SCOPE OF SERVICES

The CONSULTANT shall provide the professional, technical, and other personnel resources, equipment, materials and all other things necessary for project management, FRA grant administration, survey, environmental documentation, public meetings, geotechnical services, utility coordination, railroad coordination and preparation ofthe construction plans, specifications and cost estimate (PS&E) for the:

1) Construction of a bridge over the BNSF Railway, interchange at Route A and outer roads near Fordland and Diggins in Webster County along Route 60.
2) Preliminary and Environmental review for a railroad overpass and interchange at Route Z near Fordland in Webster County along Route 60.

The CONSULTANT shall perform the following services, all in accordance with the standard practice of the COMMISSION as outlined in the MoDOT Engineering Policy Guide and using AASHTO LFD and/or LRFD Design methods, as applicable for the structural services provided under this contract.

This scope of services is intended to be an accurate description of the items and tasks required for completion of the design of this project. However, each project is unique and may require more or less effort in an individual task to complete the design. The following information will explain and define in general terms the major design items of importance relating to this project. All the elements of work that are necessary to satisfactorily complete the design of this project may or may not be listed. The lack of a specific listing of an element or item in the scope of services does not in itself constitute the basis for additional services, supplemental agreements, and/or adjustment in compensation.

A more detailed description of the process and requirements used by MoDOT for completion of the design may be found in the MoDOT Engineering Policy Guide (EPG). The consultant is encouraged to review the appropriate sections of the manual as a means to supplement the information contained in the scope of services and provide additional guidance in the requirements and expectations of MoDOT for completion of the design services.

Services rendered by the CONSULTANT, which are considered as additional services, will be addressed per paragraph (3), Additional Services of the Project Design Consultant Agreement. The provisions of the Design Consultant Agreement outlining the responsibilities of the CONSULTANT regarding the quality and accuracy of the deliverables and products shall apply to any decisions regarding determinations of additional services.

Preparation of a supplemental agreement is necessary prior to performance of any work, which is considered as additional services, not included in the original scope of services. The consultant will not be compensated for additional services performed prior to execution of a supplemental agreement. Only additional services, which are required due to changed or unforeseen conditions or are due to a change in the specified end product, will be considered for inclusion in a supplemental agreement.

The CONSULTANT will provide the professional, technical, and other personnel

resources, equipment, materials and all other things necessary to prepare the preliminary plans, contract plans and bridge plans including all geotechnical services and additional surveying. The survey data shall be provided by the COMISSION. All elevations and vertical control shall be based on NAVD 88.

The CONSULTANT shall prepare all plans through use of a Computer Aided Drafting (CAD) program. The CONSULTANT shall conform to the Missouri Department of Transportation Specifications for Computer Deliverable Contract Plans as referenced in the MoDOT EPG. The CONSULTANT shall provide a 3D model of the project exported from Geopak software for the COMMISSION's use.

The CONSULTANT will be required to produce and update the cost estimate for this project at the completion of each major milestone or at a minimum of every six months. The major milestones for this project are defined as the location/conceptual, preliminary design, right of way design, and final design. The CONSULTANT shall prepare an estimate using BidTabs.Net format, utilizing district, county and statewide median and weighted averages for item costs or other current pay items on similar projects experienced by the COMMISSION. If needed, square foot right of way cost estimates and utility relocation cost can be provided by MoDOT. Estimated areas and locations of acquisition shall be included, to estimate the number of parcels affected for temporary construction easements, permanent easement, and Right of Way acquisition.

The CONSULTANT shall review "as built" plans, aerial photographs, manuscripts, etc. and other information to be provided by the COMMISSION and make the necessary field investigations to to note any significant changes since the information was recorded or obtained. CONSULTANT does not warrant or guarantee that all significant changes will be found during this review.

The CONSULTANT shall prepare a comprehensive design criteria memorandum for this entire project, and submit it to the COMMISSION for review and approval prior to starting the preliminary design phase. Any deviations from COMMISSION established procedures for design, construction or materials shall be approved through the MoDOT project manager and documented by the CONSULTANT. This documentation shall include a brief justification for the deviation and the signature of the CONSULTANT project manager. Any issues that meet a design exception as described in the EPG shall be documented in accordance to the EPG design exception process.

PROJECT MANAGEMENT

Project management will be provided by the CONSULTANT. Project management includes providing sufficient qualified staff to meet the requirements of the contract as well as coordination between the SUBCONSULTANTS and the CONSULTANT. The CONSULTANT shall be prepared and equipped to provide all meetings referenced in a virtual environment or at an agreed upon location.

1. Monthly invoices will be prepared and submitted including progress reports, workforce diversity tracking and reporting.

2. As necessary to complete each phase of the project (Conceptual, Preliminary, Right of Way, and Final), establish and lead core team review meetings

with project stakeholders. The purpose of each meeting is to provide stakeholders and MoDOT Divisions an opportunity to provide input on the design of the project. The project's core team communication will be coordinated by the CONSULTANT to establish the necessary stakeholder engagement.

3. Establish and lead bi-monthly progress meetings with project's leadership team. The project's leadership team shall consist of MoDOT's Railroad Administrator, the District's Project Manager, and the Webster County Clerk. The purpose of the progress meetings is to review the project schedule, performance of the CONSULTANT and other parts of the work necessary to keep the project on schedule and within budget.

