematic cost estimate and ultimately expedite PS&E development.

We appreciate the opportunity to work with you on this project. If this proposal and agreement meet with your approval, please acknowledge such by signing this proposal letter and returning it to our office via email for our records. Receipt of the executed documents will service as authorization for us to proceed with the base services described herein.

Sincerely,
Pape-Dawson Engineers, Inc.

Tyler Dube, P.E.
Project Manager

City of New Braunfels

Signature:_____
Name: _____
Title:_____
Date:_____

Attachments
H:\projects\510\30\00\ProjectData\Contracts\NB 18-016_Klein Rd Phase 2 Proposal.docx (18-01551)

EXHIBIT A

Services to be Provided by the City of New Braunfels

The City of New Braunfels will furnish to the Engineer the following items/information for the Klein Road Phase 2 project:

1) As-built plans, ROW maps, reports, and/or studies. Any readily available existing conditions data, drawings and related information it has for the project. Data, documents and related information will likely consist of varying electronic and paper format.
2) Expedited reviews as needed to meet the project schedule.
3) Specific pavement design criteria such as Equivalent Single Axle Loading (ESAL) or design traffic levels, if any.
4) Draft City of New Braunfels Pavement Design Guidelines manual, latest revision.

EXHIBIT B

Services to be Provided by the Engineer

PHASE I - SUMMARY OF NEEDS STUDY

Work includes overall project oversight including managing data collections, designs, submittals, and coordination.

Design Concept Conference

The Engineer will administer and conduct a Design Concept Conference:

- Work with City Staff to identify project goals
- Develop and refine project scope/needs analysis
- Engage key stakeholders including TxDOT, County, and Utility Owner stakeholders
- Review regional considerations and project impacts
- Refine project budget
- Develop overall project schedule

Drainage Analysis

The Engineer shall provide a Civil Assessment of the site based on existing information and information obtained as part of project research.

In addition, the Engineer shall:

Collect existing hydrologic and hydraulic data
- Field visit (1)
- Review existing data (as-builts, survey, H&H models, etc.)
- Send data request to FEMA and Local Floodplain Administrator (FPA) for any ongoing or proposed drainage models and/or studies

Develop Hydrology (flows) for drainage crossing
- Develop drainage area using available lidar, USGS, and GIS data
- Develop hydrologic model using HEC-HMS
- Develop drainage area map (11x17) to be included in summary of project needs

Develop Hydraulics for existing and proposed crossing
- Develop hydraulic model using HEC-RAS
- Develop two (2) preliminary alternatives for the crossing consisting of a culvert (bridge class) and span bridge
- Design shall remove low water crossing while creating no adverse impact to adjacent structures
- Develop two (2) exhibits, one of each alternative, showing the proposed drainage crossing alternatives

Develop drainage cost estimate

Develop drainage summary of needs to be included in project summary of needs

Assumptions:

This proposal only includes schematic phase analysis. PS&E/Design phase will require updating model services.
Coordination with FEMA and Local FPA will be limited to one data request
Agency Fees associated with data requests are not included with this proposal and will be considered an additional service
Scour analysis will not be performed
Detention analysis will not be performed
2D hydraulic analysis is not included
Bridge and culvert alternatives will be analyzed
Detention is not included in this scope.
Analysis of existing offsite detention is not included in this scope.

Traffic Analysis

Existing Conditions

The Engineer will develop an existing conditions model using Synchro traffic analysis software. Measures of Effectiveness including level of service, delays, and queueing will be analyzed and reported. Based on the results of the Existing Conditions analysis, The Engineer will identify short-term operational improvements for existing operational issues.

Traffic Projections

The Engineer will review historic traffic growth, MPO travel demand model and known development information to forecast future traffic growth. A growth rate will be applied to Klein Road and side streets to develop future volumes.

Proposed Traffic Model

The Engineer will update the traffic analysis models for future year conditions. We will identify operational issues and develop improvements for Klein Road to accommodate future traffic growth.

Traffic Study Memorandum

The Engineer will prepare a memo summarizing the study methods, analysis, and recommendations.

Site Survey

Within the project area specified herein, the Engineer's Surveyor shall complete an existing utility base map from Quality Level D investigation, and compile an ownership database of adjacent owners along Klein Road (County Road 368), from FM 725 to Walnut Avenue in the City of New Braunfels, Guadalupe County, Texas.

- The Texas 811 utility notification system shall be contacted to obtain utility map data within the project corridor. Local utility providers will also be contacted to obtain utility map data within the project corridor. Map data shall be compiled to create an existing utility base map. Field surveying of existing utilities is not a part of this survey scope.
- Adjacent property owners within the project corridor shall be identified and represented on the right-of-way base map as parcel polygons as extracted from Guadalupe County Appraisal District shape files. Parcel polygons shall be labeled with the Guadalupe County Appraisal District account numbers only.
- Adjacent property ownership data to include Guadalupe County Appraisal District account number, owner name, mailing address and property description will be listed within an excel spreadsheet.
- Survey deliverables shall include an existing utility base map and an ownership database Excel file.
- All work shall be performed under the direct supervision of a professional land surveyor, registered in the State of Texas.

PHASE II - CONCEPTUAL DESIGN

Attend project meetings including:

- Design Alternative Workshop (1 @ 4 hrs)
- Utility Coordination Meeting (1 @ 4 hrs)
- Project Team Coordination Meetings (2 @ 1 hrs)

Roadway

The Engineer shall prepare an alignment and proposed roadway layout to include projected traffic volumes, existing and proposed typical sections. The Engineer shall furnish Microsoft Office and Microstation V8i-Geopak computer generated media containing the roadway layout as requested. All supporting attachments and exhibits shall accompany the layout.

The Engineer shall produce, obtain, review, and evaluate existing and projected traffic data for use in the preparation of the design layout.

