***This Sample Scope of Services contains directions for the preparer and blank information, which must be completed when preparing the scope of services. This sample scope includes services for roadway design as well as bridge design. The preparer should delete any services which are not required for a specific project, delete all instruction lines, and be sure that all paragraphs and subparagraphs are in numerical or alphabetical order.***

**SCOPE OF SERVICES**

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 Project Development Manual (PDM) and the Bridge Manual. The consultant is encouraged to review the appropriate sections of these manuals 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 conceptual study, preliminary plans, right of way plans, construction plans and bridge plans including surveying services and data required for development of this specific project. The survey data shall be based on the Missouri State plane coordinate system, **(provide zone name)** zone, and modified by a factor provided by the COMMISSION. 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 PDM. Unless otherwise specified all plan sheets and CAD plots shall be provided to the COMMISSION as 22-inch by 34-inch sheets on 20 lb. engineering bond paper and shall conform to the Specifications for Computer Deliverable Contract Plans.

The CONSULTANT will be required to produce and update the construction 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 conceptual study, preliminary design, right of way design, and final design.

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 assure that there have been no significant changes since the information was recorded or obtained.

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.

PRELIMINARY DESIGN PHASE

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

Preliminary Design – Roadway

The CONSULTANT'S attention is directed to Chapter II of the MoDOT Project Development Manual (PDM) for general guidelines and requirements for preliminary design. Other chapters may be applicable for preliminary design preparation.

1. Upon approval of the design criteria memorandum by COMMISSION, the CONSULTANT shall undertake the following to develop the preliminary design phase:

a) Prepare a conceptual study, as outlined in Section 2-01 of the MoDOT PDM. The conceptual study report (Figure 2-01.1) is to be prepared by the CONSULTANT and approved by the COMMISSION prior to preparing preliminary plans.

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

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 a draft conceptual study report to the COMMISSION for review and comment at least 21 calendar days prior to the scheduled date for completion of the conceptual study shown in Exhibit IV.

b) Perform all surveying and design to develop a preliminary design with the plan portion showing existing topography and contours and the profile to show grades. The base drawings for the preliminary plans shall be used later as full-scale base drawings for right of way and/or final design plans.

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

1) The plan view English scale shall be 1"= 100' 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"=100' horizontal, and 1"=10' vertical.

d) 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.

e) 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.

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

g) 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 Chapter II.

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

i) 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. A public (hearing / meeting) will be held after approval of the preliminary plans. The COMMISSION will advertise for the public (hearing / meeting) and will set a date, time and place. The CONSULTANT'S representative will be required to brief the COMMISSION personnel before the (hearing / meeting), and to attend the (hearing / meeting). The CONSULTANT shall provide exhibits and handouts as requested by the COMMISSION. The CONSULTANT will record and prepare the (hearing / meeting) transcript, including the executive summary, and prepare the location sketch for appropriate Commission Approval. The MoDOT project manager will be responsible for all other documents necessary to obtain Commission approval.

5. The CONSULTANT shall be responsible for verification, furnishing, and recording of any public survey corners necessary for legal descriptions used in deed writing. The CONSULTANT shall reference Chapter III of the MoDOT PDM to ensure that the public survey corners are obtained in accordance with the requirements of the COMMISSION. The CONSULTANT personnel shall tie all public survey corners to the highway survey alignment.

6. The CONSULTANT shall prepare Bridge Survey Reports and/or Grade Separation Reports and/or Retaining Wall Reports for review and approval by the COMMISSION.

Preliminary Design - Bridge

1. Perform the geometric analysis and hydraulic 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.

2. The bridge length shall be based on roadway alignments, geometric and/or hydraulic analysis, spill slope requirements and roadway grades.

3. The superstructure type shall be either continuous composite steel plate girders/stringers or Missouri standard pre-stressed concrete I-girders with the recommendation and selection dependent upon site constraints and a cost analysis.

4. All requirements outlined in the MoDOT PDM and Bridge Manual shall be met.

5. All requirements of the Federal Emergency Management Agency's National Flood Insurance Program shall be met.

6. A hydraulic model acceptable to the engineer shall be utilized for stream crossings.

7. Scour calculations shall be performed in accordance with FHWA Hydraulic Engineering Circular No. 18.

8. Develop final detailed design criteria in the form of Bridge Memorandum and Design Layout documents.

9. Develop a layout for bridge soundings document.

10. Develop a preliminary bridge cost estimate.

11. Provide a copy of the final hydraulic models to the engineer in the form of a computer disk.

12. Provide a No Rise Certificate certified by a registered professional engineer, if applicable.

13. The Consultant shall furnish two sets of the Preliminary Bridge plans. One (1) set shall be size 22–inch by 34–inch and One (1) set shall be size 11-inch by 17-inch. Both sets shall be high resolution MicroStation CAD plots on 20 lb. engineering bond paper.