4. Provide all meeting materials to participants at least three business days prior to the meeting for review.

5. Provide meeting minutes of all meeting, including action items, within three business days of the meeting for review.

6. Provide grant administration following the FRA required format. This will include the preparation of the Detailed Work Plan, Project Management Plan, Project Schedule and Estimate, quarterly reports and other required FRA document

7. CONSULTANT shall assign a Quality Assurance Manager to develop a Quality Plan and maintain compliance with the plan and job-specific quality control procedures. This shall include monitoring the project budget, schedule, and scope.

8. CONSULTANT shall fill out and submit a Request for Environmental Services (RES) at all four stages of design (location/conceptual, preliminary plans, right of way, final design). The final design submittal shall be submitted 90 days prior to the PS&E deadline.

PUBLIC INVOLVEMENT

The COMMISSION will be the main point of contact for receiving calls from the public. The CONSULTANT shall interact with external agencies and the public as required to accomplish the scope of services of this contract.

1. The CONSULTANT shall be required to attend meetings with regulatory agencies, organizations, county officials, local municipalities, property owners and other entities as required. Due to the length of this corridor, it is anticipated that four meetings with the local municipality will be held.

2. The CONSULTANT shall be required to attend public meetings. However, a project objective is to minimize right-of-way impacts to ensure that no public meetings will be necessary for this contract. If a public meeting is required, the meeting may be held as virtual pending status of the COVID-19 pandemic. With the length of this corridor and the number of properties potentially impacted or with new required easements, it is

anticipated that two design public meetings will be held.

3. The CONSULTANT shall be required to brief MoDOT personnel before meetings and public meetings.

4. The CONSULTANT shall provide exhibits for public meetings based on conceptual/preliminary drawings as requested by the COMMISSION.

5. The CONSULTANT shall provide the COMMISSION a database containing all property owners contiguous to the project, or within a reasonable distance of the project. The database shall be of similar format and contain the same information as the example database provided by the COMMISSION to the Consultant. The database shall also designate whether the individual is someone the Commission will need to obtain right of way and/or easements from.

6. The COMMISSION will advertise for meetings, obtain the meeting location and room, produce copies of handouts and perform mass mailings of notices of meetings or hearings, and newsletters.

7. The COMMISSION will record and prepare the meeting minutes of the public meeting and shall prepare the transcript, if applicable.

CONCEPTUAL DESIGN PHASE

The CONSULTANT'S attention is directed to Chapter 128 of the MoDOT Engineering Policy Guide (EPG) for general guidelines and requirements for completing a Conceptual Study Report. The Conceptual Study Report shall summarize the concept determinations made during the scoping stage, and shall exhibit proposed improvements in the report using plan views superimposed over an aerial image, such as Google Earth.

PRELIMINARY DESIGN PHASE

The Preliminary Design Phase of this agreement shall include completing a Conceptual Report and preliminary designs for both the roadway portion and the bridge portion of the project. The CONSULTANT shall perform all of the bridge and roadway services in accordance with the standard practice of the COMMISSION.

Preliminary Design – Roadway

The CONSULTANT'S attention is directed to Chapter 100s and 200s of the EPG for general guidelines and requirements for preliminary design. Other chapters may be applicable for preliminary design preparation.

1. Upon approval of the Conceptual Report and design criteria memorandum by COMMISSION, the CONSULTANT shall undertake the following to develop the

preliminary design phase:

a) Prepare preliminary plans, as outlined in the MoDOT EPG

1) The COMMISSION shall furnish the CONSULTANT traffic information for the construction and design years to be used in the preliminary plans.

2) The COMMISSION shall furnish the CONSULTANT the latest accident data and traffic information used to calculate the project accident rate. The COMMISSION shall furnish the CONSULTANT the "statewide accident rate for a similar class of roadway" and any high hazard locations within the project limits.

3) The CONSULTANT shall submit the preliminary plans to the COMMISSION for review and approval as shown in Exhibit IV.

b) The preliminary plans shall be prepared in accordance with the applicable sections of the MoDOT EPG, as to what shall be shown thereon, including proposed design features.

1) The plan view English scale shall be 1"= 50' horizontal (or different scale as determined by MoDOT Project Manager for clarity) and extend at least 500 feet beyond the project limits.

2) The profile view English scale shall be 1"=50' horizontal, and 1"=10' vertical.

c) The CONSULTANT may have to review preliminary cross sections sufficiently to make a cost comparison between using retaining walls versus acquiring additional right of way for all proposed wall locations.

d) The CONSULTANT shall prepare the construction estimate. The COMMISSION shall prepare the right of way estimate based on the right of way requirements furnished by the CONSULTANT.

e) The preliminary plans shall be submitted to the COMMISSION for review and approval.

f) The preliminary plans shall include the tentative additional easement and right of way limits, property lines and ownerships, section lines, township and ranges, any U.S. Surveys, city limits, and a general outline of the construction staging, critical design items, and other items as outlined in the EPG.

g) Traffic assignments shall be shown on the respective roadways or on a line sketch of the roadways.

h) Typical sections shall indicate heavy, medium or light duty pavement for new roadways, along with descriptions of the existing roadway types remaining in place.

2. A Preliminary Field Check will be arranged with the COMMISSION to discuss design features in the project area.

3. The preliminary plans shall be submitted to the COMMISSION for review and approval.

4. The CONSULTANT shall provide coordination for proper environmental and cultural clearance. Items that may need to be addressed include historical buildings, archaeological sites, historic bridges, conversion of farmland, endangered species, wetlands and stream fill quantities, parklands and historical sites. The CONSULTANT shall prepare displays and quantities that are necessary for these clearances and permits.