The Engineer shall prepare preliminary drawings to identify any potential adverse impacts within the project corridor. Identification of all existing and proposed utilities (public and private), structures, burial grounds, neighborhood communities, historical landmarks, and undeveloped areas is required. Any potential utility conflicts and structural impediments must be identified as such.

Analyze Existing Conditions
Using collected data and base maps, the Engineer shall develop an overall analysis of the existing conditions in order to develop the schematic design. The analysis shall include, but not be limited to the following:

- ROW determination

- Horizontal alignment
- Vertical alignment
- Pavement cross slopes and pavement type
- Soil Exploration
- Geotechnical Testing
- Intersection design and analysis
- Sight distance
- Roadside signing
- Level-of-service
- Locations of critical constraints
- Drainage
- Traffic control and construction phasing sequence

The Engineer shall consider the following in the analysis to optimize the design:

- Efficient use of the allocated ROW
- Control of Access (COA) and driveway locations
- Roadway and intersection geometry
- Cross Sections
- Bicycle and Pedestrian design
- Drainage and Hydraulic design
- Stopping Sight distance
- Level-of-service
- Traffic and signal operations
- Construction, ROW, easement, and utility costs
- Construction sequencing
- Traffic control during construction
- Roadside safety appurtenances
- Environmental mitigation
- Bridge Layouts and Clearance

The Engineer shall propose up to 3 project design alternatives which would avoid or minimize displacements and damages, and prepare any additional attachments or exhibits required illustrating a preferred alternative alignment.

The Engineer shall identify and analyze alternatives to minimize potential adverse impacts, major utility conflicts, structural impediments, or exceptions to the State or FHWA design criteria.

All designs shall be prepared in accordance with the latest version of: TxDOT Roadway Design Manual, AASHTO Policy on Geometric Design of Highways and Streets, TxDOT Standard Specifications for Construction of Highways, Streets, and Bridges, Texas Manual on Uniform Traffic Control (TMUTCD), and Highway Capacity Manual - Transportation Research Board.

The layouts, exhibits, and attachments will be developed in English units. All Microsoft Office and Microstation V8i - Geopak computer graphic files furnished to the City must be submitted in electronic format by means of a CD, DVD, or USB media that will be compatible to the City.

Conceptual Cost Estimates for the alternative Concept Design solutions, including ROW acquisition.

After all review and approval requirements for Conceptual Design have been met, and incorporation of any changes ordered by the City, the City shall authorize the Engineer in writing to commence Schematic Design.

PHASE III - SCHEMATIC DESIGN

The design schematic horizontal layout will adhere to a design scale of 1 in. = 100 ft (or 1 in. = 200 ft as directed.) The schematic layout, exhibits, and attachments will be developed in English units. All Microsoft Office and Microstation V8i - Geopak computer graphic files furnished to the City must be submitted in electronic format by means of a CD, DVD, or USB media. Schematics will follow TxDOT and Federal Highway Administration (FHWA) standards, the schematic will also follow the CADD standards used by TxDOT and shall be submitted as an original document, accompanied with an original Microstation V8i formatted graphics file. Final copies of the schematic design shall be signed by a professional engineer licensed in the State of Texas.

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

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

Environmental Constraints
The Engineer shall consider impacts to environmentally sensitive sites during the schematic design process. The environmental sensitive sites may include, for example, historic structures, cemeteries, residential areas, historical landmarks, farmland, floodplains, wetlands, parks and nature preserves, geologic features, and significant trees.

Drainage
The Engineer shall conduct a Preliminary Drainage Study to determine and evaluate the adequacy of the ROW needed to accommodate the proposed roadway and drainage system. The drainage study shall identify the impacts to abutting properties and the 100-year floodplain due to proposed highway improvements, identify and locate outfalls, drainage outfall descriptions, provide overall drainage area map, sub-drainage area map, storm water detention facilities, and provide a drainage study report identifying the results of the study.

ROW Requirements

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

Construction Sequence
The Engineer shall consider the requirements for construction staging and traffic control throughout the development of schematic design to ensure that the proposed design can be constructed. The Engineer shall provide construction phasing assumptions as requested.

Design Exceptions
The Engineer shall identify design exceptions and waivers, and shall document the necessity for each design exception or waiver for approval.

Traffic and Operational Analysis
The Engineer shall review and analyze traffic data, existing roadway features, traffic flow patterns, accident patterns and frequencies, and transit and traffic operations.

Bicycle and Pedestrian Accommodations
The Engineer shall comply with the federal policy statement on Bicycle and Pedestrian Accommodations Regulations and Recommendations by United States Department of Transportation (USDOT).

Stakeholder Outreach

Prepare materials for and participate in a Community Meetings conducted during Schematic Design.

The Engineer shall present the Schematic Design deliverables to the City and shall incorporate any changes requested by the City regarding the Schematic Design or the requirements of the Project.

The Engineer shall participate in conference call meetings and meetings in person as determined as necessary by the City.

The Engineer shall render assistance for meetings as necessary during the development of the design as requested. The Engineer shall also render assistance to the City for meetings with affected property owners (MAPOs), public meetings and a public hearing if requested.

In addition, the Engineer shall attend all project meetings with various City departments/divisions and/or public meetings as required and shall prepare presentations and represent the City in presenting as necessary to achieve final plan review and approval.

Project Deliverables

In conjunction with the performance of the foregoing services, the Engineer shall provide the following draft and final documents and associated electronic files as applicable.

- Geometric Schematic layout

- Conceptual Design Drawings
- Preliminary Drainage Memo
- Construction Sequence Layouts
- Electronic files shall be furnished to the State on a CD or DVD Recordable media
- Traffic Data Schematics
- Traffic Projections Report
- MAPO and Public Meeting Summary
- Utility Plan – Electronic file on CD in latest version of Microstation V8 or Geopak
- An Electronic submittal of the Geopak Drainage, HEC-RAS, SWMM, & HMS models. The models must be approved by the State's District Hydraulic Engineer prior to generating any reports.
- Culvert Hydraulic Data Sheets and Preliminary Culvert Layouts.