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 three months after the completion of the bridge survey. 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.

1. Earth fill, rock blanket (square feet and cubic yards)
2. Rock blanket along right descending bank and left descending bank (linear feet)
3. Rock ditch (square feet)

3. Provide location, excavation and size of pier below OHL.

1. Excavation (cubic yards)
2. Pier (square feet)

4. Provide channel realignment data.

1. Existing channel length of section to be modified (feet)
2. Average channel width in section to be modified (feet)
3. Realigned section, length and width (feet)

5. Provide temporary fill amounts in wetlands or below OHL in streams.

1. Earth fill (square feet and cubic yards)
2. Class C (square feet and cubic yards)

6. Provide information about temporary fills and shoring.

1. Location of temporary fills and shoring
2. Source of material
3. Final disposition of removed materials

7. Provide information about temporary culverts.

1. Number of culverts
2. Size (inches)
3. Length (feet)

8. Provide information on channel cleanout - excavation below OHL.

1. Cleanout upstream and downstream of structure (linear feet)
2. 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.

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. Preliminary 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 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 PDM, particularly Chapter III.

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, which ever 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) set of fully signed and sealed right of way plans, size 22-inch by 34-inch, on 20 lb. engineering bond paper 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.

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 - Bridge

1. Design and furnish to the Commission fully checked design plans together with a suitable copy of the final design computations, coordinate geometry data, and quantity computations.

2. The design 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.

3. The design computations and plans shall be acceptable to the Commission and the Federal Highway Administration.

4. The design computations and plans will become the property of the Commission.

5. Two sets of 100% complete unsigned and unsealed final bridge design plans shall be submitted to the MoDOT project manager for review by General Headquarters Bridge staff. The CONSULTANT shall furnish two sets of 11-inch by 17-inch paper prints for this purpose. The plans must be submitted at least six (6) weeks prior to the final submission of the final bridge design. This time will be necessary to allow for proper review and correction of the bridge plans.

6. The Final Bridge Design shall consist of One (1) set of high resolution MicroStation CADD plots, size 22-inch by 34-inch, on 20 lb. engineering bond paper, signed and sealed by a professional engineer registered in the State of Missouri, from which good legible prints and satisfactory reproducible copies can be obtained. The Consultant shall also furnish three sets of 11-inch by 17-inch paper prints. The Final Bridge Design shall be prepared in accordance with the Missouri Department of Transportation Specifications for Computer Deliverable Contract Plans as referenced in the MoDOT PDM.

7. Prepare a list of items, including the appropriate bridge plan sheet of each item that will require special provisions as necessary to supplement the latest edition of the *Missouri Standard Specifications for Highway Construction.* This list shall also identify all design features, construction procedures, or material requirements in the consultant plans that are deviations from Missouri Standard Plans for Highway Construction, including a brief reason for the deviation and the authorizing contact person.

Final Design- Roadway

1. The CONSULTANT shall prepare storm water drainage and hydraulic studies and detailed drainage plans, including both pavement and crossroad drainage, for review and approval by the COMMISSION before inclusion in the final design plans.

2. 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.

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 agreements. A copy of the executed agreements will be furnished to the CONSULTANT for his information. The CONSULTANT shall conform to all design provisions of these agreements.

4. The CONSULTANT shall prepare preliminary plans for the following specialty items: highway lighting and signals, if warranted. This shall include warrant forms with required data. The CONSULTANT shall submit these preliminary plans to the COMMISSION for review and approval. These plans shall be separate from the detailed construction plans.

a) After preliminary approval of the specialty items listed above, final plans shall be submitted to the COMMISSION for final review and approval, including quantity sheets.

b) These specialty items shall be completed in accordance with the applicable sections of the MoDOT PDM and the Manual of Uniform Traffic Control Devices (MUTCD).

5. 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 PDM, 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.

6. A final design field check shall 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.

7. Prepare detailed temporary erosion control plans for review and approval before inclusion in the final design plans.

8. The CONSULTANT shall prepare computations for all design plan quantities. All plan quantities shall be shown on the "2-B" 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.

1. The CONSULTANT shall prepare for review and approval by the COMMISSION all necessary Job Special Provisions, 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.

10. The CONSULTANT shall be responsible for all incidental surveying and staking that is required to gather data or provide control for the detailed design of the project. This shall include, but not be limited to temporary and permanent easements, staking for geotechnical investigations, borrow areas and temporary right of way control points.

