Geometric Layout, Traffic Analysis and Environmental Documentation
For a Roundabout at the Intersection of
US Highway 71 and Minnesota Highway 7

Section 1 – Introduction and Intersection Information

1.1 - Introduction - The purpose of this contract is to prepare a signed geometric layout and environmental documentation for the construction of a roundabout at the intersection of US Highway 71 (TH71) and Minnesota Highway 7 (TH7). In addition to the geometric layout and environmental work, the contract will also require; a modified intersection control evaluation (ICE), preliminary hydraulics design, construction limits, and public involvement and outreach.

1.2 - Intersection Information - The junction of TH71 and TH7 is a rural intersection located in the southern part of Kandiyohi County, approximately 10 miles south of the city of Willmar. TH 71 is classified as an Oversized Overweight (OSOW) Super Load Corridor and is on the National Truck Network and TH 7 is on the National Truck Network. Both highways are posted at 60 mph and have no other stop conditions within 10-miles in any direction. The intersection also has commercial development in two quadrants and agricultural fields in the other two. The intersection control for this location has been a signal system since the late 1960’s. With a signal system and advanced warning flashers there have been several fatal and serious injury crashes at this intersection, enough to be considered a sustained crash location due to the severity of crashes. Highway Safety Improvement Program (HSIP) funds were procured for a roundabout at this intersection, through a special solicitation. Roundabouts have been shown to reduce fatal crashes by 89% and serious injury crashes by 74%. All these factors, and particularly that TH71 is a Super Load Corridor shall be incorporated into the design of this improvement.

Section 2 - Project Management (Source Type Code 1010)

2.1 - Project Coordination - Contractor will conduct up to four (4) project coordination meetings with the Project Management Team. This team will consist of members of MnDOT Engineering Staff. Task includes agenda preparation, meeting facilitation, follow-up, and a summary of activities and outcomes from each meeting. Meetings may be conducted via telephone when approved by the State’s Project Manager. Task also includes routine communications, including biweekly telephone calls or meetings with State’s Project Manager.

2.2 - Project Instructions and Quality Assurance - Contractor will develop internal tools (Project Instructions, Gantt Charts, Work Plans) to establish a schedule with defined deliverable dates, budgets, roles, and responsibilities for the project team members throughout the project.

2.3 - Monthly Progress Reports, Invoices and File Keeping - Contractor will submit monthly progress reports and invoices to State in the prescribed format. When all project work is complete, Contractor will prepare a final invoice and correspond with State to confirm the completed technical and financial status. Contractor will assemble a complete project record in paper and electronic files for archival purposes. The Contractor shall also supply an updated schedule each month.

Section 3 - Public and Agency Involvement (Source Type Code 1010)

3.1 - Public Involvement Plan - Contractor will develop a Public Involvement Plan that identifies when public involvement activities will be held, what the purpose of the activity is, who the intended audience is, what the intended format will be, and what information will be needed prior to the meeting. The plan will identify contacts with primary stakeholders as well as media outlets for receipt of project newsletters and/or press releases.
3.2 - **Project Web Documents** - Contractor will be responsible for providing project information in Web ready formats for the State’s use in keeping the general public informed in regard to the project. The Contractor will provide documents and graphics for the State to post on their Web site. The Contractor will not be responsible for hosting, or maintaining a Web site, only for supplying Web ready computer documents.

All documents provided for posting on MnDOT’s public website must meet the provisions the State of Minnesota’s Accessibility Standards and Minnesota’s accessibility standard for electronic documents at the following location: <http://mn.gov/oet/programs/accessibility/>. Contractor will provide updated information at significant steps in the process including public meetings, newsletters, publication of technical reports and environmental documents, and selection of the Preferred Alternative.

3.3 - **Newsletters** - Contractor will produce up to two (2) newsletters, which will provide updates about the project. Contractor will print and distribute up to 200 copies of each newsletter (using up to both sides of one 11x17 sheet) to a mailing list provided by State.