5. The CONSULTANT shall submit the completed Preliminary Plan checklist. The COMMISSION shall provide the checklist to the Consultant upon request.

Field Surveys

All surveying activities shall be in compliance with MoDOT EPG Section 238. Consultant shall provide additional topographical as necessary and right-of-way survey of the project area. Consultant shall provide traffic control in accordance with MoDOT EPG Section 238.3.39 and coordinate with MoDOT as necessary to gain approval.

General Topographical Survey Tasks

1. Perform topographical survey in compliance with the MoDOT EPG section 238.
2. Recover horizontal and vertical control for the project.
3. Perform additional topographic survey of the project area as necessary. Consultant will locate all improvements and utilities (visible from existing paint marks, flagging or existing utility maps) from Missouri One Call. Sewer structure information (top, flow-line and pipe sizes) of all sewers and cross road culverts within the project limits and the next upstream and downstream sewer structures shall be surveyed.
4. Consultant shall note location of existing signing and provide digital images of each sign.
5. Consultant shall stake the proposed location of the bores and survey actual location of geotechnical borings.
6. All topographic surveys shall be prepared in Micro Station V8 format at a scale of 1”=50’. The topographic survey drawing shall be prepared in a 2D drawing file. Consultant shall prepare a 3D TIN model and include a separate drawing with 3D points, break lines and triangles which was used to prepare the TIN . The topographic drawing shall include all topographic features and utilities. All drawings shall be prepared using MoDOT Standards.

General Right-of-Way Survey Tasks

1. Locate existing property pins/monumentation adjacent to both sides of existing right of way. Acquire and review existing as-built information and existing deed and plat information to define likely point locations; search for, locate and survey same;
2. Review and research records of adjacent land survey monumentation. Locate, survey and tie land survey monuments to horizontal control points. Use of certified land corners is preferred;
3. Locate and survey existing permanent easements (i.e., drainage, utility, etc.) within or adjacent to right of way and all side road right of way for the limits as defined above. Obtain informational title commitments as necessary. Consultant shall be responsible for staking of two (2) potential easement/ROW takes in the field.
4. Locate, verify, and survey existing section corners, quarter section lines, and quarter- quarter section lines that cross existing right of way limits within the project. Tie all public survey corners within the project limits to the highway survey alignment.

Survey Deliverables

All survey drawing deliverables shall be in Microstation V8i format, using MoDOT standards for a Scale of 1” = 50’;

Final Deliverables

1. One electronic drawing file (2D) depicting 3-point ties established during survey activities, for inclusion in plans;

2. One electronic drawing file (2D) depicting topographic survey information;

3. Two electronic drawing files (3D) containing points, break lines and triangles compatible DTM (one for the traditional survey and one for the Aerial photogrammetry area);

4. Two electronic TIN files created from items 2 and 3 above (one for the traditional survey and one for the Aerial photogrammetry area);

5. One electronic drawing file (2D) depicting existing R/W lines, property lines, ownership, and land survey boundaries and monuments;

6. Electronic PDF copy of field books.

7. Bridge Survey Report

Preliminary Bridge Design

Perform the geometric analysis at the proposed bridge site necessary to develop type, size and location drawings consisting of a general plan and elevation of the structure, typical roadway sections and roadway profiles.

(A) The bridge length shall be based on roadway alignments, roadway typical sections, geometric and hydraulic analysis, spill slope requirements, roadway grades and clear zone requirements.

(B) The superstructure type shall be dependent upon site constraints and a detailed cost analysis comparison.

(C) All requirements outlined in the MoDOT Engineering Policy Guide shall be met. The consultant shall also follow MoDOT's "practical design" philosophy and submit any design exceptions as necessary.

(D) Consideration shall be given to the feasibility of in-service maintenance inspection of the structure using standard MoDOT bridge inspection equipment. Consideration shall include but not be limited to height of bridge, girder depth, bridge width, and obstructions along the side of the bridge such as tall fences. If the structure being proposed would not accommodate inspection with standard equipment then a system shall be designed to make the bridge accessible for inspection.

(E) Develop a Bridge Memorandum and Design Exception Request (if applicable).

(F) Develop a preliminary itemized bridge cost estimate. The preliminary bridge cost shall be based on estimated quantities required to construct the bridge.

(G) Complete the Preliminary Bridge Design by developing bridge TS&L drawings as well as a Bridge Design Layout. The Bridge Design Layout shall list the design criteria to be used for final design including the foundation type and elevations selected as well as design values for foundation final design based on the Foundation Investigation.

(H) If applicable, submit a preliminary design approval package to the Missouri Division of the FHWA with a copy of the cover letter being sent to the MoDOT Bridge Division. This submittal shall be in accordance with the Preliminary Design Section of the MoDOT Engineering Policy Guide. The cover letter shall state that the submittal is being made on behalf of MoDOT.

(I) Plans submitted during the preliminary design phase shall be 11-inch by 17-inch. They shall be high resolution Microstation CAD plots on 20 lb. Engineering bond paper or can be submitted in Adobe Acrobat format.

(J) Complete and submit a railroad submittal package meeting the requirements of the UPRR and BNSF Grade Separation guidelines.