PLANS, SPECIFICATIONS AND ESTIMATE

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

a) Title Sheet

b) Typical Sections

c) "2-B" Sheets

d) Plan Sheets at 1"=100' horizontal (or different scale as determined by MoDOT Project Manager for clarity)

e) Profile Sheets at 1"=100' 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

**(if required)** g) Highway Lighting Sheets, including quantity sheets

**(if required)** h) Traffic Signal Sheets at 1"=20'(1:200) horizontal, with appropriate signal quantity sheets

**(if required)** i) Highway Signing Sheets, including quantity sheets

**(if required)** j)Bridge plan set, complete for each structure.

k) Culvert Sections at 1"=10'(1:100), horizontal and vertical

l) Earthwork Quantities, Cross Sections at 100' intervals, 1"=10' (1:100), horizontal and vertical, including entrance sections with existing and proposed grades

m) Tabulation of Quantities Sheets

n) Diskette with Job Special Provisions in a 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

o) 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.

BIDDING AND CONSTRUCTION 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. During this phase of the project the CONSULTANT will also be required to attend the pre-bid conference, pre-construction meeting, and post construction meeting. If a partnering meeting is held between the construction contractor and MoDOT personnel, the CONSULTANT will be required to attend.

PERMANENT RIGHT OF WAY MONUMENTATION

After the construction contractor has graded the back slopes and utility adjustments are complete, the CONSULTANT shall set permanent monuments at right of way breaks and permanent easements. Monumentation shall be in compliance with Chapter III of the MoDOT PDM.

**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 PDM. Unless otherwise specified all plan sheets and CAD plots shall be provided to the COMMISSION as 22-inch by 34–inch sheets on 20 lb. engineering bond paper and shall conform to the Specifications for Computer Deliverable Contract Plans.

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. Two (2) sets of the Conceptual Study Report.

2. 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.

3. Two (2) sets of prints of preliminary plans showing profile grades, geometric data, alignment data, etc.

4. One (1) copy of a Bridge Survey, Grade Separation, and/or Retaining Wall Report for each structure, Forms BR 105R, 105 S1, and 105 S2, as necessary.

5. Eleven (11) copies of the (hearing/ meeting) transcript. One (1) copy of the location sketch for Commission Approval submitted in electronic format.

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

7. Two (2) sets of prints of the preliminary roadway plans, culvert and cross sections, and one (1) copy of all drainage computations.

8. Two (2) sets of prints of the right of way plans, including cross sections for review and comment. After any corrections, one (1) set of fully signed and sealed right of way plans, size 22-inch by 34-inch, on 20 lb. engineering bond paper shall be submitted for the COMMISSION'S further use.

9. Two (2) sets of prints of the preliminary traffic signal plans for initial review and comments. After any corrections three (3) sets of prints will be required.

10. One (1) set of location survey plans including corridor description.

11. One (1) set of completed traffic signal warrants for the signalized intersection, including any supporting information.

12. Two (2) sets of prints of the preliminary highway signing layouts for initial review and comments. After any corrections three (3) sets of prints will be required.

13. Two (2) sets of plans for utility review, including culvert sections and cross sections. Additional sets will be required for each utility involved.

14. Two (2) sets of prints of the traffic control plan for review and comments. After any corrections three (3) sets of prints will be required.

15. One (1) 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. (Currently Microsoft Word 2000)

16. Four complete sets of the fully checked, original drawings of the final design plans, size 22-inch by 34-inch, on 20 lb. engineering bond paper, including "2-B" sheets with all quantities tabulated and subtotaled by construction stage.

17. One (1) legible copy of engineering calculations and analysis in a bound volume.

18. One (1) 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.

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

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

DELIVERABLES - BRIDGE

1. Bridge Memorandum and Design Layout.

2. Layout for bridge soundings.

3. Develop a preliminary bridge cost estimate.

4. Copy of the final hydraulic models.

5. No Rise Certification, if applicable.

6. Two (2) sets of the Preliminary Bridge plans. One (1) set size 22–inch by 34–inch and One (1) set size 11-inch by 17-inch.

7. One (1) legible copy of the final design computations, coordinate geometry data, and quantity computations in a bound volume.

8. Two (2) sets of 100% complete unsigned and unsealed final bridge design plans submitted at least 6 weeks prior to the final submission of the final bridge design

9. One (1) set of the Final Bridge Design, size 22-inch by 34-inch, on 20 lb. engineering bond paper.

10. Three (3) sets of the Final Bridge Design on 11-inch by 17-inch paper prints.

11. A list of each item that will require special provisions 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 “Project Development Manual," 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”, and MoDOT "Bridge Manual", or any other publications which the ENGINEER directs the CONSULTANT to use.