3.4 - **Public Information/Outreach Meetings** - Contractor will organize and conduct up to five (5) Public Information/Outreach Meetings in different locations upon direction from the State Project Manager to inform the public of the design of the roundabout. These meetings will be focused on public outreach of general roundabout information as well as project specific details. Contractor will arrange and pay for adequate facilities and refreshments and prepare exhibits and presentation. Public Information meeting will be held in the project area. Contractor will prepare a record of public and agency comments.

**Section 4 – Modified Intersection Control Evaluation (ICE)** (Source Type Code 1015)

4.1 - **ICE Procedure** - The analysis required under this contract is largely defined in the State’s Department of Transportation *Technical Memorandum No. 07-02-T-01 - Intersection Control Evaluation (ICE)*, including its attachments. Modifications to the ICE required for this contract are defined below. *Technical Memorandum No. 07-02-T-01* (ICE Tech Memo) can be found via the State’s Web site at the following address: <http://techmemos.dot.state.mn.us/techmemo.aspx> or directly at <http://dotapp7.dot.state.mn.us/edms/download?docId=1282991>.

4.2 - **ICE Modifications** - This contract requires some modifications to the ICE Tech Memo. These modifications are generally aimed at addressing that the preferred intersection control of a roundabout has been selected due to its obvious improvements in safety, mobility, and the existing right-of-way (R/W) that currently exists to accommodate such an improvement. These unique attributes and opportunities have led to a more obvious preferred alternative and therefore modified nature of the ICE report.

Along with the ICE Tech Memo, the evaluation will include the following:

A) The State will conduct reviews and approvals of the ICE.
B) The Modified ICE will not address Political Considerations. Only the technical elements of the ICE are required. Any political consideration will be addressed as needed by the State.
C) The following elements will be added to the analysis defined by the ICE Tech Memo.
   1. The Contractor will assess, document, and discuss roundabout layouts that will incorporate OSOW requirements.
D) The Modified ICE Report will include all analysis elements, with comparison of alternatives.
E) Four (4) concept level alternatives for the intersection have been identified for analysis. The Contractor will be allowed to introduce other alternatives, or refinements of the
original four, but only alternatives approved by the State will be included in the final ICE. The four alternative concepts defined for analysis and comparison are:

1) Leave as is (Signalized Intersection)
2) Thru-Stop Intersection
3) All-Way Stop Controlled
4) Roundabout

4.3 - ICE Deliverables

The Contractor will provide:

A) An ICE, as defined in the ICE Tech Memo, except as modified in Section 4.2 above. The review process for the ICE Report will consist of up to three (3) iterations of reviewing (State) and revising (Contractor) before final acceptance. The final Report will be provided in Adobe Acrobat PDF file format on computer CD, and also in six (6) bound copies.

B) A formal presentation of ICE findings, to the State, following acceptance of the ICE and final Report by the State (may be waived if found to be unnecessary).

The State will provide:

A) Traffic volume (AADT, turning movement (12-hour counts)) data.
B) Crash data
C) Aerial imagery and past construction plans, as available.
D) Coordination and the facility for the formal presentation of the ICE.
E) Prompt review and comment on draft versions of the ICE Report.

Section 5 - Environmental Studies (Source Type Code 1071)

5.1 - Early Notification Memo (ENM) and Categorical Exclusion (CATEX) Determination - Contractor will create the ENM and distribute it to the appropriate departments. Using the material gathered from the ENM, the Contractor will complete the CATEX (short form). The State will review the CATEX and make comments. The Contractor will incorporate the State’s comments and submit the final signed CATEX to the State in Word format.

5.2 - Preliminary Wetlands - Contractor will provide the State with CADD files of field verified wetland boundaries and types in the project area as identified from Natural Resources Conservation Service (NRCS) wetland mapping, county soil surveys, county hydric soils lists and DNR Public Waters Inventory mapping. Contractor will identify impacts of each alternative and opportunities for wetland avoidance. Contractor will summarize study findings in a draft Preliminary Wetland Technical Memo. Following modification of the alternative alignments, Contractor will reassess wetland impacts, finalize the Preliminary Wetland Technical Memo.