SECTION 404 CORPS of ENGINEERS PERMITS

The consultant shall provide the following information necessary to allow MoDOT staff to apply for any required Section 404 Corps of Engineers Permits. If the permit is required due to bridge construction, the application data shall be submitted no later than with the T.S.&L drawings. All information should be provided to the MoDOT project manager who will forward the information to General Headquarters Design.

1. Provide the amount and type of excavation and material that will be used in streams, lakes, and wetlands below the Corps of Engineers' ordinary high water line (OHL) elevations.

2. Provide location and quantities of permanent berms and spill fills below OHL.
   * Earth fill, rock blanket (square feet and cubic yards)
   * Rock blanket along right descending bank and left descending bank (linear feet)
   * Rock ditch (square feet)

3. Provide location, excavation and size of pier below OHL.
   * Excavation (cubic yards)
   * Pier (square feet)

4. Provide channel realignment data.
   * Existing channel length of section to be modified (feet)
   * Average channel width in section to be modified (feet)
   * Realigned section, length and width (feet)

5. Provide temporary fill amounts in wetlands or below OHL in streams.
   * Earth fill (square feet and cubic yards)
   * Class C (square feet and cubic yards)

6. Provide information about temporary fills and shoring.
   * Location of temporary fills and shoring
   * Source of material
   * Final disposition of removed materials

7. Provide information about temporary culverts.
   * Number of culverts
   * Size (inches)
   * Length (feet)

8. Provide information on channel cleanout - excavation below OHL.
   * Cleanout upstream and downstream of structure (linear feet)
   * Total quantity of material to be removed below OHL (square feet and cubic yards)

9. Provide 8½-inch by 11-inch copies of any plan or profile sheets required for the permit application.

10. Provide 8½-inch by 11-inch copies of any plan or profile sheets required for the permit application.

11. Provide bridge elevation and plan views with OHL indicated.

Cultural Resource Requirement:

The CONSULTANT'S attention is directed to Chapter 127 and Chapter 135 of the MoDOT Engineering Policy Guide (EPG) for guidance for the Cultural Resource requirements related to this project. Other chapters may be applicable for this requirement.

(A) As directed by MoDOT, the CONSULTANT shall prepare drawings and estimates as necessary for compliance with Section 4(f) of the Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. Requirements may include but not limited to development of alignment alternates to avoid historically significant bridges.

(B) The CONSULTANT shall assist in providing responses to any inquiries throughout the Section 106 consultation process.

(C) If necessary, the CONSULTANT shall develop aesthetic enhancements to mediate the requirements from the Section 4(f) and Section 106 study. The development of aesthetic enhancements shall include preliminary costs to include in the project.

(D) Necessary aesthetic enhancements shall be incorporated in the final roadway and bridge plans and include additional construction costs in the final estimate.

(E) If requested, the CONSULTANT shall provide artistic drawings that include necessary aesthetics. These drawings will be needed to communicate to the public the final bridge and roadway design at meetings.

NEPA Requirement:

The CONSULTANT's attention is directed to Chapter 127 of the MoDOT Enginering Policy Guide (EPG) for guidance related the NEPA requirements. Other chapters may be applicable for this requirement.

(A) As directed by MoDOT, the CONSULTANT shall prepare an FRA CE document and/or a FHWA CE2 document for compliance with NEPA. This includes exhibits and drawings needed to support those documents.

(B) MoDOT will reasonably assist with examples and guidance.

Geotechnical Investigations:

The CONSULTANT'S attention is directed to Chapter 320 and 321 of the MoDOT Engineering Policy Guide (EPG) for general guidelines and requirements for the Geotechnical Investigations.

(A) Perform all geotechnical work necessary for the project including the Preliminary Geotechnical Report and the Foundation Investigation Report.

(B) Consultant is responsible for attaining all necessary permits to perform the work.

(C) Produce a Preliminary Geotechnical Report which includes an initial geotechnical investigation of the site including recommended sides slopes and spill slopes. The site work for the preliminary geotech work and the final soundings may occur simultaneously.

(D) Perform all necessary bridge soundings and testing and incorporate into a Foundation Investigation Report. The CONSULTANT shall provide nominal side friction and nominal end bearing for rock sockets. These values as well as resistance factors will be provided by elevation to the closest half of a foot following procedures for LRFD in MoDOT's EPG. The CONSULTANT shall provide p-y parameters for lateral loading or LPile parameters for all bent locations. The report shall also include recommendations for site remediation to support MSE walls (if required) and recommendations for the use of driven piles due to soil acidity. The CONSULTANT shall also determine the seismic site class, seismic design category, and evaluate the liquefaction potential using a horizontal acceleration of 1.5g and an earthquake magnitude of 7.5 (if applicable).

(E) The CONSULTANT shall provide, at a minimum, a geologist registrant in training (GRIT) or an engineer in training (FE) to log the borings in the field per MoDOT's logging protocol. The engineer or geologist shall have at least 2 years of experience logging boreholes. Logs shall be reported in gINT format. MoDOT will provide preferred gINT templates when requested. At final submittal, please provide a copy of the electronic gINT file, in addition to the final report deliverables.

