

**PRECONSTRUCTION**

**Unit contact:**

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**HYDRAULIC DESIGN**

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Discipline Code	Discipline	Description of Work	Key Personnel Required	Employee NC Registration Required	Minimum Years of Experience	Firm NC Registration Required	Additional Requirements
433	Tier I Basic Hydrologic and Hydraulic Design	a) Roadway drainage design, including ditches, small pipe culverts, storm sewer systems, outfall analysis, drainage investigations, etc...  b) Bridge and/or culvert design over streams using the Federal Highway Administration (FHWA) design guidelines, such as Hydraulic Design Series 5, 7, HY-8, HEC-Ras, etc...  c) Drainage design using the North Carolina Department of Transportation "Stormwater Best Management Practices Toolbox" or similar.	Hydraulic/ Hydrologic Engineer	P.E.	3	P.E.	1. Submit samples of the approved design reports and/or hydraulic calculations/models for a, b and c.  2. Submit resumes/work experience of all key staff.  3. Proof of work experience may be waived by the State Hydraulics Engineer for Engineers who have worked at NCDOT Hydraulics Unit as an Engineering Supervisor and/or Engineer with a minimum of five (5) years in review and/or design of hydrologic and hydraulic projects in the Unit.

434	Tier II Complete Hydrologic and Hydraulic Design	<p>a) Tier I, plus:</p> <p>b) Design of bridges and culverts over FEMA regulated streams that require coordination and approvals from FEMA or their designees.</p> <p>c) Experience evaluating scour and stream instability using FHWA guidance such as HEC 18, HEC 20 and HEC 23.</p>	Hydraulic/ Hydrologic Engineer	P.E.	8	P.E.	<ol style="list-style-type: none"> <li>1. Meet all the requirements of a, b, and c. Submit samples of b and c.</li> <li>2. Submit resumes/work experience of all key staff.</li> <li>3. Firm is required to prepare drainage plans using current NCDOT CADD standards and Drainage Software.</li> <li>4. Proof of work experience may be waived by the State Hydraulics Engineer for Engineers who have worked at NCDOT Hydraulics Unit as an Engineering Supervisor and/or Engineer with a minimum of 10 years in review and/or design of hydrologic and hydraulic projects in the Unit.</li> </ol>
479	Tier III Complex Hydraulic Design	<p>a) Tier I and Tier II, plus:</p> <p>b) Two-dimensional (2D) hydraulic modeling design experience for bridges over streams that are under the influence of turbulent, unsteady flow, etc...</p>	Hydraulic/ Hydrologic Engineer	P.E.	8	P.E.	<ol style="list-style-type: none"> <li>1. Meet all the requirements of Tier II.</li> <li>2. Submit resumes/work experience of all key staff.</li> <li>3. Submit samples of the approved design reports and design models using 2-D hydraulic modeling.</li> </ol>
480	Highway Floodplain Program Support	Extensive knowledge of the National Flood Insurance Program. Extensive experience in hydraulic model design and community flood map revision or creation for FEMA or a designee of FEMA. Experience reviewing hydraulic models for bridges and/or culverts over FEMA regulated streams.	Hydraulic/ Hydrologic Engineer	P.E. CFM	8	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of the approved reviews, designs and maps while under contract with FEMA and/or their designees.</li> <li>2. Submit resumes/ work experience of all key staff.</li> <li>3. Firm is required to have and use current NCDOT CADD standards.</li> <li>4. Certified Floodplain Manager (CFM) required.</li> </ol>

481	NPDES Stormwater Permit Programmatic Support	Extensive knowledge of the USEPA's NPDES stormwater program and experience assisting MS4s in implementation of NPDES permit stormwater programs. Experience negotiating NPDES permit language with regulatory agencies, administering and overseeing the implementation of NPDES compliance programs, preparation of NPDES annual reports, preparation of fiscal year program business/work plans, designing and performing internal program self-assessment audits, managing water quality research projects, development of NPDES internal education programs for MS4 staff and contractors, and development of information technology solutions to support delivery of NPDES programs.	Hydraulic/ Hydrologic Engineer,  Environmental Scientist, Biologist/Ecologist, IT Specialist	P.E.	8	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of work demonstrating NPDES programmatic support for MS4 NPDES programs.</li> <li>2. Proof of work experience may be waived by the State Hydraulics Engineer for Engineers who have worked at NCDOT Hydraulics Unit as an Engineering Supervisor and/or Engineer - Advanced with a minimum of 10 years in managing and reviewing NPDES compliance tasks in the Unit.</li> </ol>
482	Coastal Hydraulic Engineering	Extensive knowledge and experience of coastal hydrodynamics and simulation models using RMA2 (Resource Management Associates), ADCIRC (Advanced Circulation Model for Coastal Ocean Hydrodynamics), SWAN (Simulation Waves Near Shore) software or similar state-of-the-art hydrodynamic modelling techniques for coastal resources.	Hydraulic/ Hydrologic Engineer	P.E.	8	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of the approved design reports and hydraulic models in the coastal areas.</li> <li>2. Submit resumes/ work experience of all key staff.</li> </ol>

553	NPDES Stormwater Program - Industrial Facility Compliance and Asset Inventory	<p>a) Experience preparing stormwater pollution prevention plans (SPPPs) and spill prevention, control, and countermeasure (SPCC) plans for industrial facilities. Experience developing and delivering stormwater pollution prevention training for industrial facility staff.</p> <p>b) Experience with geospatial field mapping of industrial facility assets, stormwater conveyance systems and outfalls draining roadways and industrial facilities.</p> <p>c) Experience identifying waters of the US for the purposes of outfall identification and Clean Water Act compliance.</p>	Hydraulic/ Hydrologic Engineer, Geologist, Biologist/ Ecologist, GIS Specialist	P.E.	3	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of SPPPs and SPCC plans prepared by the firm.</li> <li>2. Demonstration of experience preparing and delivering stormwater pollution prevention training.</li> <li>3. Submit examples of asset inventory maps prepared by the firm which demonstrate field geospatial data collection capabilities. Maps should include stormwater conveyance system features and outfalls. Prequalification under discipline code 280 preferred.</li> </ol>
554	NPDES Stormwater Program - Water Quality Modeling Support and TMDL Compliance	Experience developing and applying water quality models to support regulatory compliance. Relevant experience includes the application of watershed and surface water models such as, but not limited to, HSPF, WASP, SWMM, EFDC, WARMF, SWAT, and SELDM. Review of model applications developed by third parties. Preparation of modeling reports and TMDL compliance plans.	Hydraulic/Hydrologic Engineer, Environmental Scientist	P.E.	5	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of work demonstrating water quality model development and application.</li> <li>2. Submit samples of work demonstrating TMDL compliance support for regulated entries.</li> </ol>

555	NPDES Stormwater Program-BMP Retrofit Site Selection and Design	<p>a) Experience locating potential retrofit sites using a combination of desktop and field evaluation techniques.</p> <p>b) Experience preparing BMP construction drawings, pollutant load calculations and management of databases for the storage, retrieval, and reporting of site assessment information.</p> <p>c) Experience with BMP construction engineering and inspection.</p>	Hydraulic/Hydrologic Engineer, Biologist/Ecologist, Soil Science Engineer	P.E.	3	P.E.	<ol style="list-style-type: none"> <li>1. Submit samples of work that were approved by Local, State or Federal Agencies.</li> <li>2. BMP inspection and maintenance certification preferred.</li> <li>3. Prequalification under discipline code 433 required.</li> </ol>
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