CONTRACT MANAGEMENT AND ADMINISTRATION

The Engineer shall direct and coordinate the various elements and activities associated with developing the design schematic.

The Engineer shall prepare the detailed Project Work Schedule depicting the order of the various tasks, milestones, and deliverables.

The Engineer shall submit monthly Progress Reports, as requested by the City.

The Engineer shall prepare subcontracts for subconsultants, direct and monitor subconsultants activities, and review subconsultant work and invoices.

The Engineer shall provide ongoing quality assurance and quality control to ensure completeness of product and compliance with the City procedures.

The Engineer shall prepare and submit invoices.

The Engineer shall record and issue meeting minutes for all meetings, conferences, and conference calls attended by the Engineer to all attendees.

EXHIBIT B1

Additional Services to be Provided by the Engineer by Separate Work Authorization

PHASE I - SUMMARY OF NEEDS STUDY

Site Survey

Within the project area specified herein, the Engineer's Surveyor shall gather survey data within the floodway of the unnamed tributary of the Guadalupe River for hydraulic modeling, complete an existing right-of-way base map along Klein Road (County Road 368), from FM 725 to Walnut Avenue in the City of New Braunfels, Guadalupe County, Texas.

- Survey horizontal data shall be based on the North American Datum of 1983 (NAD83), Texas Coordinate System of 1983 (State Plane Coordinates), established for the South Central Zone, with values in U.S. Survey Feet, unless directed otherwise.
- Survey vertical data shall be based on the North American Vertical Datum of 1988 (NAVD88), Geoid 12B, unless directed otherwise.
- Survey data gathered within the floodway of the unnamed tributary shall be located at the right-of-way line and at intervals of 150', 300' and 500' outside the right-of-way, but within the limits of the flood plain as mapped by the Federal Emergency Management Agency (FEMA).
- Available right-of-way maps, right-of-way deeds to Guadalupe County, and adjacent subdivision plats will be researched, drawn, calculated for minimal field recovery and represented within the CADD deliverable as an "apparent right-of-way line". Apparent right-of-way lines are accurate to a +/- 2-feet.
- Survey deliverables shall include a 3D survey data provided in CADD and point file format, a PDF and CADD existing right-of-way base map
- All work shall be performed under the direct supervision of a professional land surveyor, registered in the State of Texas.

Geotechnical Analysis

Determine Locations for Proposed Geotechnical Testing (See Figure 1) – The Engineer will drill 7 total borings along the existing alignment of Klein Road within the project limits. 5 borings (P-101 through P-105) will be drilled through the existing pavement surface to maximum depths of 10 ft below the existing ground surface for the pavement portion of the study. If a bridge is needed, 2 borings (Borings B-101 and B-102) will be drilled in the vicinity of the low water crossing, near the abutments of the proposed bridge (if the locations are available) to maximum depths of 40 ft below the existing ground surface. Borings B-101 and B-102 will be utilized for both the pavement portion of the study as well as for the bridge/retaining wall portion of the study. Exact locations of the

borings will be determined after a brief distress survey of existing pavement condition is conducted and depending on the alignment of the bridge. The general extent and severity of distresses encountered on the existing pavement will confirm the field sampling and testing program that will be conducted for the pavement reconstruction design.

