

Alfred Benesch & Company 8 Cadillac Drive, Suite 250 Brentwood, Tennessee 37027 www.benesch.com P 615-370-6079 F 615-627-4066

March 4, 2018

Mr. Paul Holzen, PE City of Franklin 109 Third Avenue South, Suite 142 Franklin, TN 37064

RE: Scope and Design Proposal Carothers Parkway Modification and SE Park Entrance Road Including a new bridge over the Harpeth River Franklin, TN

Dear Mr. Holzen:

In response to your request I have attached a design scope for completing the roadway and bridge design for the new SE Park Entrance Road in Franklin, TN. Included with this scope is a separate scope from Terracon for the completion of the geotechnical exploration required for the project. The proposed design fee assumes that a 600 feet long bridge will be constructed.

As part of this estimate we will coordinate with Barge Design Solutions for the completion of the hydraulic model for the park and this new entrance road. We will also coordinate the location of the entrance road to fit within their design for the remainder of the park project.

If you have any questions or need additional information, please let me know. Thanks for the opportunity to serve the City of Franklin.

Sincerely,

Sammie McCoy, PE Vice President TN Division Manager



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Southeast Park Entrance Road– City of Franklin

Proposed Scope of Work: Roadway and Structural Design Tasks

Park Entrance Road over the Harpeth River

The overall park plans are being developed by Barge Design services (Barge). As part of their work they will be providing the survey and hydraulic modeling for the entire site which includes the roadway entrance and new bridge. Benesch will work closely with Barge for the development of the plans.

Benesch will develop plans for the entrance road into the new SE Park off Carothers Parkway in Franklin. The new road will tie as a fourth leg to the Carothers and Lockwood Way intersection. Carothers and the current intersection are only partially constructed so the plans will include development of crossovers on each Carothers approach so that the full intersection can be constructed to accommodate the future widening of Carothers. This work will include the design of the full width intersection for Carothers. The intersection will be developed to accommodate all future lanes but in the interim Carothers through traffic will remain in a single lane in each direction vs. the future two lanes. The intersection will not be signalized at this time. Carothers will be free flowing, and the side roads will be under stopped condition.

On Carothers, Benesch will design the crossovers which are anticipated to be a total of approximately 1800 feet of widened roadway. This includes building the full length of intersection turn lanes, so the intersection will not require additional work in the future widening of Carothers. These cross overs will be designed to meet the original design speed of Carothers. The design will coordinate with the original design plans for Carothers and modify the drainage as necessary to accommodate the widening. If existing lighting along Carothers is impacted by the widening the poles will either be removed or temporarily relocated to a nearby location, so no redesign of lighting is anticipated. Our understanding is MTEMC developed the lighting design for the previous Carothers Parkway Project. Currently the median light poles contain only one light head but were designed and installed so a second head can be installed with minimal work. The addition of the second head will be incorporated into the plans within the limits of the work on Carothers.

The new park entrance designed by Benesch is estimated at 1150 feet long from the center of Carothers Parkway and will meet the internal roadway designed by Barge. This leg of the intersection will include one inbound lane and 2 outbound lanes (left turn and a thru-right turn). All tapers will occur on the east side of the river bridge to avoid extra widening on the bridge. Gates to control access to the park are required and these will either be accommodated on the east end of the bridge if adequate room is available for turnaround or shortly after crossing the bridge.

This portion of the roadway will be curb and gutter. Lanes will be 12' wide with 2' shoulders to provide additional width between parapets across the bridge. Along the south side of the roadway a 6' grass strip will provide separation for a 12' concrete multiuse path. Across the bridge a pedestrian parapet will be constructed within the 6' grass strip. Closed drainage will be designed for the curb and gutter sections of roadway and this will discharge near the bridge. Design of water quality units or other water quality items are not included for this portion of closed drainage system.

The entrance road and bridge will accommodate the following items to be designed by others: a Milcrofton waterline, a Franklin reclaimed water line, lighting conduits/foundations, Franklin fiber optic, ATMOS gas line

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and future multi-use paths under each bridge approach. For purposes of this estimate these lines are all assumed to be less than 12" diameters and can be versatile (i.e. internal bay is acceptable) in where they can be located.