(F) The CONSULTANT will perform standard penetration testing (SPT) and split-barrel sampling in accordance with ASTM D1586 using an automatic hammer in accordance with section 7.4.1 Method A. The automatic hammers shall be calibrated in accordance with manufacturer's recommendations and ASTM D4633 at least every 2 years or sooner as required therein. The calibration report shall be prepared in accordance with ASTM D4633 and shall be signed and stamped by a professional engineer. During field exploration, the automatic hammer shall be run in accordance

with manufacturer's recommendations and in accordance with the settings and rates that were used during the hammer calibration.

The CONSULTANT shall provide the following information on their boring logs:

- N value of blows per foot
- N_{60} value of blows per foot (corrected for the energy efficiency of the auto-hammer)
- Energy efficiency of the auto hammer
- Drilling equipment identification
- Borring locations (Stations and/or Coordinates, and Elevations with datums)

(G) All boring holes shall be filled with grout.

(H) Public utilities shall be notified via Missouri One-Call before drilling begins.

(I) The cores shall be handled and labeled following MoDOT procedures.

(J) Laboratory testing will be performed to estimate pertinent engineering properties of the soil overburden and soil and rock properties for design including analysis of the soil acidity.

RIGHT OF WAY DESIGN

1. The CONSULTANT shall prepare right of way plans, which may be separate drawings from those used for design and construction details. The right of way plans shall show alignment, geometric design, removal of improvements, drainage facilities, property lines and ownership, other land survey information, street lines and existing right of way and easements. The CONSULTANT should also include any plan details, which will require additional right of way or easements during the construction phase of the project such as bypasses, temporary erosion control, etc. Right of way plans include title sheet, typical sections, profile sheets, and cross sections of the roadway, entrances, and side roads. Areas of new right of way, permanent easements and/or temporary easements required from each individual property owner may be shown in tabular form on the respective sheets.

a) The CONSULTANT shall finalize any previous review of the roadway cross sections sufficiently to determine the feasibility of constructing retaining walls versus obtaining additional right of way. This final review shall consist of construction estimates versus right of way estimates.

b) Upon completion of the estimates by COMMISSION and CONSULTANT, the CONSULTANT shall recommend to the COMMISSION a choice at the various locations which warrant consideration of the alternate retaining wall versus right of way solutions. The COMMISSION shall make the final determination of purchasing right of way, or constructing retaining walls.

2. Right of way plans shall be submitted to the COMMISSION for review and approval. The right of way plans shall be at the same scale as the construction plans. The right of way plans shall include any design details that will control the width of right of way and necessary easements.

a) New right of way lines and all easements shall be dimensioned from the centerline, or cross road centerlines, if necessary. Bearings and distances on the right of way lines may be required.

b) The following minimum design features shall be included on the right of way plans:

1) Title sheet with the appropriate project limits, access note and traffic data completed.

2) Typical sections

3) Cross sections at 100' intervals, including additional sections at each entrance with new and existing entrance grades.

4) Construction limits (slope lines); drainage facilities; entrances and their reference location, width and type; property owners, with areas of new right of way, easements and remaining property; centerline bearing, ties to legal land corners from centerline stations with notation for corner witness by a registered land surveyor; existing utility locations and easements, including replacement utility easements; horizontal curvature information; and proper right of way symbolization for new right of way (access control) and easements, including areas which may be required to accommodate temporary erosion control.

5) Township, Range, Section and/or U.S. Survey information on each plan sheet near the title block or appropriate survey/section line.

3. The CONSULTANT shall perform a land survey of the R/W corridor for the project compliant with the Missouri Minimum Standards for Property Boundary Surveys. This will include the development of a survey plan, as described in the MoDOT EPG, that will serve as the recordable survey plat.

The survey plan will include a land description of the highway R/W corridor. This description shall (1) be based on the location survey, (2) be concise, (3) contain title identity, (4) contain measured dimensions and highway stationing in ground units, (5) contain measurement data that describes the geometric area of the corridor and closes mathematically, (6) contains information that does not lend to alternate interpretations, and (7) be written to facilitate the relocation of the corridor by a professional land surveyor.

The CONSULTANT shall perform the layout of the R/W corridor with the placement of monuments at the locations of line breaks in the R/W. Monumentation in compliance with the standards for permanent monuments including a cap stamped with the department’s name and the highway station and offset for that location shall be placed.

The CONSULTANT shall comply with the most recent and applicable State and Federal Laws. Survey procedures and criteria shall be determined in accordance with the Missouri Standards for Property Boundary Surveys and any applicable portions of the MoDOT EPG, particularly Section 236.

Any source data provided to the CONSULTANT by the COMMISSION shall be returned in the same manner and condition as when it was provided. The data should be returned at the point when it is no longer needed by the CONSULTANT to perform the services required by this agreement or at the conclusion of the contract, whichever occurs first.

4. The COMMISSION shall arrange for a design field check to review right of way plans with the CONSULTANT and right of way personnel prior to completion of the right of way plans. The CONSULTANT shall make any necessary revisions to the right of way plans as determined by this design field check.

5. The COMMISSION shall review, approve, and certify the right of way plans as completed by the CONSULTANT. The CONSULTANT shall provide one (1) electronic set of fully signed and sealed right of way plans, for the COMMISSION'S further use.

6. The COMMISSION will provide title insurance information, prepare right of way appraisals and secure the necessary right of way by negotiation or condemnation, if necessary, for construction of this project.

7. The CONSULTANT shall be responsible for staking and re-staking tentative right of way on individual properties, as required by MoDOT staff, during the right of way negotiation and acquisition phase of the project.