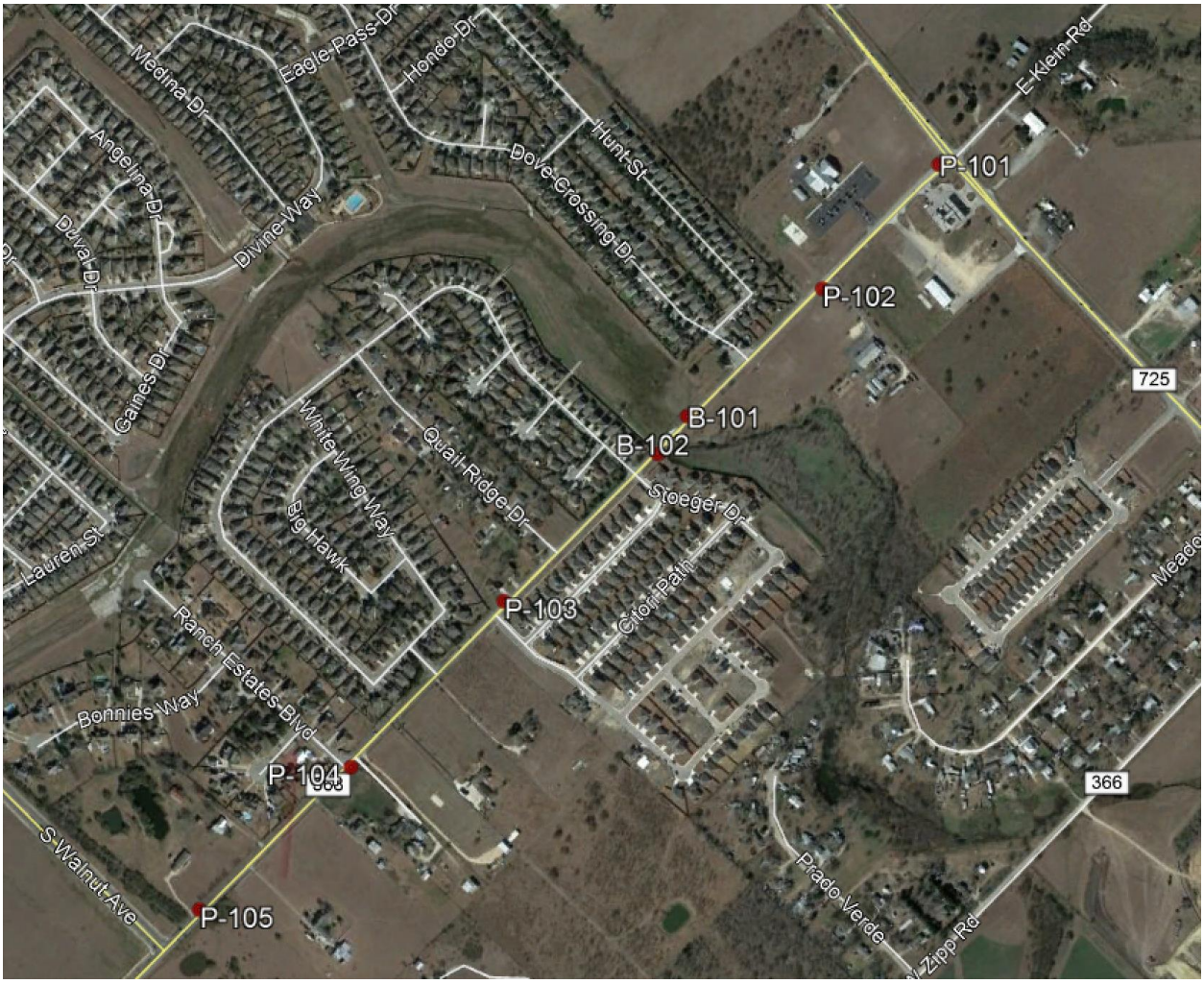

Figure 1 Proposed Boring Plan

Obtain Permits and Utility Clearances for Proposed Test Holes - The Engineer will obtain the appropriate street cut permit(s) required by the City of New Braunfels for all drilling activities (coordinated with the assigned City Inspector). Streets will be restored to the condition required by the permit after completion of the drilling operations. The Engineer assumes that all boring locations will accessible to a conventional, truck-mounted drilling rig. The Engineer will contact Texas Excavation Safety System, Inc (Texas811) for clearance of certain utilities.

Coordinate with City of New Braunfels for Potential Lane Closures for Drilling of Test Holes - The Engineer will provide the necessary traffic control for all sampling activities that may occur for the drilling. Proper notification will be provided to the City of New Braunfels for public notification of lane closures.

Obtain Test Hole Information - Borings will be conducted at the locations and depths discussed above using industry accepted drilling practices and procedures. If contaminated soils are encountered, drilling will be suspended and environmental drilling and sampling protocols will have to be followed with additional costs to be determined.

Complete Geotechnical Laboratory Testing of Test Samples - From the borings, representative materials will be collected to define the strength and classification characteristics of the foundation soils. Split-spoon samples (with Standard Penetration Testing) will be completed in the P-series borings while Texas Cone Penetrometer (TCP) testing will be completed in the B-series borings with Shelby Tube and grab sampling of the auger cuttings. The laboratory testing program may include moisture content tests, Atterberg Limits (plasticity tests), unconfined compression testing, and grain size analyses. In addition to the above described testing program, one representative sample of the predominant subgrade soil will be obtained from the pavement areas and will be subjected to one California Bearing Ratio (CBR) test and one Lime Series test. The CBR testing will provide information regarding inundated strength and swell characteristics of the surficial subgrade soils for direct use in pavement design analyses. The Lime Series testing will allow determination of required proportions of hydrated lime needed in conventional stabilization to sufficiently reduce the plasticity of the subgrade soils. Sulfate testing will also be completed to identify the potential for sulfate induced heave.

If it is determined that reusing the existing paving materials as part of the reconstructed pavement is desired, samples of the asphaltic concrete and granular base may be collected for testing in the laboratory with an additional cost to be determined. The specific testing will be defined based upon the ultimate usage of the recycled material (i.e. will it be used as a granular base, a cement treated base, or asphalt treated base? etc.).

Pavement Analysis

The Engineer will utilize the information gathered during the field investigation to develop the pavement designs to establish anticipated cross sections for the proposed street reconstruction.

Develop Pavement Designs - The pavement design will be conducted using guidance available from City of San Antonio, specifically Article 5 Section 35-506 Subsection (p) of the Unified Development Code (UDC) (dated April 30, 2018) titled "Pavement Standards" and using the additional requirements of Appendix 10-A of the DGM entitled "City of San Antonio Pavement Design Standards" dated October 2017. Both flexible and rigid pavements will be considered for design. Temporary pavement designs will be provided. If available at the time of reporting, the Engineer will utilize pavement design guidance currently under development by the City of New Braunfels. The draft of this document will be used for reference in the event the final is not complete.

Pavement design inputs for the reconstruction will be based upon data collected from the field sampling and testing program as well as the UDC and Appendix 10-A of the DGM using a street classification or Equivalent Single Axle Loading (ESAL) to be provided by the client at a future date. Design traffic levels will be determined in accordance with DGM Appendix 10-A: Pavement Design Parameters – Design Traffic Levels or as directed by the City.

Prepare Pavement Design Report - Pertinent information needed for the pavement design will be provided in an engineering report, which will include typical cross-sections, soil conditions encountered, and existing pavement conditions noting the general extent and severity of distresses encountered on the roadway. A recommendation as to the suitability of the existing materials for use in the reconstructed pavement may also be provided if requested by the City at additional cost. The report will also cover:

- A summary of the field and laboratory sampling and testing program;
- Boring logs and laboratory testing results;
- A review of general site conditions including drainage considerations affecting pavement performance as well as a visual summary of pavement distresses encountered at the site;
- Pavement reconstruction design recommendations; and
- Pavement construction considerations.

Bridge and Retaining Analysis (If required)

If the hydraulic study concludes a bridge is required, the Engineer will utilize the information gathered during the field investigation to develop drilled pier capacity curves to be used in the design of cast-in-place concrete piers. In addition, and if required, the Engineer will also prepare a global stability analysis for any retaining walls associated with the bridge. The bridge and retaining wall report will be prepared as a separate report from the pavement design study.