Fill material will be required to construct the approaches to the bridge. Should the Benesch plans be bid separately our plans will coordinate with the Barge mass grading plan to provide access to adequate borrow material within the park boundary.

The roadway plans will be developed as a standard Preliminary 30% set of plans that can be used by Barge for coordination with FEMA. Following FEMA approval development of a 60% Utility set will occur. Right of Way is not anticipated as all the property is owned by the City of Franklin, but this 60% set can be used for coordination with utility companies. The 100% construction documents will be produced for bidding. Probable construction costs will be estimated at the 60% and 100% stages of plans production. The plans will be developed for the project based upon the approved alignment. The roadway design parameters for the project will based upon current versions of the following design guides; "A Policy on Geometric Design of Highways and Streets", American Association of State Highway and Transportation Officials; "TDOT Standards Specifications for Road and Bridge Construction"; City of Franklin Street Standards. These technical guidelines and specifications shall be followed unless superseded by the standard for the City of Franklin.

The scope includes plans to attend a Public Meeting should this be deemed necessary to inform the public about the project. Benesch will assist city staff through-out the bidding phase of the project. This will include supplying all required documents in Portable Document Format (PDF) suitable for printing. Benesch will assist the city in producing the bid book. Benesch can organize and lead the pre-bid meeting and assist the city as necessary with opening and evaluating the bids once received.

The roadway design scope includes production of erosion control plans and a SWPPP for this portion of roadway and bridge construction. This will be used to apply for initial NPDES Permit coverage which can be amended by Barge for the larger site project. ARAP and USACE permits will be applied for by Benesch to cover the bridge construction over the Harpeth River.

Proposed New Bridge

The proposed structure has yet to be determined. It will be assumed for this scope that a 600-foot-long, three to five span, prestressed concrete beam bridge will be constructed. This crossing of the Harpeth River lies within a FEMA designated Zone AE floodplain. A hydraulic study will be required for this project to demonstrate that the proposed design will not increase the water surface elevation (No Rise). It is our understanding that another consultant will perform the hydrologic analysis and develop hydraulic models for existing and proposed conditions. Benesch will coordinate preliminary structural design with the other consultant performing the hydraulic analysis. Once a bridge configuration is confirmed by the hydraulic engineer and the City of Franklin, Benesch will develop final design and construction plans for the structure.

Structural Design Scope of Work

1. General Bridge Design: Assumed 600', maximum five span, prestressed concrete girder bridge, concrete deck, concrete substructures with H-Pile foundations or spread footings on sound bedrock.

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- 2. Preliminary bridge design
 - a. Coordination with hydraulic design to size the structure opening for the Harpeth River.
 - b. Coordination with roadway design to set centerline, profile, bridge width, approach limits, and phasing requirements. As noted in the section above the proposed width for the bridge will be 52.5' wide to accommodate 2-12' lanes, 2' shoulders, C&G on both sides, on the south side a 6' grass strip and 12' multi use path. A pedestrian safety rail will be constructed within the 6' grass strip.
 - c. Development of utility conveyance needs and incorporation into proposed bridge design.
 - d. Coordination with environmental requirements regarding stream impact and substructure locations.
 - e. Develop a preliminary structural design for:
 - i. Substructures: Abutments, piers, and foundation types
 - ii. Superstructure: Prestressed concrete girder size and configuration, expansion joint location if required, location of deck drains
 - f. Coordination with utility requirements to avoid conflicts and incorporate conveyance with the structure.
 - g. Coordination with Geotechnical Engineer for foundation recommendations
 - h. Development of preliminary plans including:
 - i. Preliminary Layout of Bridge
 - ii. Preliminary Bridge Cross Section
 - iii. Preliminary Bridge Phasing
 - iv. Accommodations for the utilities noted above
 - v. Accommodations for lighting conduits and foundations for the lighting design by Barge
- 3. Final bridge design
 - a. Develop final design for all structural elements as required
 - b. Develop final plans for the structure in accordance with TDOT standards
 - c. Incorporation of utility conveyance loads in design
 - d. Tabulation of required quantities and assistance with cost estimates
 - e. Submit all CAD files as required

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Bridge Geotechnical

1. See the attached scope and fee from Terracon to provide the necessary geotechnical exploration and report for construction of the bridge over the Harpeth River.