**(The district should review and include the**

**following items, only if applicable)**

**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. All completed field survey work, and one (1) copy of all available field survey information, including benchmarks and alignment reference ties. Ground surveying topographic mapping files and digital terrain models on CD ROM, with a 1"=100' plan map having contours of 2' interval.

2. All geotechnical work, including a soil survey and any necessary foundation investigation for embankments or for any structures.

3. One (1) copy of the environmental screening with location recommendations for preparing the conceptual study.

4. One (1) copy of the latest accident data and traffic information required to calculate the project accident rate, the "statewide accident rate for a similar class of roadway", and any high hazard locations within the project limits.

5. One (1) copy of aerial photographs obtained for this project. This is for information only.

6. One (1) copy of prior improvement "as builts" of State routes.

7. The approved pavement type design and shoulder design.

8. Traffic assignments for construction and design year traffic, including turning movements

9. All available title information and subdivision plats.

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

11. One (1) copy each of the MoDOT Standard Plans; MoDOT PDM, the Standard Specifications for Highway Construction; and the Standardized Job Special Provisions if copies are not available from an active or a previously completed engineering services contract.

12. Conduct necessary public (hearings/ meetings). The CONSULTANT will record and prepare the (hearing/ meeting) transcript and location sketch. MoDOT will be responsible for all other documents necessary to obtain Commission Approval.

13. Obtain title information, write deeds and conduct appraisals, negotiation and/or condemnation activities for new right of way.

14. Handle arrangements for any "scoping" meetings and the public (hearing / meeting) and other meetings, which may be held or requested by local agencies. The CONSULTANT shall provide materials for displays or exhibits as may be required for such meetings.

15. The latest version of the MoDOT ESTIMATE program will be provided to the CONSULTANT for use in estimates for conceptual, preliminary, and right of way phases, and for final contract quantities for the final design phase.

16. Conduct environmental studies and handle utility relocations. The CONSULTANT shall identify possible environmental issues.

17. Attend meetings with interested officials of the Federal Highway Administration, and local communities.

18. Apply for Section 404 permits. The CONSULTANT will be required to furnish the information outlined elsewhere in the scope of services.

19. Blank aluminum caps, fiberglass witness posts and decals for permanent right of way monuments.

**SAMPLE FORMAT**

**ESTIMATE OF COST**

Man-hours Rate Cost

Preliminary Design Phase

Partner

Engineer

Technician

Typist

Right of Way Design Phase

Partner

Engineer

Technician

Clerk

Final Design Phase

Partner

Engineer

Technician

Typist

Bidding and Construction Phase

Partner

Engineer

========= =========

Subtotals

Payroll Overhead (Est. at \_\_\_\_\_\_\_ %)

General and Admin. Overhead (Est. at \_\_\_\_\_\_\_ %)

=========

Subtotal

Other Direct Costs

Travel, \_\_\_\_\_\_\_ trips @

Computer Time

Value Engineering (100 hrs. @ $50 per hr.) $5,000

Printing

Computer Deliverable Contract Plans **(Only include if CONSULTANT does not produce drawings using MoDOT specified CAD applications)**

\*Subcontracts

Photogrammetric Survey (Name of Firm \_\_\_\_\_\_\_\_\_\_)

Others (Name of Firm \_\_\_\_\_\_\_\_\_\_ Man-hours\_\_\_\_\_\_\_)

=========

Subtotal Direct Costs

Fixed Fee =========

## SAMPLE FORMAT FOR OVERHEAD RATE BREAKDOWN

FOR YEAR 20\_\_\_\_\_

PAYROLL ADDITIVES

\_\_\_\_\_\_\_%

\_\_\_\_\_\_\_%

\_\_\_\_\_\_\_%

\_\_\_\_\_\_\_%

Total Payroll Additives \_\_\_\_\_\_\_\_\_%

GENERAL AND ADMINISTRATIVE OVERHEAD

\_\_\_\_\_\_%

\_\_\_\_\_\_%

\_\_\_\_\_\_%

\_\_\_\_\_\_\_\_\_%

Total General and Administrative Overhead \_\_\_\_\_\_\_\_\_%

TOTAL OVERHEAD \_\_\_\_\_\_\_\_\_%

Less Unallowable Items \_\_\_\_\_\_%

\_\_\_\_\_\_%

\_\_\_\_\_\_%

\_\_\_\_\_\_%

TOTAL ALLOWABLE OVERHEAD \_\_\_\_\_\_\_\_\_%

**PERIOD OF SERVICE**

The phases of work will be completed in accordance with the following schedule:

1. **CONCEPTUAL STUDY** within calendar days after the notice to proceed. This time includes a total of calendar days for COMMISSION review(s). **(A completion date may be substituted for calendar days)**

2. **BRIDGE MEMORANDUM AND LAYOUT OF SOUNDINGS** within calendar days after approval of the conceptual study. This time includes a total of 21 calendar days for COMMISSION review(s). **(A completion date may be substituted for calendar days)**

4. **PRELIMINARY DESIGN** within calendar days after approval of the conceptual study. This time includes a total of calendar days for COMMISSION review(s). **(A completion date may be substituted for calendar days)**

5. **RIGHT OF WAY DESIGN** within calendar days after approval of preliminary design phase by the COMMISSION. This time includes a total of calendar days for COMMISSION review(s). **(A completion date may be substituted for calendar days)**

6. **100% UNSIGNED AND UNSEALED FINAL BRIDGE DESIGN PLANS FOR REVIEW** at least 42 calendar days prior to the submittal of the Final Design. This time will be necessary for COMMISSION review of the Final Bridge Plans.

7. **FINAL DESIGN** within calendar days after approval of the right of way design phase by the COMMISSION. This time includes a total of calendar days for COMMISSION review(s). **(A completion date may be substituted for calendar days)**

8. **PERMANENT MONUMENTATION** within calendar days after all utilities have been adjusted and the grading contractor has completed grading of the back slopes, subject to the maximum period of time allowed by statute.

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.

***(The following exhibit should be included if the project estimate exceeds 10 million dollars. The district Value Engineering Facilitator will contact the Value Engineering Administrator to arrange for a Value Engineering Study.)***

**VALUE ENGINEERING STUDY**

This project will be subject to a Value Engineering (VE) Study prior to completion of the preliminary design phase. The VE Study will be conducted by a multi-disciplined team of COMMISSION personnel and a representative from the CONSULTANT whose purpose will be to consider cost improvements and develop alternate designs.

VE is an event oriented function that will occur prior to completion of the preliminary plans. The VE Study will be part of the preliminary plan review done by the COMMISSION. VE Study support services required of the CONSULTANT will include preparation of project data, an engineer from the CONSULTANT to participate on the 5-7 member VE team, presentation of the project by the CONSULTANT to the VE Study team, follow-up communications during the VE study, attendance of the VE Study presentation and review of design recommendations made by the VE team. The total CONSULTANT VE Study support services may require up to 100 man-hours as outlined below:

1. Preparation of project data and drawings. - The CONSULTANT will assemble project reference material, design data and documentation developed during the preparation of the preliminary plans. A Project Data Check List is provided on sheet 3 of this Exhibit. Three (3) sets of drawings will be submitted to the COMMISSION’S District Office two (2) weeks prior to the start of the VE Study. The project data files should be brought to the study site for use by the team.

2. CONSULTANT VE Study Team Member - The CONSULTANT will be represented on the VE Study team by an Engineer employed by their organization. The CONSULTANT'S VE Study team Engineer will meet with the VE Study team four consecutive days for eight (8) hours each day.

3. Presentation of the Project to the VE Team - The CONSULTANT'S Project Manager and other key project personnel shall meet with the VE team during the first day of the study to explain development of design features and explain the rationale used. The presentation portion of the VE study may require 1-2 hours.

4. Follow-up Communications - The CONSULTANT will provide telephone and written communications during the course of the VE Study.

5. VE Study Presentation - The CONSULTANT'S Project Manager will attend the VE Study presentation of recommendations. The presentation will be given the last day of the study and may require 1-2 hours.

6. Review Design Recommendations - The CONSULTANT'S Project Manager will review the design recommendations made by the VE Study team and respond in writing to the COMMISSION'S District Office with their recommendations. Recommendations should fall into one of three categories for each recommendation; approval, disapproval or modification.

7. COMMISSION Preliminary Plans Review - The COMMISSION will ultimately approve, disapprove or modify any recommendation made by the VE Study team as part of the preliminary plans review.

8. This work will be eligible for reimbursement after completion of the VE Study. Payment will be made as a part of the monthly progress payments.

**PROJECT DATA CHECKLIST FOR VALUE ENGINEERING**

**INFORMATION FOR THE V.E. TEAM**

\_\_\_ 1) Traffic information (which was utilized in making the conceptual design decisions) consisting of preliminary 10 and 20 year projections based on present and historical counts should be available. Also any other known traffic impact, which is anticipated.

\_\_\_ 2) Aerial photo coverage of the project depicting corridors or interchange layouts.

\_\_\_ 3) Information on current right of way values consisting of such items such as square foot market values for areas which are affected by each proposed design.