Develop Drilled Pier Capacity Curves - The TCP test data collected during the field investigation will be used in conjunction with the Texas Department of Transportation (TxDOT) Geotechnical Manual dated March 2018. A range of shaft diameters will be considered in our report and curves for both downward axial and uplift will be provided. In addition, L-Pile parameters will be provided for lateral resistance consideration.

Prepare a Global Stability Analysis – The Engineer will prepare general information about retaining walls as they relate to the soil conditions at this site, including bearing capacity and settlement potential.

Prepare Bridge and Retaining Wall Design Report - Pertinent information needed for the bridge and retaining wall design will be provided in an engineering report, which will include the downward axial and uplift curves, the lateral resistance parameters (L-Pile), and either the global stability analysis or general retaining wall recommendations, depending on the information available at the time of our report.

Monitoring Well Study – At the request of the City

The Engineer can install up to 2 piezometers along the alignment to establish and monitor the groundwater levels at specific locations. The Engineer will periodically check, record, and bail any water existing in each of the piezometers to establish the presence of and depth to groundwater, if any. 12 months of observation are included in this optional study. No sampling or laboratory testing is anticipated to be completed in conjunction with the piezometer installation. A report presenting the observations and an opinion of the impact of the groundwater (if encountered) will be prepared for the City.

Environmental Analysis

The Engineer shall identify the potential of environmental concerns and review known environmental issues such as potential contamination, historical districts, archeological sites, endangered species habitat area, tree protection and projects over the Edwards Aquifer recharge zone(s); provide a Phase I Assessment as deemed necessary by the City.

Permitting: The Engineer shall identify, and review known or potential permitting issues including, but not limited to, USACE404 under the Clean Water Act, National Environmental Policy Act (NEPA), National Historic Preservation Act, WPAP, etc. and the anticipated duration for submittal and the approval of applicable permits;

Task 1 Archaeological Desktop Study and USACE/THC Coordination

The Desktop Review will consist of a comprehensive review of records that pertain to the project area or Area of Potential Effect (APE). Specifically, during the background study, The Engineer's archaeologists will consult the available resources from the Texas Historical Commission (THC) and the Texas Archaeological Research Laboratory (TARL) in Austin, Texas. Survey reports, site files, and maps will be examined to gather more

detailed information regarding the project area and its immediate vicinity. In addition, aerial photos, topographic maps, geologic maps, and soil survey maps will also be reviewed to provide information on land use, topography, soils, vegetation, geology, and levels of development within the project vicinity. The goal of the study is to determine the likelihood that the project will impact significant historic (historic and prehistoric sites) resources. Significant historic resources may consist of standing structures and/or prehistoric cultural deposits that have the potential to be listed on the National Register of Historic Places and to be formally designated as State Antiquities Landmarks.

The desktop study will result in the production of a letter report summarizing the resources consulted, the findings of the review, and recommendations regarding any additional field investigations that may be warranted prior to the inception of the development activities. The document will be submitted to the City for review. In anticipation for the potential need of a US Army Corps of Engineers (USACE) permit, the desktop will be prepared to meet appropriate standards. Once the City has reviewed the report, and all comments addressed, The Engineer will produce a final version of the desktop study to submit to the THC and USACE for consultation. The submittal can be done by the City or by The Engineer, depending on the City preference. If USACE involvement is determined over the course of the project, the USACE will handle coordination with the THC, if needed. The USACE will have final determination on the appropriate level of effort needed to comply with Section 106 of the NHPA (National Historic Preservation Act).

Task 2 Phase I Environmental Site Assessment

Review of Records and Resource Materials: The Engineer will review reasonably ascertainable pertinent records and resource materials (e.g. historical aerial photographs, city directories, Sanborn maps, closed/abandoned landfill inventories, USGS topographic maps, Railroad Commission of Texas data, or other resources providing clues as to potential hazardous material or petroleum product usage on site) that are practically reviewable within the cost and time constraints of the ESA-I. Federal, state, local, and facility records will be evaluated for environmentally significant information regarding the site and documented facilities or incidents within the approximate minimum search distance established by the environmental professional in accordance with the ASTM standard.

Review of Recorded Land Title Records: The Engineer will review records of fee ownership, leases, land contracts, easements, liens, and other encumbrances on or of the property as provided by City or owner, for the purpose of identifying past owners or operators on the site who may have been involved in activities known or reported to include the generation, handling, or disposal of hazardous waste.

The Engineer will perform a site reconnaissance to identify any *recognized environmental conditions* in connection with the properties. The environmental professional shall visually and physically observe the property, and any structure(s) located on the property not obstructed by bodies of water, adjacent buildings, or other obstacles for environmental hazards and conditions related to the property. The adjoining properties, structures, and

potential recognizable environmental hazards and conditions of the property shall be observed visually from all adjacent public thoroughfares, roads, or access points, as well as subject property. The extent of the site reconnaissance is subject to limiting conditions such as weather, impassable obstacles, or access restricted by owners or occupants.

In order to comply with the All Appropriate Inquiry (AAI) rules, it is mandatory for The Engineer to conduct interviews with current owner(s) and occupant(s) of the subject property. Should the City not wish The Engineer to contact current or past owners or occupants, the City shall notify The Engineer in writing.

Additional interviews will be conducted with parties such as current and past facility managers, past owners, operators or occupants of the property, and employees of the government, environmental regulatory personnel, fire department personnel, health department personnel, and occupants or owners of adjoining properties or operations as necessary and or practical to meet the objectives and performance factors of the AAI rule. Interviews include inquiries in person, by telephone, or by written correspondence. Information from interviews shall be documented including persons interviewed, date and time of the interview, and information provided. In the event an interview is not possible, this possible data gap will be discussed in the report.

