Project Utility Engineering – Specialty Area Body of Knowledge
May 2026

Project Utility Engineer Specialty Area Body of Knowledge (PUEBOK)

Abstract

The **Project Utility Engineer – Specialty Area Body of Knowledge** (PUE-SABOK) presents the knowledge and core competencies integral toward proficiency in the specialized discipline of project utility engineering .The purpose for the PUE – SABOK is to provide a framework for the comprehensive study and mastery of the range of knowledge and skills that define the professional practice of the Project Utility Engineer. The PUE SABOK describes the knowledge, skills, experience, and mindset required of a board certified Project Utility Engineer The PUE - SABOK builds upon the American Society of Civil Engineers (ASCE) Body of Knowledge 3rd edition (CEBOK3) for the practice of Civil Engineering, of which Project Utility Engineering is a sub discipline. The typical path to fulfill these outcomes is through a combination of bachelor's degree-level coursework, postgraduate level coursework, mentored professional experience, continued self-development, and adherence to the ASCE Code of Ethics (see detailed eligibility requirements on the "Eligibility" section of the program website). **The PUE - SABOK outlines the content included in the written exam for board-certification in Project Utility Engineering and is utilized by the Utility Engineering & Surveying Certification Board (UESCB) to help evaluate candidates for board certification.**

Project Utility Engineer SABOK (PUE-SABOK)

The Specialty Area Body of Knowledge for board certification as a Project Utility Engineer is an outline of post graduate study, experience, and continuing education of the specialty area subject matter for examination to support a determination of competency for exam applicants for award of the board-certified Project Utility Engineer (BC.PUE).This document will be used by the UESCB evaluation committee to evaluate candidate eligibility for board certification. The intent of the PUEBOK is not to establish a checklist of requirements, but to provide a template by which the UESCB has developed examination content.

The American Society of Civil Engineers Civil Engineering Body of Knowledge, third edition, (CEBOK3), lists the outcomes necessary for professional licensing in 21 categories. The CEBOK3 outlines 21 foundational, technical, and professional practice learning outcomes for individuals entering responsible charge in the practice of civil engineering.

Table ES-1. *Civil Engineering Body of Knowledge* Outcomes.

Foundational	**Engineering Fundamentals**
Mathematics	Materials Science
Natural Sciences	Engineering Mechanics
Social Sciences	Experiment Methods and Data Analysis
Humanities	Critical Thinking and Problem Solving
Technical	**Professional**
Project Management	Communication
Engineering Economics	Teamwork and Leadership
Risk and Uncertainty	Lifelong Learning
Breadth in Civil Engineering Areas	Professional Attitudes
Design	Professional Responsibilities
Depth in a Civil Engineering Area	Ethical Responsibilities
Sustainability	

American Society of Civil Engineers. (2019). *Civil engineering body of knowledge for the 21st century: Preparing the future civil engineer* (3rd ed.). Table ES-1.

Mastery of an outcome means the engineer has reached the level of expertise such that more challenging, complex, and difficult problems may be solved than can be addressed by an ordinarily competent licensed engineer.

Mastery of an outcome can be demonstrated through an expert-level understanding of utility systems; utility investigations and documentation; project utility risk management; utility coordination; conflict identification, evaluation, and mitigation; and project utility asset management, as well as by authoring or co-authoring papers, writing standards, and advancing the profession through society committees, including the Utility Engineering and Surveying Institute.

Project Utility Engineer Job Role

The Project Utility Engineer (PUE) is typically a direct report to the project owner and project team members and plays a critical role throughout the project development and delivery lifecycle. The PUE is responsible for developing and implementing a comprehensive and cost-effective plan to avoid existing utility infrastructure, when possible, address conflicts that may be unavoidable, to minimize disruption of service, and protect the integrity of the utility when it is not in service. The following is a description of the job role of the PUE for which this certification recognizes:

Management of the inherent project risks associated with existing utility infrastructure impacted within the limits, and surrounding utility service areas, on proposed infrastructure projects.

Investigation, identification, designation and depicting subsurface and above ground utility systems, including utility structures and appurtenances, as well as qualitative assessment on unknown observed subsurface features that occupy the footprint of the proposed infrastructure project.