8. The CONSULTANT shall be responsible for making all revisions to the right of way and construction plans due to negotiations with the property owners in an effort to acquire the right of way.

9. The CONSULTANT shall write deed descriptions for all right of way acquisitions and provide a centerline description that is tied to an accepted land tie at the beginning and end of the project. All points along the new right of way line shall be referenced by the station and offset from the centerline. A PLS will be required to sign and stamp/seal the legal descriptions for all permanent right of way/land acquisitions and complete MoDOT's Professional Land Surveyor Description Review form for this project.

10. The CONSULTANT shall submit the completed Right of Way Plan checklist. The COMMISSION shall provide the checklist to the Consultant upon request.

RAILROAD COORDINATION

The consultant shall coordinate design of the project with the Railroad(s) and MoDOT's Multimodal Operations-Rail (MO-R) group. Guidance for railroad coordination is provided in MoDOT EPG Section 643.4.

1. The CONSULTANT shall furnish all drawings and documentation necessary to gain approval from the railroads. This may include drawings and documentations necessary to meet the railroads preferred design parameters along with drawings and documentation to gain approval of a variance by the railroad.

2. The COMMISSION will provide a template Job Special Provision (JSP) for the railroad. The CONSULTANT shall modify the JSP as necessary with approval of MoDOT.

3. The COMMISSION will complete any necessary agreements and right of way transaction with the railroad. The CONSULTANT shall provide any drawings to be used as exhibits for these documents.

4. The CONSULTANT shall be responsible for all communications with the railroad concerning approval of the design and JSP. All communications with the railroad shall include a copy to the MO-R representative and the MoDOT project manager or structural liaison.

5. The CONSULTANT shall provide meeting minutes to any in-person meetings with the railroad.

UTILITY COORDINATION

The CONSULTANT shall provide utility coordination for the project. Guidance for utility coordination is provided in MoDOT EPG Section 643.4.

1. The CONSULTANT shall furnish all drawings and documentation necessary for utilities to determine conflicts with their facilities. The CONSULTANT will coordinate with the utility on determine a relocation plan that is in compliance with the EPG. This coordination with the utility does not include planning or engineering on the utility's behalf to complete their utility relocation design. The CONSULTANT shall ensure the utility's relocation plan in added to the project design drawings as required bu the EPG.

2. The COMMISSION will provide a template Job Special Provision (JSP) for the utility JSP. The CONSULTANT shall modify the JSP as necessary with approval of MoDOT.

3. The COMMISSION will complete any necessary agreements with the utility. The CONSULTANT shall provide any drawings or documents to be used as exhibits for these documents.

4. The CONSULTANT shall be responsible for all communications with the utilities including coordinating on-site meetings. All communications with the utilities shall include a copy to the MoDOT utility representative and the MoDOT project manager.

5. The CONSULTANT shall provide meeting minutes to any in-person meetings with the utility.

FINAL DESIGN PHASE

The Final Design Phase of this agreement shall include final designs for both the roadway portion and the bridge portion of the project.

Final Design- Roadway

1. Upon request, the CONSULTANT shall furnish design plans, which show approved right of way, drainage facilities, signing, cross sections and roadway design features, for the COMMISSION'S handling and coordination with the utility companies' existing facilities, and proposed plans of adjustments. The CONSULTANT shall revise plans to adhere to all utility company standards and requirements, and make necessary

utility plan revisions as become necessary during final plan design and approvals.

2. The COMMISSION shall coordinate utility company activities for any adjustments required to be included in the final design plans.

3. The COMMISSION will secure execution of municipal agreements with the cities and/or county. A copy of the executed agreements will be furnished to the CONSULTANT for their information. The CONSULTANT shall conform to all design provisions of these agreements.

4. The design plans shall include a detailed traffic control plan with an outline for construction staging conforming to the requirements of the MUTCD and the MoDOT EPG, and as may be supplemented by samples provided by the COMMISSION. The traffic control plan requires submittal to the COMMISSION for review and approval prior to inclusion in the final design plans.

5. A final design field check may be held with CONSULTANT and COMMISSION representatives prior to completing final design plan quantities. The CONSULTANT shall make any necessary revisions to the final plans as determined by this design field check.

6. The CONSULTANT shall prepare detailed temporary erosion control plans for review and approval before inclusion in the final design plans.

7. The CONSULTANT shall prepare computations for all design plan quantities. All plan quantities shall be shown on the Quantity Sheets, by construction stage, if applicable. The format for these sheets shall be furnished by the COMMISSION. Specialty items may have separate sheets for quantity tabulations.

8. The CONSULTANT shall prepare for review and approval by the COMMISSION all necessary Job Special Provisions except Utilities, which are to supersede the Missouri Standard Specifications for Highway Construction. A brief reason for the deviation from the standard plans and specifications should also be provided. After coordination with the utility companies, the COMMISSION will provide a Job Special Provision for the Utilities to be included with any other Job Special Provisions.

9. The CONSULTANT shall submit the completed Final Plans checklist and Form D-12. The COMMISSION shall provide the checklist to the Consultant upon request.