Items not included in the Benesch Scope

- 1. Survey to be provided by Barge
- 2. Hydraulic engineering and FEMA coordination to be completed by Barge
- 3. Stormwater quality design
- 4. Signal design or traffic studies
- 5. Landscape or irrigation design
- 6. Roadway and under bridge lighting will be designed by Barge for the park entrance road
- 7. Utility Coordination or design
- 8. Environmental boundary determinations will be provided by Barge for the entire site.
- 9. Mitigation design for impacted environmental features.
- 10. Permit fees will be paid for by the City as a reimbursable item(s) under this contract.
- 11. Construction phase services or full TDOT level Construction Engineering and Inspection (CEI)
- 12. Printing of review or bid plans

Compensation:

The following is the compensation to be paid to Benesch for the scope items noted above:

Fee Summary			
Item	Fee Type		Amount
Roadway Design	Lum Sum	\$	124,548.00
Bridge Design	Lum Sum	\$	202,908.00
SWPPP and Permitting	Lum Sum	\$	7,800.00
Bid Administration	Lum Sum	\$	3,900.00
Geotechnical (By Terracon)	Lum Sum	\$	19,500.00
	Total Lump Sum	\$	358,656.00

March 1, 2019



Alfred Benesch & Company 8 Cadillac Drive, Suite 250 Brentwood, TN 37027

- Attn: Jake Williams Project Manager II
 - P: (615) 370-3079
 - E: jwilliams@benesch.com
- Re: Proposal for Geotechnical Engineering Services Revised SE Municipal N Access Approach and Bridge Carothers Parkway Franklin, Williamson County, TN Terracon Proposal No. P18185215 R1

Dear Mr. Williams:

We appreciate the opportunity to submit this proposal to Alfred Benesch & Company (Benesch) to provide Geotechnical Engineering services for the above referenced project. The following are exhibits to the attached Agreement for Services. Our proposal was revised to provide alternate scope and pricing for additional spans.

Exhibit A	Project Understanding
Exhibit B	Scope of Services
Exhibit C	Compensation and Project Schedule
Exhibit D	Site Location and Nearby Geotechnical Data
Exhibit E	Anticipated Exploration Plan

Our base fee to perform the scope of services described in this proposal is \$11,500. See Exhibit C for more details of our fees and consideration of additional services.

Your authorization for Terracon to proceed in accordance with this proposal can be issued by signing and returning a copy of the attached Agreement for Services to our office.

Sincerely, Terracon Consultants, Inc.

John E. Agee, P.E. Regional Manager

Environmental

David A. Been, P.E. Geotechnical Department Manager

Geotechnical

Materials

Terracon Consultants, Inc. 5217 Linbar Drive, Suite 309 Nashville, TN 37211 P (615) 333 6444 F (615) 333 6443 terracon.com

Facilities

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EXHIBIT A - PROJECT UNDERSTANDING

Our scope of services is based on our understanding of the project as described by Benesch and the expected subsurface conditions as described below. We have not visited the project site specifically to confirm the information provided. Aspects of the project, undefined or assumed, are highlighted as shown below. We request the design team verify this information prior to our initiation of field exploration activities.

Site Location and Anticipated Conditions

ltem	Description	
Parcel Information	The project is located at Carothers Parkway in Franklin, Williamson County, TN. 35.8887404, -86.8228464	
Existing Improvements	Agricultural uses	
Current Ground Cover	Earth and grass covered areas, wooded areas,	
Existing Topography (from Williamson County GIS)	Surface elevations vary from about 640 feet to 635 feet, MSL, and generally slopes down from west to east and east to west towards the Harpeth River.	
Site AccessWe expect the site, and all exploration locations, are accessible with ATV-mounted drilling equipment. Dozer clearing is anticipated and to move trees from desired exploration locations.		
Expected Subsurface Conditions	Our experience near the vicinity of the proposed development indicates subsurface conditions consist of 15 to 20 feet of lean to fat clay overlying limestone bedrock.	