Project Utility Engineering – Specialty Area Body of Knowledge

May 2026

As a subject matter expert (SME), the PUE understands the fundamentals behind the deployment of near-surface geophysical equipment and other minimally invasive techniques, as well as the engineering survey tasks needed to complete a Subsurface Utility Engineering (SUE) investigation in a common datum.

PUE possess the knowledge and experience in utility systems (i.e. water, sewer, gas, telecom, electrical, steam, etc.), including materials, placement parameters, system constraints/restrictions, services, joint ownership/usage, maintenance needs, access, and right-of-way management. This includes a thorough understanding of the types of utility conflicts (direct vs. indirect), identification and evaluation of potential conflicts between the existing utility infrastructure and proposed project, and resolution of conflicts identified. The PUE is responsible for designing strategies, analyzing alternatives, and selecting remedies to avoid/minimize cost and schedule impacts that utility conflicts and/or utility construction requirements may have on the overall project performance.

PUE has the technical knowledge allowing for coordination of utility designs with various design disciplines (Cross-Discipline"), requiring a general knowledge and understanding of related civil engineering disciplines, such as highways, structures, traffic, drainage, etc. and their influence on utility infrastructure.

Understanding utility construction management, including construction techniques (such as open cut, HDD, jack and bore, and other trenchless technologies); the tools and equipment required to adjust, relocate, or protect utility infrastructure; construction staging and sequencing requirements; and utility service cut-over strategies to avoid or minimize service interruptions.

Knowledge and management of applicable regulatory compliance requirements, environmental permitting, and specialized utility permits (Sanitary Treatment Works, Potable Water, etc.).

Project Utility Engineering Technical Knowledge and Skills

PUEBOK Domains (Exam Topic Areas) and References

Project Utility Engineers, depending on their specific expertise, shall have experience and responsibilities in the following domains (topic areas).

In addition, the references aligned with each domain contain information and guidance on the content of this exam. We recommend that you have general familiarity with key concepts outlined below.

1) **Project Utility Risk Management**

   This domain includes the understanding of the identification of utility risk related to existing utility verification, planning, design, and construction, including impacts to project costs and schedules. Candidates shall have the ability to:

   - Identify risks during the planning phase of the SUE investigations as it relates to identification of utility owners, operators, and stakeholders, scope and objectives of the SUE investigation, and equipment methodology to achieve the objective of the SUE investigation.
   - Recognize existing utilities that may have a direct or indirect impact based on their location, type, age, material, or separation requirements.
   - Understand construction methodology alternatives and selection criteria for utility relocations and their compliance with utility agency regulations and standards.
   - Evaluate how construction activities and loading may impact existing utilities.
   - Assess alternative construction methods for the decommissioning, relocation or protection of utilities to be considered in the overall project scope of work.
   - Develop construction risk mitigation strategies to address utility risks that are unable to be fully resolved as part of the project planning and utility coordination during design development.

- Understanding utility data and system security needs and potential hazards, and ability to support the identification of utility risk mitigation strategies.
- Understanding and application of environmental, weather, and regulatory risks and risk management strategies.

References:

- Utility Standards and Guidelines for Design and Construction
- General understanding of construction methodology
- Transportation Association of Canada – Guidelines for the Coordination of Utility Relocations

2) Utility Investigation and Documentation

This domain includes content based on ASCE 38, including the understanding of utility networks and the practices, equipment and locating technologies to accurately detect, identify, and map existing utility systems, as well as data-processing technologies to enable the collection, documentation, exchange, depiction and use of existing utility infrastructure data. Candidates should have the ability to demonstrate skills in comprehension and understanding of evaluating utility records, understanding utility systems and networks, effective utility locating technologies, understanding of engineering survey and data processing into CADD and documentation including Utility Reports with recommendations and observations to convey to design engineers. These include:

- Utility Records requests, review, depiction, and evaluation of conflicting information.
- Utility Networks including water, gas, electric, communications, sanitary, stormwater, fiber-optic, steam, chill water, fuel, pipelines.
- A working knowledge of the SUE concepts, along with corresponding geophysical technologies and associated capabilities and limitations, full understanding of the ASCE 38 Quality Levels, and corresponding data collection and attribution in accordance with ASCE 75.
- Understanding field notes, field sketches, etc.
- Engineering Survey – including reading survey plans, maps, drawings, blueprints, aerial photography, geospatial data, and topographical or geologic data. Understanding and using benchmarks, inverts, horizontal and vertical accuracies. These include:
    - Geodetics
    - NSRS/CSRS
    - Projections
    - Line of Sight
    - Global Navigation Satellite System (GNSS)
    - Statutory Constraints
    - Professional Survey Support
- Data processing into CADD platforms
    - Linestyles and levels
    - Feature depiction
    - Underground structures including manholes and vaults
- Utility Engineering Reports
    - Scope of Work, Investigations, and methodologies utilized.