The final report of the ESA-I will include:

- documentation of information sources;
- the facts and description of environmental conditions relevant to the site;
- the identity and qualifications of the environmental professional(s) involved in the performance of the ESA-I, including signed declarations;
- the opinion by the environmental professional of the impact of *recognized environmental conditions* in connection with the property; and
- recommendations for further action if deemed warranted.

Task 3 Natural Resources Evaluations

Rare, Threatened, and Endangered Species

The Engineer will research readily available environmental information from appropriate local, state, and federal agencies relative to the project area. This will include a review of desktop resources such as USGS topographic maps, aerial photography, Texas Parks and Wildlife Department (TPWD) Natural Diversity Database (TXNDD) Element of Occurrence Records (EOR), TPWD Rare Resources by County lists, U.S. Fish & Wildlife designated critical habitat, and other available data.

A field visit will be conducted in support of the assessment. The vegetation of the project area will be characterized as will the ecological setting in accordance with TPWD map publications, including The Vegetation Types of Texas. This data will aid in determining the potential presence of state and federally listed species and critical habitat in the proposed project area. The Engineer will report suitable and non-suitable habitat for the species potentially occurring within the project area.

This scope of work does not include the preparation of a Biological Assessment or formal consultation under Sections 7 and/or 10 of the Endangered Species Act.

Potential Waters of the U.S. Determination/Delineation

The Engineer will conduct field investigations and prepare a Waters of the U.S. (including wetlands) delineation report in accordance with current federal delineation methodology including the *1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual* and *2010 Regional Supplement for the Great Plains Region*. The Engineer will identify and delineate the boundaries of potential waters of the U.S., including special aquatic sites (e.g., wetlands), and collect representative wetland sample data points. If no wetlands features are readily observed in the field, Wetland Determination Data Forms will be completed to document negative findings. Any identified stream/wetland boundaries will be surveyed using a survey-grade Global Positioning Satellite (GPS) system.

The Engineer will prepare a delineation report complete with appropriate field data forms to provide documentation of these conditions. This report will need to accompany a Section 404 permit application, if one is required prior to site development. The report will include:

- Brief description of the project, methods/sampling procedures, and results as required by the USACE;
- Boundaries of waters of the U.S. identified in the field;
- Figure depicting the location of each wetland sample data point;
- Completed wetland data forms;
- Area (acres) of potential jurisdictional waters of U.S. shown on an exhibit;
- Pertinent published data (e.g., historical USGS topographic maps, historical aerial photography, Federal Emergency Management Agency maps, National Wetland Inventory Maps, and USDA soil surveys) to support the findings.

The WOUS Delineation report will be used as supporting documentation in the Department of the Army Permit Application.

The Engineer will prepare a memorandum indicating whether the project requires a Section 404 permit, the most appropriate permit(s) based on the proposed construction activities, potential mitigation, and next steps.

Task 4 NEPA Compliance – The scope assumes no federal transportation funds

It shall be the responsibility of the Engineer to obtain any additional information necessary for the full and proper execution of this work. The cost for all Engineers required shall be borne by the Engineer and included in the Fee.

The Engineer shall participate in conference call meetings, and meetings in person as determined as necessary by the City.

After all review and approval requirements for the Summary of Needs Study have been met, and incorporation of any changes requested by the City, the City shall authorize the Engineer in writing to commence Conceptual Design.

PHASE II - CONCEPTUAL DESIGN

Structural

The Engineer shall develop structural alternative concepts at the Guadalupe Tributary No. 28 crossing of Klein Rd, which may include a culvert, bridge structure, or other special structural span elements.

EXHIBIT C

WORK SCHEDULE

The Engineer will commence work upon receipt of signed authorization from City of New Braunfels. Our project schedule is as follows:

Phase	Start Date	End Date	Duration
PHASE I - SUMMARY OF NEEDS STUDY	5/30/2018	7/11/2018	6 weeks
PHASE II - CONCEPTUAL DESIGN	7/11/2018	8/1/2018	3 weeks
PHASE III - SCHEMATIC DESIGN	8/1/2018	9/12/2018	6 weeks

EXHIBIT D

Basis of Compensation

Pape-Dawson will perform the Base Services described in Exhibit B per the enclosed Attachment A – Base Services Fee Schedule.

At the City's request, Pape-Dawson will perform Additional Services described in Exhibit B1 per the enclosed Attachment B – Additional Services Fee Schedule to enhance study findings, cost estimate accuracy, and reduction of risks associated with the broad assumptions that will be made in lieu of the tasks enumerated therein. Should the City elect to authorize Pape-Dawson to perform some of the Additional Services listed, the major tasks are presented in order of greatest potential benefit to study results.