Planned Construction

ltem	Description
Information Provided	Bridge layout drawing and requested borings locations were provided by Benesch via email from Mr. Jake Williams to Terracon's John Agee on November 15, 2018. An alternate 600-foot, 6-span request was made via email March 1, 2019.
Project Description	The project is the construction of a bridge across the Harpeth River to connect the planned recreational complex to Carothers Parkway.
Proposed Structure	The project includes a 300-foot long, three span bridge, with an alternate for a 600-foot long, six span bridge. The new spans would progress south into the park from the original layout.
Building Construction	Concrete bridge with steel pile supported abutments and bents supported on cast foundations or drilled shafts.



ltem	Description	
Finished Floor Elevation	Unknown	
Maximum Loads	 Bents: 1,500 kips Abutments: 500 kips 	
Grading/Slopes	We anticipated up to <mark>3</mark> feet of cut and <mark>3</mark> feet of fill will be required to develop final grades. Final slope angles of as steep as <mark>4H:1V</mark> (Horizontal: Vertical) are expected.	
Below Grade Structures	None anticipated	
Free-Standing Retaining Walls	Abutment walls are expected to be constructed as part of site development to achieve final grades.	
Pavements	Paved driveway will be constructed on the approach to the bridge from Carothers Parkway.	
	We assume both rigid (concrete) and flexible (asphalt) pavement sections should be considered. Please confirm this assumption.	
	Anticipated traffic is as follows:	
	 Autos/light trucks: 1,000 vehicles per day Light delivery and trash collection vehicles: 10 vehicles per week Tractor-trailer trucks: <1 vehicle per week 	
Estimated Start of Construction	Q3 2019	

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EXHIBIT B - SCOPE OF SERVICES

Our proposed scope of services consists of field exploration, laboratory testing, and engineering/project delivery. These services are described in the following sections.

Field Exploration

The field exploration program consists of the following:

Number of Borings	Planned Boring Depth (feet) ¹	Planned Location
8	Auger refusal	Planned bridge supports
1	10 or refusal	Approach drive
1. Below ground surface		

The alternate field exploration program for the 600-foot, 6-span bridge consists of the following:

Number of Borings Planned Boring Depth (feet) ¹		Planned Location	
14	Auger refusal	Planned bridge supports	
1	10 or refusal	Approach drive	
1. Below ground surface			

Boring Layout and Elevations: For improved accuracy, we request Benesch have the corners of the planned bridge staked in the field for our use in locating our borings. Field measurements from existing site features may be utilized. If available, approximate elevations are obtained by interpolation from a site specific, surveyed topographic map.

Subsurface Exploration Procedures: We advance soil borings with an ATV-mounted drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Four samples are obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Soil sampling is typically performed using thin-wall tube and/or split-barrel sampling procedures. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split barrel sampling procedure, a standard 2-inch outer diameter split barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. The samples are placed in appropriate containers, taken to our soil laboratory for testing, and classified by a geotechnical engineer. In addition, we observe and record groundwater levels during drilling and sampling.

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Our exploration team prepares field boring logs as part of standard drilling operations including sampling depths, penetration distances, and other relevant sampling information. Field logs include visual classifications of materials encountered during drilling, and our interpretation of subsurface conditions between samples. Final boring logs, prepared from field logs, represent the geotechnical engineer's interpretation, and include modifications based on observations and laboratory tests.

Property Disturbance: Based on aerial images, we anticipate clearing is required on both sides of the river in order to access the requested boring locations. Felled trees will be windrowed and we anticipate not felling anything into the river.

We backfill borings with auger cuttings after completion. Our services do not include repair of the site beyond backfilling our boreholes. Excess auger cuttings are dispersed in the general vicinity of the borehole. Because backfill material often settles below the surface after a period, we recommend boreholes are checked periodically and backfilled, if necessary. We can provide this service, or grout the boreholes for additional fees, at your request.