\_\_\_ 4) Preliminary Plans, including construction quantities and cost, right of way cost, environmental impacts, utilities and safety.

\_\_\_ 5) Design reports (Reconnaissance, EIS, Public Hearing)

\_\_\_ 6) Traffic operation analysis.

\_\_\_ 7) Contour maps

\_\_\_ 8) Typical section.

\_\_\_ 9) Plan and profile sheets

\_\_\_ 10) Intersection and Interchange Layouts

\_\_\_ 11) Bridge plans, bridge memorandum or bridge survey report.

\_\_\_ 11) Cross sections

\_\_\_ 12) Retention areas

\_\_\_ 13) Soils reports

\_\_\_ 14) Accident data

\_\_\_ 15) The most current detailed cost estimate available

**(The following exhibit should be included if the Phase I screening for cultural resources is to be done by the consultant.)**

**SCOPE OF SERVICES FOR**

**PHASE I CULTURAL RESOURCES SURVEYS**

This scope of services covers only CONSULTANT services through the Phase I cultural resources survey and the resulting Phase I survey memo/report. The Missouri Department of Transportation (MoDOT) reserves the right to negotiate a supplemental agreement with the current CONSULTANT or enter into a separate agreement with a different CONSULTANT(s) for any further work inclusive of specialized studies, Phase II investigations, or mitigation efforts.

TASK 1 - PROJECT INITIATION

The CONSULTANT will complete and submit a Project Summary Form for the project to the Missouri Department of Natural Resources, Historic Preservation Program (HPP). The primary CONSULTANT should do this before hiring a sub-consultant or otherwise committing to a cultural resources survey, as one outcome may be that no survey is required. If HPP's response to this submittal is that no further cultural resources investigations are required, Section 106 clearance will have been received and no further cultural resources investigations will be done for that project. If HPP determines that cultural resources investigations are required for a project, those investigations will follow the process outlined below.

TASK 2 - PRE-FIELD STUDIES

A general cultural overview will be developed to generate historical themes and provide a cultural context for the evaluation of cultural resources identified in the project vicinity. This shall also include background research conducted for the project vicinity. The records of the HPP and the Archaeological Survey of Missouri (ASM) must be consulted and the results of this research documented in the memo/report regardless of whether or not cultural resources are identified in the project area. This task shall minimally include:

1. Review and summary of the existing archaeological, architectural, and historical literature (CRM reports, academic publications, regional histories, architectural inventories, bridge inventories, archival maps, plat records, etc.) for the study area.

2. Identification of previously reported cultural resources within and adjacent to the study area. Typically, resources within one mile of the project area should be discussed (tabular data may be substituted for discussion if there is a great number of redundant resource types or if the resources are poorly documented and do not contribute to the understanding of regional resources).

3. Identification of cemeteries that may be within or adjacent to the project area. Typically, this is performed through the review of topographic maps or other archival resources and will be supplemented through later field investigations.

4. Review and summary of the pertinent environmental data (e.g. geology, soils data, hydrology, biological resources, etc.) for the area. These data are to be integrated with the cultural resources identified (or their absence) within the project area as appropriate.

5. Contacting the MoDOT Historical Bridge Coordinator for additional data on bridges, including information on potential National Register of Historic Places (NHRP) eligible bridge resources, and other data.

TASK 3 - FIELD INVESTIGATIONS

1. Architectural investigations will be completed to identify and document all architectural resources (i.e., buildings, structures, objects, ruins, and districts/landscapes) within the project area and the area of potential effect as has been determined by MoDOT.

a) All architectural resources within the job limits and the area of potential effect shall be photographed. Photographs shall minimally be 3 1/2" x 5" in size and mounted on plates for inclusion in the memo/report or otherwise inserted into the document. Each plate or figure shall bear a reference number linking it to a master map of architectural resources and an appropriate legend including the direction of view. Multiple views are required for all properties for which the *Missouri Office of Historic Preservation's Architectural/Historic Inventory Survey Form* is submitted*.*

b) The *Missouri Office of Historic Preservation's Architectural/Historic Inventory Survey Form* shall be completed for all buildings on properties where one or more buildings are greater than fifty years old. Forms shall also be completed for properties less than fifty years old that can reasonably be considered significant under Criterion G or other related criteria where the fifty-year guideline may be waived.

c) Site plans of all properties, which have *Architectural/Historic Inventory Survey Forms* and contain two or more buildings shall be compiled. These plans may be derived from aerial photographs, construction plans, other plans, or professionally drafted sketch maps. The buildings must be identified and keyed to any text descriptions and any photographs.

d) A recommendation of eligibility must be made and include the criteria of eligibility which apply to that resource. Justification for the conclusion, along with the eligible resources' boundaries, and a determination of the project's effects on said resource, shall be presented for each resource in the area of potential effect.

