

Hydraulic and Hydrological Studies

[Standard Work Category: 209](#)

A. OVERVIEW OF THE WORK:

1. This work involves hydrologic and hydraulic studies of drainage basins and streams to define the most practicable solutions for all hydraulic related issues in floodplains, bodies of water, rivers and streams, drainageways, and wetland areas. This may include:
 - a. Hydrologic studies related to highway drainage facilities and floodplains
 - b. Hydraulic design of bridges, culverts, flumes, ditches, channels, and storm sewer systems
 - c. Hydraulic design of stormwater detention facilities
 - d. Design of stormwater treatment facilities for projects within MS4 communities
 - e. Hydrologic and Hydraulic analysis and design of wetland mitigation and bank sites
 - f. Floodplain "Certification of Compliance" for different types of highway projects with work performed within a mapped or unmapped floodplain
 - g. Design of dams, including certification and completion of necessary permits
 - h. Stream and bank stabilization
 - i. 408 Coordination with USACE
2. Developing guidance and/or training manuals for Roadway and Bridge Design Divisions for H&H related initiatives and processes.

B. QUALIFICATIONS, KNOWLEDGE AND EXPERIENCE:

1. The work is to be performed by, or under the direct supervision of a Licensed Professional Engineer with hydraulic experience.
2. Consultant's employees must have a working knowledge of the latest NDOT Bridge Division "Hydraulic Analysis Guidelines 2015".
3. Consultant's employees must have a working knowledge of the latest NDOT Roadway Design Division "Drainage Design & Erosion Control Manual".
4. For projects involving dams, consultant's employees must meet minimum qualifications in the Nebraska Department of Natural Resources (DNR) dam safety rules as defined in Title 458.
5. Consultant's employees must have competence in design of municipal storm sewer systems and knowledge of NDOT policies and procedures and the related regulatory requirements.

**BASIC SCOPE OF SERVICES
ON-CALL HYDRAULIC AND HYDROLOGICAL STUDIES**

6. Consultant's employees must have competence in design of stormwater detention facilities.
7. Consultant's employees must have competence in the design of stormwater quality treatment facilities (STFs).
8. Consultant's employees must have competence in designing and establishing wetland mitigation sites and banks. Experience should include establishing the sites based on groundwater and/or surface water sources for successful establishment and attainment of maximum wetland credits.
9. Consultant's employees must have knowledge of Nebraska Floodplain Regulations and competence in "Certification of Compliance".
10. Consultant's employees must have knowledge and experience in Section 408 levee design, certification and permit application process.

C. SOFTWARE AND EQUIPMENT REQUIREMENTS:

Consultant's employees must have a working knowledge of hydrologic analysis, and hydraulic programs for 1-dimensional and 2-dimensional modeling such as:

1. HY-8 (1D)
2. HEC-RAS (1D & 2D)
3. SMS – Tuflow, SRH2D (2D)
4. HEC-SSP

D. EXPECTATIONS FOR THE DELIVERABLES:

1. Consultant's hydrologic and hydraulic work must be completed in accordance with the latest Bridge Division's "Hydraulic Analysis Guidelines 2015" and NDOT Roadway Design Division "Drainage Design & Erosion Control Manual".
2. For Letter of Map Revision (LOMR) or Conditional Letter of Map Revision (CLOMR), Consultant shall comply with the FEMA Guidelines.
3. When applicable, Consultant's work must comply with the DNR Dam Safety Guidelines (only for projects with dams).
4. Consultant shall submit their design and supporting documentation for review and approval by NDOT (electronic copy and hard copies as requested).
5. Consultant shall address all issues raised by NDOT's review and make all necessary changes to the work.
6. Consultant shall submit an electronic copy (and hard copies as requested) of the signed and sealed final approved report and design plans.