Laboratory Testing

The project engineer reviews field data and assigns various laboratory tests to better understand the engineering properties of various soil strata. Exact types and number of tests cannot be defined until completion of field work. Procedural standards noted below are for reference to methodology in general. In some cases, local practices and professional judgement require method variations. Standards noted below include reference to other related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D7012 Standard Test Method for Compressive Strength of Intact Rock Core Specimens

Our laboratory testing program often includes examination of soil samples by an engineer. Based on the material's texture and plasticity, we describe and classify soil samples in accordance with the Unified Soil Classification System (USCS).

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Safety

Terracon is currently not aware of environmental concerns at this project site that would create health or safety hazards associated with our exploration program; thus, our scope considers standard OSHA Level D Personal Protection Equipment (PPE) appropriate. Our scope of services does not include environmental site assessment services, but identification of unusual or unnatural materials encountered while drilling will be noted on our logs and discussed in our report.

Exploration efforts require borings (and possibly excavations) into the subsurface, therefore Terracon complies with local regulations to request a utility location service through Tennessee 811. We consult with the owner/client regarding potential utilities, or other unmarked underground hazards. Based upon the results of this consultation, we consider the need for alternative subsurface exploration methods, as the safety of our field crew is a priority.

Private utilities should be marked by the owner/client prior to commencement of field exploration. Terracon will not be responsible for damage to private utilities that are not made aware to us. If the owner/client is not able to accurately locate private utilities, Terracon can assist the owner/client by coordinating or subcontracting with a private utility locating services. Fees associated with the additional services are not included in our current scope of services and will be forwarded to our client for approval prior to initiating. The detection of underground utilities is dependent upon the composition and construction of the utility line; some utilities are comprised of non-electrically conductive materials and may not be readily detected. The use of a private utility locate service would not relieve the owner of their responsibilities in identifying private underground utilities.

Site Access: Terracon must be granted access to the site by the property owner. By acceptance of this proposal, without information to the contrary, we consider this as authorization to access the property for conducting field exploration in accordance with the scope of services.

Engineering and Project Delivery

Results of our field and laboratory programs are evaluated by a professional engineer. The engineer develops a geotechnical site characterization, performs the engineering calculations necessary to evaluate foundation alternatives, and develops appropriate geotechnical engineering design criteria for earth-related phases of the project.

Your project is delivered using our *GeoReport* system. Upon initiation, we provide you and your design team the necessary link and password to access the website (if not previously registered). Each project includes a calendar to track the schedule, an interactive site map, a listing of team members, access to the project documents as they are uploaded to the site, and a collaboration portal. A typical delivery process includes three basic stages:

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- Stage 1: **Project Planning**
- Stage 2: Site Characterization
- Stage 3: Geotechnical Engineering

When utilized, a collaboration portal documents communication, eliminating the need for long email threads. This collaborative effort allows prompt evaluation and discussion of options related to the design and associated benefits and risks of each option. With the ability to inform all parties as the work progresses, decisions and consensus can be reached faster. In some cases, only minimal uploads and collaboration will be required, because options for design and construction are limited or unnecessary. This is typically the case for uncomplicated projects with no anomalies found at the site.

When services are complete, we upload a printable version of our completed final geotechnical engineering report, including the professional engineer's seal and signature, which documents our services. Previous submittals, collaboration, and final report are maintained in our system indefinitely. This allows future reference and integration into subsequent aspects of our services, as the project goes through final design and construction.

The final geotechnical engineering report provides the following:

- Boring logs with field and laboratory data
- Stratification based on visual soil (and rock) classification
- Groundwater levels observed during and after completion drilling
- Site and Boring location plans
- Subsurface exploration procedures
- Description of subsurface conditions
- Recommended foundation options and engineering design parameters, including L-Pile material parameters
- Estimated settlement of foundations
- Seismic site classification
- Subgrade preparation/earthwork recommendations
- Recommended pavement options and design parameters

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Additional Services

In addition to basic services noted above, the following services are often associated with geotechnical engineering services. Fees for basic services noted above do not include the following:

Review of Plans and Specifications: Our geotechnical report and associated verbal and written communications will be used by others in the design team to develop plans and specifications for construction. Review of the project plans and specifications is a vital part of our geotechnical engineering services. This consists of review of project plans and specifications related to site preparation, foundation, and pavement construction. Our review includes a written statement, which conveys our opinions, related to the plans and specifications' consistency with our geotechnical engineering recommendations.