2. Historic bridge investigations will be completed to identify and document all bridge resources (i.e., highway, railroad and pedestrian bridges, viaducts and culverts, excluding metal, plastic and reinforced concrete pipes) located within the job limits and area of potential effect.

a) All bridge resources within the job limits and the area of potential effect shall be photographed. Photographs shall minimally be 3½-inch by 5-inch in size and mounted on plates for inclusion in the memo/report or otherwise inserted into the document. Photographs shall include at least one shot each of the entire structure from the side or at an angle, superstructure, substructure, roadway, the bridge nameplate, or identification number, and any unusual details, areas of damage, or embellishments. Each plate or figure shall bear a reference number linking it to a master map of bridge resources that indicates all locations. The plates shall include the route number, MoDOT Job Number, MoDOT bridge number (or field number if there is no MoDOT bridge number), and direction of view.

b) *The Missouri Office of Historic Preservation Bridge Inventory Survey Form* shall be completed only for those bridge resources in Clayton Fraser’s July 15, 1996 *Revised Summary Listing* and for bridge resources otherwise considered NRHP eligible or possibly eligible.

c) Location maps of all bridge resources that have Bridge Inventory Survey Forms shall be provided. These maps shall be derived from USGS Quadrangle Maps. Bridge resources must be identified and keyed to MoDOT bridge numbers (or field numbers if there are no MoDOT numbers), and to the photographs.

d) A recommendation of eligibility must be made and include the criteria of eligibility which apply to that resource. A justification for that conclusion, and a determination of the project’s effects on said resource, shall be presented for each bridge resource in the job limits and area of potential effect.

3. The CONSULTANT will complete a full Phase I archaeological survey for the project area. Unless otherwise identified, the area of potential effect for archaeological resources shall be confined to properties, which are or will be owned by MoDOT or regulated by MoDOT through permanent or temporary easements.

a) Through consultation with the engineering CONSULTANT, the cultural resources sub-consultant will identify the general depth of ground disturbance activities that are anticipated throughout various areas of the project limits.

b) Pedestrian survey shall be conducted of the project area. Previously recorded sites are to be re-evaluated.

c) Survey methodologies are to be concordant with the nature of the project's impact to potential deposits (e.g. deep testing may not be appropriate in areas to be elevated through the importation of fill materials but would be appropriate in areas to be cut or the locations of bridge bents, ditches, water retention structures, etc.).

d) Deep testing (auger tests, core drills, backhoe trenches) sufficient to detect buried cultural deposits within the vertical extent of project impacts or documentation that buried cultural deposits are unlikely to be present (prior disturbance, recent landforms, etc.) is required. Sampling of the job limits is permissible, expected, and should target areas of deep project impacts.

e) Determine the impact, if any, that the project will have on all identified sites.

f) Site boundaries, when possible, are to be determined. When a site extends out of the project area, an estimate of its extent based on surface walk over (if possible) or landscape features should be made and identified as such.

g) A recommendation of eligibility must be made and include the criteria of eligibility which apply to that resource where appropriate. A justification for that conclusion shall be presented for each archaeological site in the job limits.

TASK 4 – REPORTING RESULTS

HPP has developed a *Section 106 Survey Memo* (MO 780-1718) that may be used to report the results of cultural resources investigations. This form may be submitted in lieu of a Phase I cultural resources survey report, although enough relevant information needs to be presented to adequately explain the results of the investigations and the subsequent recommendation. Consult with MoDOT cultural resources staff if there is a question whether a memo or a report should be produced. If it is determined that a report is required to adequately explain the investigations, the *Section 106 Survey Memo* should be attached to the front of the report as a summary sheet.

1. Consultation with MoDOT staff following the completion of the survey for preliminary NRHP evaluations for each identified archaeological site is recommended.

2. The CONSULTANT shall prepare an integrated *Section 106 Survey Memo* or Phase I cultural resources report that meets or exceeds professional standards and incorporates the archaeology, architecture, and bridge resources. The memo/report will include the results of the background and field investigations as described above. The memo/report shall also minimally include a discussion of survey methodologies, constraints on field investigations, descriptions of all cultural resources including discussion and analysis of artifacts, historic contexts, regional or local architectural trends, as appropriate. The memo/report will also include recommendations regarding either the need for additional investigation or the NRHP eligibility for each resource.