Klein Road Phase 2 - Base Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	$160.00	$160.00	$137.00	$120.00	$115.00	$115.00	$85.00	$85.00	$70.00	$150.00	$125.00	$100.00	$160.00	$195.00		
PHASE I - SUMMARY OF NEEDS STUDY																
Stakeholder and Team Coordination Meetings																
Project Kickoff Workshop	4		4	4												12
Project Team Coordination Meetings			4	4	4	4										16
Design Code Review	1		1	2		4										8
Drainage Analysis																
Collect existing hydrologic and hydraulic data																
Field visit (1)	4					4										8
Review existing data (as-builts, survey, models, etc.)	1					2										3
FEMA / FPA Data request	1					2										3
Develop Hydrology (flows) for drainage crossing																
Develop drainage area	1					12										13
Develop hydrologic model	1					12										13
Develop drainage area map (11x17)	1					6	6									13
Develop Hydraulics for existing and proposed crossing																
Develop hydraulic model	4					12										16
Develop two (2) preliminary alternatives	1					8										9
Develop two (2) exhibits, one of each alternative	1					6	6									13
Develop drainage cost estimate			4	4												8
Develop Drainage Summary of Needs Memo	4					12										16
Traffic Analysis																
Existing Conditions	2		4	8		20										34
Traffic Projections	1		2	4		10										17
Proposed Traffic Model	2		2	8		12										24
Develop Traffic Summary of Needs Memo	1		1	8		8										18
Report Development																
Contact Texas 811 and local utility providers for map data											1	5				6
Compile utility map data to create a utility base map										1	2	25				28
Add Ownership polygons and GCAD account numbers to right-of-way base map											1	5				6
Compose Ownership Database											1	8				9
Draft Report			4	12		8										24
QA/QC	4															4
Incorporate any changes requested by the City			1	4		4										9
SUB-TOTALS	34		27	58	4	146	12			1	5	43			$ -	330
TOTAL LABOR COSTS	$ 5,440.00	$ -	$ 3,699.00	$ 6,960.00	$ 460.00	$ 16,790.00	$ 1,020.00	$ -	$ -	$ 150.00	$ 625.00	$ 4,300.00	$ -	$ -		$ 39,444.00
% DISTRIBUTION OF STAFFING	10.3%		8.2%	17.6%	1.2%	44.2%	3.6%			0.3%	1.5%	13.0%				85%
SUBTOTAL - PHASE I - SUMMARY OF NEEDS STUDY																**$39,444.00**

Klein Road Phase 2 - Base Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	**$160.00**	**$160.00**	**$137.00**	**$120.00**	**$115.00**	**$115.00**	**$85.00**	**$85.00**	**$70.00**	**$150.00**	**$125.00**	**$100.00**	**$160.00**	**$195.00**		
PHASE II - CONCEPTUAL DESIGN																
Stakeholder and Team Coordination Meetings																
Attend Design Concept Conference	4		4			8										16
Project Team Coordination Meeting	2		2		2	2										8
Concept Development																
Develop alignment and proposed roadway layout, existing and proposed typical sections			1	2	8	12	12									35
Identification of all existing and proposed utilities (public and private), structures, burial grounds, neighborhood communities, historical landmarks, and undeveloped areas is required			1	4		4	4	8								21
Develop alternative alignments with associated exhibits, identify a preferred alternative alignment.			2	8	4	12	12	4								42
Conceptual Cost Estimates for the alternative Concept Design solutions, including ROW acquisition.			2	4		8										14
QA/QC	4															4
Incorporation of any changes ordered by the City prior to Schematic Design			2	4	8	12										26
SUB-TOTALS	10		14	22	22	58	28	12							$ -	166
TOTAL LABOR COSTS	$ 1,600.00	$ -	$ 1,918.00	$ 2,640.00	$ 2,530.00	$ 6,670.00	$ 2,380.00	$ 1,020.00	$ -	$ -	$ -	$ -	$ -	$ -		$ 18,758.00
% DISTRIBUTION OF STAFFING	6.0%		8.4%	13.3%	13.3%	34.9%	16.9%	7.2%								100%
SUBTOTAL - PHASE II - CONCEPTUAL DESIGN																**$18,758.00**

Klein Road Phase 2 - Base Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	**$160.00**	**$160.00**	**$137.00**	**$120.00**	**$115.00**	**$115.00**	**$85.00**	**$85.00**	**$70.00**	**$150.00**	**$125.00**	**$100.00**	**$160.00**	**$195.00**		
PHASE III - SCHEMATIC DESIGN																
Stakeholder and Team Coordination Meetings																
Attend Schematic Workshop	4		4	4												12
Attend Utility Coordination Meeting			4	4		8										16
Attend Public Meeting	4		4	4		8										20
Project Team Coordination Meeting			4	4	4	4										16
Schematic Development																
Develop Base Maps				4	4	8	4	4								24
Typical Sections				2		4	4									10
Environmental Constraints				1	2	2		4								9
Drainage				2		4										6
ROW Requirements	1		1	2		4										8
Construction Sequence	1		2	4		4										11
Design Exceptions	1		2	4												7
Traffic and Operational Analysis				2		4	4									10
Bicycle and Pedestrian Accommodations				2		4	4									10
Stakeholder Outreach			8													8
Prepare materials for and participate in a Community Meeting			4			8										12
Deliverable Schematic					4	8	12									24
Refine study models, perspective sketches, and/or digital models				2	4	4										10
Schematic Design Cost Estimate			2	4		8										14
Updated Code/Standard/Ordinance Review and Summary of Needs Report			1	4		8										13
QA/QC	4															4
Incorporate any changes requested by the City regarding the Schematic Design			1	2		8										11
SUB-TOTALS	15		37	51	18	98	28	8							$ -	255
TOTAL LABOR COSTS	$ 2,400.00	$ -	$ 5,069.00	$ 6,120.00	$ 2,070.00	$ 11,270.00	$ 2,380.00	$ 680.00	$ -	$ -	$ -	$ -	$ -	$ -		$ 29,989.00
% DISTRIBUTION OF STAFFING	5.9%		14.5%	20.0%	7.1%	38.4%	11.0%	3.1%								100%
SUBTOTAL - PHASE III - SCHEMATIC DESIGN																**$29,989.00**

Klein Road Phase 2 - Base Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	**$160.00**	**$160.00**	**$137.00**	**$120.00**	**$115.00**	**$115.00**	**$85.00**	**$85.00**	**$70.00**	**$150.00**	**$125.00**	**$100.00**	**$160.00**	**$195.00**		
PHASE IV - CONTRACT ADMINISTRATION																
Coordination, Schedule, and Meetings																
Develop and maintain a Design Schedule	2		8													10
Monthly Progress Reports	2		4						8							14
Coordination with Subconsultants	2		16													18
Prepare monthly invoices	2		4						8							14
Meeting Minutes for project meetings	2		4			10										16
SUB-TOTALS	10		36			10			16						$ -	72
TOTAL LABOR COSTS	$ 1,600.00	$ -	$ 4,932.00	$ -	$ -	$ 1,150.00	$ -	$ -	$ 1,120.00	$ -	$ -	$ -	$ -	$ -		$ 8,802.00
% DISTRIBUTION OF STAFFING	13.9%		50.0%			13.9%			22.2%							78%
SUBTOTAL - PHASE IV - CONTRACT ADMINISTRATION																**$8,802.00**