- Findings and observations, evaluations, and recommendations.
- Review all data inputs to assign a Quality Level to the data.

References:

- ASCE 38
- ASCE 75

3) Utility Systems Knowledge

This domain includes a detailed understanding, identification and knowledge of basic design principles of above ground and underground utility network systems including water, gas, electric, communications, sanitary, stormwater, fiber-optics, steam, chill water, fuel, pipelines, and others. Candidates should have the ability to understand and identify these utilities and appurtenances, intended uses, ancillary features, materials, connections, and installations and understanding of these specific utility networks:

- Water – water mains, well systems, transmission lines, residential and fire services, irrigation systems, fittings and appurtenances including hydrants, valves, meters, storage and tanks, building connections, etc.
- Gas – gas mains, test stations, valves, high pressure, low pressure, transmission, distribution and service, cathodic protection, etc.
- Electric – aerial and underground, pedestals, transformers, substations, grounding grids, vaults, transmission, distribution and services, as well as generation methods including coal / gas fired power stations, hydroelectric, wind, solar, nuclear, etc.
- Communications including cable and fiber-optics, broadband, cellular towers, microtowers, pedestals, vaults, etc.
- Steam including condensate, chill water, fuel, pipelines, etc.
- Gravity systems including stormwater collection, conveyance and infiltration systems, french drains and inlets, manholes, etc.
- Sanitary systems including force mains, pump stations, treatment systems, and gravity systems including manholes, septic and infiltration, etc.
- Systems knowledge also include support and ancillary utility features including thrust blocks, utility pole guy wire supports, casing pipe systems, vent systems, bridging and support systems, ducts and innerducts, shielding, utility bridge attachments, etc.
- Pipe and conduit materials related to specific utility systems including ductile iron, cast iron, copper wire, plastic pipe, steel, clay, RCP, CMP, as well as weldings, coatings, etc.
- Pipe and conduit system connections including pole drops, joints including bell and spigot, mechanical joints, joint restraint types, etc.
- Pipe and conduit system configurations including looped systems, dead end, etc.
- Utility installation knowledge and techniques including direct bury, open trench, HDD, jack and bore, trench boxes, select backfill, flowable fill, concrete overpours, asphalt, etc. and settlement considerations/ impacts

References:

- Gas Institute
- PMHSA
- NFPA 70 – National Electrical Code (NEC)
- 49 CFR Part 192**:** Federal regulations for pipeline safety, including design, testing, and maintenance of natural gas systems
- AWWA
- OSHA
- High Voltage Proximity Act (HVPA)

4) **Utility Coordination** – Technical (Conflict Matrix, Analytics, Solutions, Designs)
This domain includes a detailed understanding of the various impacts that the existing utilities can have on the design and construction of a civil infrastructure project. The conflicts can be direct in nature or can involve constructability issues. Candidates should have the ability to understand utility information as shown on a drawing (ASCE 38) as well as the construction and constructability requirements of a project. This knowledge will allow the candidates to identify potential conflicts, analyze impacts, propose solutions and determine appropriate design for protection, relocation or avoidance of the utility conflict. Candidates should have knowledge of the following components of utility coordination:

- Utility Accommodation Polices
- Identification of environmental permits, and environmental permit conditions.
- Identification and support for specialized utility permits
- Prior Rights, Property Rights, easements, Knowledge of Right of Way usage.
- Reimbursement, cost sharing, grandfathered utilities
- Understanding of the Range of utility installation methods, including trenchless technology methods.
- Mediation/conflict resolution skills, Communication Skills, Meeting Skills (Coordinate, Communicate, Collaborate, Commitment)
- Integration of Utility Activities into the overall Project Schedule
- Utility, Highway Occupancy, and License to Cross Agreements
- Utility Crossing or Occupation of Railroad ROW
- Health and Safety (workers, public, utilities, businesses)
- Utility construction staging requirements, constructor issues (multiple contractor safety issues)
- Utility as-builts/records, inspection, documentation
- Knowledge of safety, regulatory, and applicable code compliance activities
- Activity management and coordination with stakeholders and authorities having jurisdiction during project planning and design phases.
- Knowledge and experience in identifying and evaluating utility conflicts, including both types of utility conflicts (direct vs. indirect).
- Understanding of utility system configuration opportunities and constraints – looped, dead end, low pressure, high pressure, encased, etc.
- Ability to identify any utility data limitations/unknowns during the design phase and effectively mitigate them in a manner to avoid design and construction related issues.
- Cross-Discipline knowledge allowing for effective coordination of utility designs with various design disciplines. Requires a general knowledge and understanding of related civil engineering disciplines, such as highways, structures, traffic, drainage, etc. and their influence on utility infrastructure.