PLANS, SPECIFICATIONS AND ESTIMATE

The following list shall be considered the as the minimum requirements for a complete set of Final Design Plans.

a) Title Sheet
b) Typical Sections
c) Quantity Sheets
d) Plan Sheets at 1"=50' horizontal (or different scale as determined by MoDOT Project Manager for clarity)

e) Profile Sheets at 1"=50' horizontal and 1"=10’ vertical
f) Special Sheets for geometrics, referenced points, grading plan, traffic control plan, temporary erosion control plan and any other sheets for special design features
g) Culvert Sections at 1"=10'(1:100), horizontal and vertical
h) Earthwork Quantities, Cross Sections at 100' intervals, 1"=10' (1:100), horizontal and vertical, including entrance sections with existing and proposed grades
i) Tabulation of Quantities Sheets
j) Job Special Provisions in an electronic format readable in COMMISSION'S current word processor, and a computer file with the bid items and quantities as generated by COMMISSION'S Estimate Program
k) Construction workday study

Additional plans and information may be required to complete the final Design Plans. With the submittal of the Final Design the CONSULTANT shall also provide the COMMISSION a statement that an internal quality control check has been conducted and to the best of the CONSULTANT'S knowledge the final design plans are free of gross errors, misleading or confusing typos, and includes adequate information to construct the project.

Final Bridge Design:

Furnish to the COMMISSION fully checked design plans, job special provisions, design computations, quantity computations, final cost estimate, and a construction workday study for each bridge

(A) The plans shall be complete and shall cover all parts of the structure they represent. The degree of detail shall be comparable to that furnished on typical plans prepared by the COMMISSION. High resolution CADD plots, in Microstation format, from which good legible prints and satisfactory reproducible copies can be obtained will be acceptable. The Consultant shall also furnish(1) electronic deliverable copy of plans in 11-inch by 17-inch size for review. High resolution final signed and sealed plans, will be submitted in Adobe Acrobat Reader format version 7 or higher. Final signed and sealed plans shall be in pdf full size (34” x 22”) format. These deliverables shall use the file naming convention and be in accordance with the “Specifications of Computer Deliverable Contract Plans” requirement outlined in the COMMISSION’S Engineering Policy Guide, Section 237.13.2. The electronic plans in Microstation format cannot be signed and sealed. Electronic Submittals shall include electronic plans in Microstation format, signed and sealed plans in Adobe Acrobat Reader format including all construction changes made to the plans during construction of the project.

(B) The job special provisions shall be complete and describe all design features, construction procedures, or material requirements in the plans that are deviations from latest edition of the Missouri Standard Plans for Highway Construction. Typical job special provisions that have been developed by MoDOT for previous jobs are posted on MoDOT’s website and are available for use and modification as needed. The job special provisions shall include a table of contents sheet that is signed and sealed by a professional engineer registered in Missouri. The signed and sealed job

special provision shall also, be submitted in Adobe Acrobat Reader format, version 7 or higher. Job Special Provisions shall also be submitted in Microsoft Word format. The submittal letter shall explain the need for each provision.

(C) The design computations and plans shall be acceptable to, and will become the property of, the COMMISSION. The consultant shall submit design computations on compact disk in Adobe Acrobat Reader version 7.0 format or greater. Each design computation compact disk submitted by the consultant shall contain an index file, with electronic links to the files contained within. Submittals shall include a minimum of one design computations CD for each project. The design computations CD shall not be combined with the Microstation or the Adobe Acrobat Reader CD submittals.

(D) The final estimate submitted by the Consultant shall include backup material that supports the estimates made for non-standard or lump sum pay items.

(E) The Consultant shall submit the hours and cost summarizing the design effort for each bridge. The summary shall include separate amounts for: Number of Hours for Bridge Preliminary Design, Cost of Bridge Preliminary Design, Number of Hours for Bridge Final Design, Cost of Bridge Final Design. Generally, the above amounts should include all hours & costs invoiced that are attributable to bridge design and plans preparation up to the point of turning in the signed and sealed plans. It should not include hours attributable to preparing the bridge survey, final construction cost estimate, or workday study.

BIDDING AND CONSTRUCTION SUPPORT PHASE

After the Final Design Phase of the project is completed the CONSULTANT shall be available to the COMMISSION to discuss and interpret the plans and specifications during the bidding and construction phase of the project as determined necessary by the ENGINEER. If issues arise during construction, there will be a direct line of communication established between the MoDOT Construction Office and the Consultant. The Consultant will immediately inform MoDOT Bridge Division of any recommendations or clarifications made to the Construction Office.

Exclusion:

- Shop drawing review

DRAWING AND DOCUMENT DELIVERABLES

The CONSULTANT shall prepare all plans through use of a Computer Aided Drafting (CAD) program. The CONSULTANT shall conform to the Missouri Department of Transportation Specifications for Computer Deliverable Contract Plans as referenced in the MoDOT EPG.

The Consultant shall furnish the COMMISSION the following completed sheets and documents, as applicable, for each separate construction project included in this contract, as follows:

DELIVERABLES - ROADWAY

1. All mapping, sketches, cross sections and all other engineering documents necessary to secure a permit from the administrator of the FEMA Flood Insurance Program if required.

2. Preliminary Plans showing profile grades, geometric data, alignment data, etc.

3. Bridge Survey, Grade Separation, and/or Retaining Wall Report for each structure, Forms BR 105R, 105 S1, and 105 S2, as necessary.

4. One (1) electronic copy of the location sketch for COMMISSION Approval submitted in electronic format.

5. All information necessary for the Section 404 Corps of Engineers Permit application as indicated elsewhere in the scope of services.