DESCRIPTION																**TOTAL COST**
PHASE I - SUMMARY OF NEEDS STUDY																$ 39,444.00
PHASE II - CONCEPTUAL DESIGN																$ 18,758.00
PHASE III - SCHEMATIC DESIGN																$ 29,989.00
PHASE IV - CONTRACT ADMINISTRATION																$ 8,802.00
SUBTOTAL LABOR EXPENSES																**$96,993.00**

OTHER DIRECT EXPENSES	**UNIT**	**RATE**	**QUANTITY**				**TOTAL COST**
Mileage	mile	0.54	200				$ 108.00
Standard Postage	letter	0.47	72				$ 33.84
Courier Services	each	33	54				$ 1,782.00
Photocopies B/W (11" X 17")	each	0.2	100				$ 20.00
Photocopies B/W (8 1/2" X 11")	each	0.1	1000				$ 100.00
Photocopies Color (11" X 17")	each	1.2	1000				$ 1,200.00
Photocopies Color (8 1/2" X 11")	each	0.65	1000				$ 650.00
Plots (Color on Photographic Paper)	per sq. ft.	4	1000				$ 4,000.00
TOTAL OTHER DIRECT EXPENSES							**$7,893.84**

SUMMARY

TOTAL LABOR COSTS	$96,993.00
NON-SALARY (OTHER DIRECT EXPENSES)	$7,893.84
GRAND TOTAL	**$104,886.84**

Klein Road Phase 2 - Additional Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	$160.00	$160.00	$137.00	$120.00	$115.00	$115.00	$85.00	$85.00	$70.00	$150.00	$125.00	$100.00	$160.00	$195.00		
PHASE I - SUMMARY OF NEEDS STUDY																
Site Survey																
Obtain ROE to obtain hydraulic XS within floodway of unnamed tributary to Guadalupe River (2 owners)											1	2				3
Obtain hydraulic XS within floodway of unnamed tributary to Guadalupe River (4500 linear feet)											2	12		30		44
Obtain threshold or finished floor elevations of houses adjacent to floodway of unnamed tributary to Guadalupe River												3	5			8
Research, draw (12 plats, 5 deeds) and create calculated points for minimial field recovery of existing right-of-way										2	5	45		20		72
Correlate deed, plat and map data to field recovered evidence to create a right-of-way base map										2	12	5				19
Environmental Analysis																
Task 1 Archaeological Desktop Study and USACE/THC Coordination															$ 3,866.00	
Task 2 Phase I Environmental Site Assessment															$ 4,131.00	
Task 3 Natural Resources Evaluations															$ 12,183.50	
Geotechnical Analysis																
Drilling															$ 4,859.00	
Field logging/coordination															$ 6,339.00	
Laboratory testing															$ 3,007.00	
Develop Geotechnical Summary of Needs report components															$ 4,190.00	
SUB-TOTALS										4	20	67	5	50	$ 38,575.50	146
TOTAL LABOR COSTS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 600.00	$ 2,500.00	$ 6,700.00	$ 800.00	$ 9,750.00		$ 20,350.00
% DISTRIBUTION OF STAFFING										2.7%	13.7%	45.9%	3.4%	34.2%		
SUBTOTAL - PHASE I - SUMMARY OF NEEDS STUDY																**$58,925.50**

Klein Road Phase 2 - Additional Services

	Sr Project Engineer	Structural Engineer	Project Manager	Project Engineer	Designer	EIT	Engineering Technician	GIS Technician	Clerical	RPLS Project Manager	RPLS Task Leader	Senior Survey Tech	2-Person Survey Crew	3-Person Survey Crew	Lump Sum Cost Items ($)	TOTAL LABOR HRS. & COSTS
CONTRACT RATE PER HOUR	**$160.00**	**$160.00**	**$137.00**	**$120.00**	**$115.00**	**$115.00**	**$85.00**	**$85.00**	**$70.00**	**$150.00**	**$125.00**	**$100.00**	**$160.00**	**$195.00**		
PHASE II - CONCEPTUAL DESIGN																
Structural Alternatives																
Klein Rd at Guadalupe Tributary No. 28 Crossing Structural Analysis		20	4													24
Concept Development																
Meetings with affected property owners (MAPOs), public meetings and public hearing			4	4												8
SUB-TOTALS		20	8	4											$ -	32
TOTAL LABOR COSTS	$ -	$ 3,200.00	$ 1,096.00	$ 480.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ 4,776.00
% DISTRIBUTION OF STAFFING		62.5%	25.0%	12.5%												100%
SUBTOTAL - PHASE II - CONCEPTUAL DESIGN																**$4,776.00**

DESCRIPTION																**TOTAL COST**
PHASE I - SUMMARY OF NEEDS STUDY																$ 58,925.50
PHASE II - CONCEPTUAL DESIGN																$ 4,776.00
SUBTOTAL LABOR EXPENSES																**$63,701.50**

OTHER DIRECT EXPENSES	**UNIT**	**RATE**	**QUANTITY**					**TOTAL COST**
Mileage	mile	0.54	300					$ 162.00
Map/Plat Records	sheet	2	15					$ 30.00
Deed Copies	sheet	2	10					$ 20.00
GPS RTK	hour	25	40					$ 1,000.00
TOTAL OTHER DIRECT EXPENSES								**$1,212.00**

SUMMARY

TOTAL LABOR COSTS	$63,701.50
NON-SALARY (OTHER DIRECT EXPENSES)	$1,212.00
GRAND TOTAL	**$64,913.50**