5.3 - Final Wetlands - Following selection of a Preferred Alternative Contractor will conduct the following work on wetlands within 300 feet the proposed highway centerlines:

1. Identify regulatory wetlands according to the currently accepted procedures (1987 COE manual) and using the Circular 39 classification system, identifying wetland acres by type.
2. Complete Army Corps of Engineers-approved wetland delineation forms; these forms will be appropriate for submittal to state and federal agencies during wetland permitting.
3. Identify and map all wetland edge locations per the 1987 Army Corps of Engineers manual.
4. Identify and assess wetland avoidance, minimization and mitigation strategies.
5. Conduct an assessment of the functions and values of delineated wetlands (Preferred alternative only) using the Minnesota Routine Assessment Method (MnRAM version 3.4. or current)
Contractor will develop an “Only Practicable Alternative Finding” regarding wetland impacts in accordance with Executive Order 11990. Contractor will prepare a Final Wetland Technical Memo by appending summary of this study to the Preliminary Wetland Technical Memo and submit the document to State in paper and electronic formats.

**Section 6 - Surveying** *(Source Type Code 1140)*

**6.1 - Design Surveying** - The State will provide all anticipated horizontal and vertical end controls upon Contract Execution.

**6.2 - Supplemental Surveying** - Contractor will provide supplemental surveys, as needed, and only with approval of the State’s Project Manager. All surveying will maintain the appropriate horizontal datum, County Coordinates, and vertical datum. The tasks will be performed in conformance with the current standards and specifications of State Survey and Mapping Manual, unless otherwise specified. The State anticipates that no more than 40 crew hours of Contractor’s staff time may be needed for surveying tasks.

**Section 7 – Hydraulics Engineering** *(Source Type Code 1141)*

**7.1 - Preliminary Hydraulics** - Contractor will provide analyses of the basic surface water management features for the proposed roundabout. All drainage and receiving waters (lakes, wetlands, streams, and county ditches) identified as a part of the preliminary environmental studies will be identified and considered. Contractor will identify major water crossings and potential stormwater treatment locations. Contractor will provide mapping of surface water features to the State for review.

**7.2 - Final Hydraulics** - Contractor will conduct a hydraulic study on the Preferred Alternative alignment including the following:

1. Verifying drainage area boundaries.
2. Determining existing and future surface water runoff hydrology, modeled in HydroCAD software.
3. Locate and identify major water crossings (defined as discernible swales from quad maps), drainage and receiving waters (lakes, wetlands, streams, county ditches, etc.).
4. Determining preliminary sizes and locations of bridges, culverts, and storm sewer where required.
5. Identifying location and size of water quality and retention ponds, infiltration areas and temporary sediment ponds (if needed) that would be placed in advance of the receiving water bodies.

Contractor will coordinate the hydraulic study and will document hydraulic study results in a draft and final Hydraulic Study Technical Memo. The final memo will be provided to State in paper and Acrobat Reader (*.pdf) formats.

**Section 8 – Geometric Layout** *(Source Type Code 1140)*

**8.1 - Preliminary Geometric Layout** - Contractor will prepare and analyze alignment alternatives. Contractor will develop and evaluate alternative alignments and/or cross sections that demonstrate consideration of strategies to avoid resources and minimize the impacts of R/W acquisition. Upon selection of a preferred roundabout layout, Contractor will submit a Preliminary Layout and Draft Construction Limits for MnDOT review. R/W impacts will be a critical path for this project and therefore construction limits a key focus in order to start that process as soon as possible. MnDOT will then provide comments to the Contractor to be incorporated into the Final Geometric Layout.
Contractor will attend one (1) meeting with the State’s Central Office Geometric Design Support Unit to review preliminary layout.

Contractor will submit the Preliminary Geometric Layout and profiles for MnDOT review. Submittal will include both hard copy (up to 3 copies) and electronic file. All electronic files will be in MicroStation Version 8i and GEOPAK in accordance with MnDOT CADD standards, online at <http://www.dot.state.mn.us/caes/cadd/>.