6. Preliminary roadway plans, culvert and cross sections, and one (1) copy of all drainage computations.

8. Right of way plans , including cross sections for review and comment. After any corrections, one (1) electronic set of fully signed and sealed right of way plans, shall be submitted for the COMMISSION'S further use.

9. Location survey plans including corridor description.

10. Traffic control plan for review and comments.

11. Draft copy of the job special provisions for review. After corrections, the job special provisions shall be furnished in electronic format utilizing the COMMISSION'S latest word processing program.

12. One (1) legible electronic copy of engineering calculations and analysis.

13. One (1) electronic copy of a completed summary of quantities and estimate of the construction costs. The estimate shall be prepared using the latest version of MoDOT’s ESTIMATE program.

14. One (1) electronic copy of the completed Standard Plans list, MoDOT Form D-2.

15. One (1) electronic copy of a workday study showing the estimated number of workdays required to construct each project.

16. Final signed and sealed Roadway Design Plans submitted electronically in Adobe Acrobat. One CD shall be submitted for the final roadway plans. One CD shall include electronic plans in Microstation format. This CD shall also be in Microstation format.

17. An electronic copy of completed D-12 form.

18. PDF version of displays for public meetings.
19. Electronic deliverables as outlined in EPG 237.9.
20. Construction estimate in BidTabsPro (PLUS AND XML) format.

DELIVERABLES - BRIDGE

1. Bridge Memorandums and Design Layouts.

2. Layouts for bridge soundings.

3. Develop preliminary bridge cost estimates.

4. An electronic copy of the Preliminary Bridge plans in Adobe Acrobat.

5. If necessary, provide a copy of the final hydraulic models to the Commission in the form of a computer disk or electronically.

6. Legible copies of the final design computations, coordinate geometry data, and quantity computations on a CD or electronically.

7. An electronic copy of the 100% complete unsigned and unsealed final bridge design plans.

8. Final signed and sealed Bridge Design Plans submitted electronically in Adobe Acrobat. Two CD's or similar electronic version shall be submitted for the final bridge plans. One CD shall include electronic plans in Microstation format. One CD shall be submitted during construction and include all construction changes made to the plans during construction of the project. This CD shall also be in Microstation format.

9. Written job special provisions – bridge, as necessary to supplement the latest edition of the *Missouri Standard Specifications for Highway Construction.*

STANDARDS

The CONSULTANT shall use the latest version of the following publications to determine the design criteria and procedures which will be followed for development of the project: "Federal Emergency Management Administration Flood Insurance Guidelines and Specifications," MoDOT "Engineering Policy Guide," AASHTO's "Manual on Uniform Traffic Control Devices" (MUTCD), AASHTO's "A Policy on Geometric Design of Highways and Streets", "Missouri Standard Specifications for Highway Construction", "Missouri Standard Plans", "Missouri Department of Transportation Specifications for Computer Deliverable Contract Plans", or any other publications which the ENGINEER directs the CONSULTANT to use.

SERVICES PROVIDED BY THE COMMISSION

The COMMISSION will provide available information of record to the CONSULTANT. In addition, the following specific items will be furnished or performed by the COMMISSION:

1. The COMMISSION will provide the existing plans for state higways within the project limits.

3. The approved pavement type design and shoulder design.

4. All standard sheets and forms required. Electronic copies of all necessary special sheets and standard format sheets should be provided to the consultant in MicroStation format.

5. The MoDOT Standard Plans, the Standard Specifications for Highway Construction and the Standardized Job Special Provisions are available at www.modot.mo.gov/business.

6. The latest version of the MoDOT ESTIMATE program is available at www.modot.mo.gov/business for use in estimates for the Statewide Transportation Improvement Program and for final contract quantities for the final design phase.

7. Attend meetings with interested officials of the Federal Railroad Administration and the Federal Highway Administration.

The Consultant shall proceed with the design, check, and plans preparation in accordance with the data approved or furnished by the Commission which will meet with the general standards adopted by AASHTO and approved by the Department of Transportation as provided by Title 23, United States Code, Section 109(b).

SCHEDULE

The CONSULTANT shall make submittals in accordance with the schedule described below:

CONCEPTUAL REPORT – completed by August 2, 2021 with alternates considered, recommendation and associated estimates.

PRELIMINARY PLANS – completedy by January 21, 2022 with Bridge Memorandum and a preliminary cost estimate.

Bridge Type, Size & Location (TS&L) drawings shall be submitted to MoDOT by March 18, 2022.

FRA CE document or FHWA CE2 document shall be submitted to MoDOT by March 18, 2022. Final design activities cannot be started without NEPA approval.

RIGHT OF WAY PLANS – completed by June 3, 2022 with a revised cost estimate and the necessary environmental clearances for right of way acquisition to begin.

100% unsigned and unsealed roadway and bridge plans along with job special provisions are due to MoDOT by March 1, 2023.

Final electronic signed and sealed bridge plans, specifications and the cost estimate must be submitted to MoDOT by April 1, 2023 for the August 2023 letting. This includes the prepared working day study.

CONSTRUCTION CONSULTATION **–** March 1, 2025 unless construction of the project is not completed. Then, the date will be upon completion of the projects.

The COMMISSION will grant time extensions for unavoidable delays beyond the control of the CONSULTANT. Requests for extensions of time shall be in writing by the CONSULTANT, before plans are due, stating fully the reasons for the request.