3. The CONSULTANT shall provide two copies of the draft memo/report to MoDOT for review. If substantial revisions are required, the memo/report shall be returned to the CONSULTANT for revision; the CONSULTANT for these revisions can bill no additional costs. MoDOT will forward the initial or revised memo/report to the HPP for their concurrence with the recommendations. If MoDOT and the CONSULTANT cannot agree upon the resource recommendations, the memo/report will be submitted with the CONSULTANT's recommendations, with MoDOT presenting its recommendations in a cover letter. Following HPP's concurrence with the recommendations, the final version of the memo/report shall be transmitted to MoDOT: two copies if just the *Section 106 Survey Memo*; seven additional copies, with two of the copies to be unbound, if a Phase I cultural resources report is produced.

TIMELINES

1. Upon receipt of the draft memo/report by the Cultural Resources Section, MoDOT shall respond to the primary CONSULTANT with any request for revisions within fifteen days.

2. The primary CONSULTANT shall have fifteen days upon receipt of MoDOT's comments to respond and provide a revised memo/report.

3. MoDOT shall forward any comments made by the HPP to the primary CONSULTANT within five days of receipt.

4. The CONSULTANT or sub-consultant shall respond to those comments as deemed appropriate by MoDOT within fifteen days.

5. Following concurrence with the Phase I cultural resources recommendations by the HPP, the CONSULTANT or sub-consultant shall provide the remaining copies to MoDOT within thirty days of being notified that the HPP has accepted the findings and recommendations of the memo/report.

***(The following is a sample " narrative " about the project. It is not an official part of the contract. It should be given to the consultant at the kickoff meeting.)***

Route 67

St. Louis County

Job No. J6U0750

**PROJECT SUMMARY**

This project consists of widening and rehabilitating the existing pavement on Route 67 to meet the needs of the current and anticipated levels of traffic on this roadway.

This roadway was widened to a 52 foot four lane section in the mid 1960's. Shortly thereafter, our Maintenance and Traffic Department restriped this roadway to provide a narrow 52 foot five lane section. The roadway is 62 feet wide at most signalized intersections, and in some areas where private development was required to widen under permit.

A study was done in 1988 to determine ways to handle the excessive traffic that a typical five-lane roadway is not capable of handling. One alternate, which was flatly rejected, was to close the median, and provide lefts turns at specific locations, with U-turn ramps. Another idea was to provide a seven-lane section, which has never been done on a MoDOT route. This was also rejected, and the project was put on the back burner until something could be decided.

The Lynn Haven overpass was completed in 1991, and provided a seven-lane section up to Flamingo Drive on the northbound side, and to Coachway on the southbound side. Route 67 was resurfaced in 1993.

Since the Cold Water Creek Floodplain extends along and into a considerable portion of Route 67 right of way, the extent of possible floodplain infringement will need to be studied. This needs to be done to determine the exact extent of the floodplain, and if any and/or how much work can be done within its limits etc.

Since two earlier plans were studied and rejected, this project will begin at the conceptual level. The plans that were rejected in the past should not automatically be excluded from consideration. We want all ideas out on the table, and ideas should be ruled out based on data. Excessive right of way costs should be a factor, as should the level of service. We are interested in innovative ideas to move traffic through this area. In addition to any alternatives the Consultant may have, the following items should all be closely studied: signal coordination; traffic management systems; signal installation or removal; entrance removals and combinations; side road geometrics, removals and combinations with entrances etc. It is generally felt that five lanes will not provide the capacity for the current and anticipated amount of traffic. However, data will need to be obtained in order to rule out this option.

The CONSULTANT shall consider the consequences of the proposed improvements, and the requirements of MoDOT under ISTEA. For example, if additional lanes are required, will an alternative analysis need to be done, along with an air quality enhancement study etc. This shall be addressed in the Conceptual Plan Report Phase.

We require the CONSULTANT to review the costs and consequences involved with combining entrances, side roads, etc. to limit the number of access points to Route 67, and possibly include this as a general design concept, with some general guidelines as to when an entrance can be eliminated, combined with an adjacent property owner's entrance, etc.

The project is currently classified as an open ended categorical exclusion (CE2). We want the CONSULTANT to identify possible environmental concerns, so that the Commission can complete the proper forms and investigate and clear any environmental issues.

All plan phases shall be done using current English (metric) standards.

We will periodically require construction estimate updates, at a minimum of every six months, based on the latest design.

If the final design conclusion shows a large number of parcels, the CONSULTANT should recommend the pros and cons of letting the project in phases, taking right of way acquisition into account.

Traffic control will require handling traffic over the existing pavement. General traffic control standards should suffice for temporary lane closures. We will require all work be done during off peak hours, possibly requiring nighttime operations only. We will supply some standard drawings for traffic control to be inserted into the plans.

We will require regular monthly meetings with the CONSULTANT to review progress and further iron out design details etc.