8.2 - Final Geometric Layout - Contractor will prepare a Final Level 1 Layout for MnDOT signature. Included with the Final Layout will be profiles, preliminary cross sections at 50 foot intervals, construction limits and any other elements necessary for plan preparation and R/W acquisition. Construction limits will consider special ditch grades and pond locations. Contractor will submit the electronic files with the refined alternatives and a draft and final Technical Memo documenting the alternative development and evaluation process in paper and Acrobat Reader (*.pdf) formats to State.

Contractor will submit the Final Geometric Layout and profiles for MnDOT approval. Submittal will include both hard copy (up to 3 copies) and electronic file. Submission of Final Geometric Layout will include construction limits map. All electronic files will be in MicroStation Version 8i and GEOPAK in accordance with MnDOT CADD standards.

8.3 - Develop Additional Design Vehicles for Turning Movements - The Contractor will be required to model five (5) or more different design vehicles other than the standard WB-series, in order to address the significant freight hauling that occurs thru this intersection and that will traverse the newly constructed roundabout. The State will provide 3 design vehicles with the Contractor providing at least 2 more design vehicles. The developed design vehicle shall be in CADD format and able be automated along a path in a MicroStation drawing in order to determine wheel paths and impacted areas. These alternate turning movements will also be shown on the geometric layout.

Section 9 – Cost Estimating (Source Type Code 1140)

9.1 - Cost Estimating - Contractor will prepare preliminary cost estimates for the alternatives. Cost estimates will be based on the Contractor’s preliminary geometric layout, and typical MnDOT roadway construction costs, assembled by Contractor with concurrence by State Project Manager.

Cost estimates will be calculated on a detailed (including all grading, base, surfacing, etc.) basis for various roadway design typical sections (mainline roadway, frontage roads, ramps, etc.) plus drainage features, structures, lighting, retaining walls, bridges and any other features of the constructed project. Additionally, R/W acquisition costs will also be estimated.

A benefit-cost analysis will be completed for the proposed alternatives in accordance with MnDOT Office Transportation Systems Management guidelines for preparing benefit-cost analyses. Contractor will prepare draft and final Technical Memos documenting the cost estimate and benefit-cost analysis. The Technical Memos will contain a table documenting items, quantities and unit costs and a sketch illustrating the items included in the table, and will be submitted in paper and electronic formats.

Section 10 – Project Schedule

The following schedule is for the major items and is based off an assumed study commencement date (notice to proceed) of May 15, 2015. The schedule should be adjusted accordingly as per the actual notice to proceed date at the time of contract execution.
The Contractor will be responsible for carrying out all work on the project according to the following schedule. Dates shown are the date a task must be complete and the work accepted by the State’s Project Manager.

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<thead>
<tr>
<th>Deliverable Item</th>
<th>Deliverable Date</th>
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<tbody>
<tr>
<td>Project Management</td>
<td>Duration of the Project</td>
</tr>
<tr>
<td>Updated project schedule</td>
<td>May 29, 2015</td>
</tr>
<tr>
<td>Design Vehicles</td>
<td>June 1, 2015</td>
</tr>
<tr>
<td>Distribute ENM</td>
<td>June 12, 2015</td>
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<tr>
<td>Public involvement Plan</td>
<td>June 15, 2015</td>
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<td>Final Ice Report</td>
<td>June 30, 2015</td>
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<td>Construction Limits</td>
<td>July 17, 2015</td>
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<td>Preliminary Geometric Layout</td>
<td>July 17, 2015</td>
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<td>Wetland Documents</td>
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<tr>
<td>Hydraulics Study Tech Memo</td>
<td>July 31, 2015</td>
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<tr>
<td>Layout to CO for review</td>
<td>August 30, 2015</td>
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<tr>
<td>Signed CATEX</td>
<td>October 15, 2015</td>
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<tr>
<td>Final signed layout</td>
<td>October 15, 2015</td>
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