Observation and Testing of Pertinent Construction Materials: Development of our geotechnical engineering recommendations and report relies on an interpretation of soil conditions. This is based on widely spaced exploration locations, and assuming construction methods will be performed in a manner sufficient to meet our expectations and is consistent with recommendations made at the time the geotechnical engineering report is issued. We should be retained to conduct construction observations, and perform/document associated materials testing, for site preparation, foundation, and pavement construction. This allows a more comprehensive understanding of subsurface conditions and necessary documentation of construction, to confirm and/or modify (when necessary) the assumptions and recommendations made by our engineers.

Perform Environmental Assessments: Our scope for this project does not include, either specifically or by implication, an environmental assessment of the site intended to identify or quantify potential site contaminants. If the client/owner is concerned about potential for such conditions and/or contamination, an environmental site assessment should be conducted. We can provide a proposal for an environmental assessment, if desired.

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EXHIBIT C - COMPENSATION AND PROJECT SCHEDULE

Compensation

Based upon our understanding of the site, the project as summarized in Exhibit A, and our planned scope of services outlined in Exhibit B, our base fee is shown in the following table:

Task	Lump Sum Fee
Clearing, Subsurface Exploration, Laboratory Testing, Geotechnical Consulting & Reporting	\$11,500

Additional services not part of the base fee include the following:

Additional Services (see Exhibit B)	Lump Sum Fee	Initial for Authorization
Private Utility Locate Service ¹	\$1,000	
Additional scope for Alternate 6-Span Bridge	\$6,500	
Plans and Specifications Review	\$500	
Construction Materials Testing Services	TBD	

1. If the owner/client is unable to accurately locate private utilities, we can subcontract a private utility locating firm and/or utilize geophysical equipment, if necessary. The detection of underground utilities is dependent upon the composition and construction of utility lines. Some utilities are comprised of non-electrically conductive materials and may not be readily detected. The use of a private locate service does not relieve the owner of their responsibilities in identifying private underground utilities.

Our scope of services does not include services associated with site clearing, wet ground conditions, tree or shrub clearing, or repair of/damage to existing landscape or crops. If such services are desired by the owner/client, we should be notified so we can adjust our scope of services. If borings are performed when crops are planted, a crop damage agreement should be established between the Client and crop owner prior to subsurface exploration.

Unless instructed otherwise, we will submit our invoice(s) to the address shown at the beginning of this proposal. If conditions are encountered that require scope of services revisions and/or result in higher fees, we will contact you for approval, prior to initiating services. A supplemental proposal stating the modified scope of services as well as its effect on our fee will be prepared. We will not proceed without your authorization, as evidenced by your signature on the Supplemental Agreement for Services form.

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Project Schedule

We developed a schedule to complete the scope of services based upon our existing availability and understanding of your project schedule. However, this does not account for delays in field exploration beyond our control, such as weather conditions, permit delays, or lack of permission to access the boring locations. In the event the schedule provided is inconsistent with your needs, please contact us so we may consider alternatives.

GeoReport Stage	Posting Date from Notice to Proceed ^{1, 2}
Project Planning	3 days
Site Characterization	15 days ³
Geotechnical Engineering	25 days ³

Upon receipt of your notice to proceed we will activate the schedule component of our GeoReport website 1. with specific, anticipated calendar dates for the three delivery points noted above as well as other pertinent events such as field exploration crews on-site, etc.

- 2. We will maintain a current calendar of activities within our GeoReport website. In the event of a need to modify the schedule, the schedule will be updated to maintain a current awareness of our plans for delivery.
- 3. Add 5 days for the Alternate 6-Span Bridge

EXHIBIT D - SITE LOCATION and NEARBY GEOTECHNICAL DATA

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DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

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EXHIBIT E - ANTICIPATED EXPLORATION PLAN

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