



# COMPETENCY ASSESSMENT

COMPETENCY CATEGORY	COMPETENCIES (10)	CIVIL - MUNICIPAL/INFRASTRUCTURE INDICATORS (guidance on example content that will demonstrate the competency)
<b>1. Technical Competence (10 competencies)</b>	1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.	<ol style="list-style-type: none"> <li>1. Identify and comply with legal and regulatory requirements for project activities</li> <li>2. Prepare Permit Applications</li> <li>3. Incorporate knowledge of codes and regulations in design materials</li> <li>4. Prepare reports on standards and project compliance</li> <li>5. Recognize the need to design for code compliance while achieving constructability</li> <li>6. Interpret and apply regulations that affect the handling, transportation and disposal of waste materials</li> </ol>
	1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> <li>1. Demonstrate knowledge of materials and/or operations: Cost, Storage, Quality &amp; Handling problems</li> <li>2. Develop and implement evaluation, maintenance or rehabilitation programs for infrastructure and operations</li> <li>3. Coordinate with other disciplines</li> </ol>
	1.3 Analyze technical risks and offer solutions to mitigate the risks.	<ol style="list-style-type: none"> <li>1. Demonstrate familiarity with system protection objectives, philosophies, and functions</li> <li>2. Identify risk areas</li> <li>3. Develop risk management plans</li> <li>4. Demonstrate an understanding of the difference between technical risk and public safety issues</li> </ol>

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	1.4 Apply engineering knowledge to design solutions.	<ol style="list-style-type: none"> <li>1. Collect, record, and analyze information from sources such as geological reports, subsurface investigations, and in situ testing</li> <li>2. Calculate material quantities and volumes using mathematical formulae, measurements and data from construction drawings and specifications</li> <li>3. Prepare technical specifications</li> <li>4. Conduct inventories of water supplies and assess impact of projected population growth on water supply demands</li> <li>5. Design sanitary sewer systems</li> <li>6. Conduct model and flow analysis for public sewer facility design</li> <li>7. Demonstrate knowledge of lift station design</li> <li>8. Conduct inflow/outflow infiltration studies</li> <li>9. Design water treatment facilities (e.g. operations for sedimentation, flocculation and coagulation, filtering, disinfection and chlorination)</li> <li>10. Apply methods of alternate technology (e.g. precipitation, absorption oxidation and ion exchange to remove metals and soften water)</li> <li>11. Use standard methods for the treatment of waste water (sample and assess waste water for physical, chemical and microbiological characteristics using tests; Select treatment processes for septic tanks and tile beds)</li> <li>12. Select tertiary treatments for waste water</li> </ol>
	1.5 Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> <li>1. Demonstrate an understanding of the engineering principles used in the application of computer design programs</li> <li>2. Participate in an independent review process</li> </ol>
	1.6 Safety awareness: be aware of safety risks inherent in the design; and Demonstrate Safety Awareness - on-site and possible safety authorization/certificate as appropriate.	<ol style="list-style-type: none"> <li>1. Identify and incorporate safety procedures, processes, and equipment</li> <li>2. Review and incorporate safety or system operating procedures</li> <li>3. Demonstrate specific knowledge of safety regulations</li> <li>4. Incorporate explicit human and public safety considerations in design and all other professional activities</li> </ol>
	1.7 Demonstrate understanding of systems as well as of components of systems.	<ol style="list-style-type: none"> <li>1. Calculate and assess current or projected infrastructure needs according to their area of practice</li> <li>2. Demonstrate an understanding of each element in the process, and the infrastructure required</li> </ol>

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	1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.	1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages: <ul style="list-style-type: none"> <li>◦ <b>Identification:</b> generation of the initial project idea and preliminary design</li> <li>◦ <b>Preparation:</b> detailed design of the project addressing technical and operational aspects</li> <li>◦ <b>Appraisal:</b> analysis of the project from technical, financial, economic, social, institutional and environmental perspectives</li> <li>◦ <b>Preparation of specifications and tender documents:</b> preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work</li> <li>◦ <b>Implementation and monitoring:</b> implementation of project activities, with ongoing checks on progress and feedback</li> <li>◦ <b>Evaluation:</b> periodic review of project with feedback for next project cycle</li> </ul>
	1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.	1. Conduct field checks to verify the validity of design 2. Follow Quality Management principles in practice 3. Prepare quality control plans, including frequency and test parameters, for specific construction processes or products 4. Evaluate test results and determine adequacy 5. Carry out or supervise field testing of materials or construction processes
	1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.	1. Demonstrate familiarity with CAD software and techniques for specific design requirements 2. Demonstrate knowledge of capture and validation of as-built information 3. Prepare complete drawings with sufficient cross sections and details and eliminate any discrepancies; provide technical specification; refer to the related items of the specification on each part and detail on the drawings 4. Prepare rough sketches for the drafter and explain your intentions 5. Review designs of others and communicate findings and issues, including suggested alternatives