Project Overview
This work is for a geotechnical analysis and design, plan development and specification preparation for embankment construction at the Twin Ports Interchange Project (TPI) in Duluth, Minnesota. It is part of State Project No. 6982-322 (I-35), S.P. 6980-60 (I-535) and S.P. 6915-136. The TPI Project is located at the Junction of I-35, I-535 and TH 53 in Duluth Minnesota and will replace the existing interchange known locally as the “Can of Worms”. The approach embankments for this bridge will include significant fills over thick layers of highly compressible foundation materials (organic soils). To safely and economically construct the roadways at each end of this bridge, column supported embankments (CSE) were determined to be the best solution for this area. The final deliverables for this work will include a Geotechnical Analysis and Design Report, Embankment Construction Plans and Specifications to be inserted in the PS&E for SP 6982-322. More information on the Twin Ports Interchange can be found at: http://www.dot.state.mn.us/d1/projects/twin-ports-interchange/index.html

The most up-to-date project information and draft design files and geotechnical information can be found at: ftp://ftp2.dot.state.mn.us/pub/outbound/Duluth/ State will deliver this project through the Construction Manager/General Contractor (CMGC) delivery method. Contractor will be part of a collaborative project delivery team consisting of State, Contractor, Preliminary and Final Bridge Designer(s), CMGC, Independent Cost Estimator (ICE), Engineer’s Estimator (EE) and other stakeholders. State has also procured the services of the CMGC through a separate process and is in the process of procuring the ICE and EE.

While the CMGC’s input will serve to reduce changes and inefficiencies during construction, responsibility for the Construction Plans and Specifications (i.e. Engineer of Record) for the final road plans will remain with Contractor and not with the CMGC. Information on the State’s CMGC program can be found at: http://www.dot.state.mn.us/const/tools/const-manager-general-contractor.html

Contractor’s Detail Tasks include:

Task 1
Review the available information in the vicinity of the proposed CSE. This includes existing subsurface investigation information and preliminary plans, profiles and cross-sections. Using this information, a preliminary CSE settlement mitigation plan will be developed to limit long term embankment settlement to tolerable conditions. Long-term settlement is considered to be all vertical deformation that occurs after construction of the embankment and placement of the pavement; however, for the purposes of an effective CSE, some vertical deformation is necessary to mobilize the system. The preliminary design will be presented to State during a meeting to be
held at the Project Office in Duluth. Contractor will also use this opportunity to perform a site reconnaissance of the project.

Task 2
A detailed geotechnical analyses and design will be performed using the available subsurface information. The results will be provided in a Geotechnical Analysis and Design Report (GADR). This will include design calculations, typical section(s), and specific recommendations for design and construction of the CSE.

Task 3
A Geotechnical Instrumentation Plan (GIP) will be developed to monitor the embankment. It is estimated that the instrumentation plan will include settlement measurement devices, pore pressure transducers, strain gages in structural elements and other pertinent devices if necessary.

Task 4
Design drawings and specifications for the settlement mitigation system will be developed and submitted to State for inclusion in the construction documents at each milestone below. The drawings will include typical sections and a plan view indicating CSE column locations; general civil, site grading, etc. plans will not be generated. The drawings will be developed in Microstation and will be submitted electronically to State in the standard plan format. It is anticipated that two construction specification sections will be required. The plans and specifications will be presented to State during a meeting to be held at the State’s Project office in Duluth. Any necessary changes that result from that meeting will be incorporated into the final plans and specifications.

Task 5
Once construction of the settlement mitigation system begins, Contractor will provide on-site construction observations for a time period of approximately 5 weeks. These services will be provided to ensure the construction is commensurate with the design and to instruct State on-site personnel on the critical components of the construction. However, routine QC/QA and inspection will be performed by others. Brief memorandums including recommendations will be submitted following each of the five construction observation visits.

Task 6
Contractor will participate in weekly conference calls with the State, road and bridge designers and CMGC staff. Assume 20 calls of 2 hours in duration.

Schedule of Deliverables:

30 % Road Plans/Preliminary Design Concept       June 3, 2019

60 % Road Plans/Geotechnical Design and Analysis  November 14, 2019

90 % Road Plans       March 2, 2020

100% Road Plans       June 5, 2020