- Knowledge and experience of utility construction staging and sequencing integration with the overall project construction staging.
- Understanding of the tie-in and cut-over utility system needs and constraints, including excavation dimensions and duration for tie-in operation.
- General understanding of Maintenance and Protection of traffic requirements.

References:

- Transportation Association of Canada – Guidelines for the Coordination of Utility Relocations
- AASHTO Guidelines for Utility Coordination ASCE 38
- ASCE 75
- 23 CFR Part 645 Subparts A, B, C - https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-645
- Guide for Accommodating Utilities Within Highways and Freeways, (AASHTO Publication)
- MUTCD

5) **Project Utility Asset Management** how do we share the information, ASCE-75.
This domain includes an understanding of utility asset management including depiction and data exchange, utility as-built data standards, utility geodatabases including schemas and rules, sharing of utility data, data updates and corrective processes, non-disclosure agreements. Candidates should have the ability to understand data management, databases, field collection systems, and data exchanges, including the following specific areas:

Data Management

- Data Standards
- Data Exchange
- Data Updates / Corrections Process Depiction Standards
- Depiction Standards
- Subsurface Utility Information (SSI)
- GIS Systems for Data Management
- As-Built Documentation

References:

- FHWA Transportation Asset Management Guide (roadway-adjacent utilities)
- AWWA Utility Management Standards
- IEEE Standards for Electric Utility Asset Management
- ASCE 38
- ASCE 75

6) **Construction Activities:** This domain involves overseeing and coordinating aspects of utility construction and installation activities as part of an overall transportation or similar infrastructure improvement project. Candidates should demonstrate expertise in assessing constructability, utility layout, inspecting installations, monitoring/overseeing construction activities, interpreting design intent, evaluating and accommodating unanticipated field conditions and conflicts, and integration of utility construction staging with the overall project construction staging and MPT plan. Candidates should have knowledge of the following components of utility construction:

- Direct or participate in construction surveying to lay out utility installations and make field adjustments as required.
- Planning, scheduling and coordination of utility construction activities, including procurement of

materials and an understanding of long-lead material procurement timeframes.

- Work closely with utility owners, construction stakeholders and authorities having jurisdiction during construction.
- Identify contingency plans and alternate utility sources to minimize project delays in case of unforeseen events, such as service disruptions or utility accidents.
- Testing and verification requirements of utility systems before proceeding with subsequent construction activities, ensuring functionality and adherence to quality standards.
- Knowledge to verify utility construction and installation is performed in accordance with plans, owner requirements, and utility industry recognized requirements and that utility construction adheres to Environmental and/or Utility permit conditions.
- Knowledge of the processes to be followed for proper as-built creation in accordance with ASCE 75 and as-bult deliverable documents

Project Utility Engineering - Additional References

This list of additional references does not necessarily reflect exam content but rather informed the development of the PUEBOK and the exam development process. References directly aligned with exam questions are listed with their corresponding domains above (exam content areas).

- Additional state and local manuals applicable to the state of practice
- SUE for Municipalities
- ASCE/CI/UESI 38-22
- ASCE/CI/UESI 75-22
- CSA 250
- OGC MUDDI
- ASCE MOP 152
- TAC – The Guideline for the Coordination of Utilities (Risk Management)
- Code of Federal Regulations pertaining to utilities, including CFR 10, 18, 23, 36, 40, 47, 49.
- Federal reference documents for Utility Accommodation Title 23 of the U.S. Code and Title 23 of the Code of Federal Regulations, especially 23 CFR Part 645,

**MOP## = ASCE Manuals of Practice (MOPs)*

* *ASCE## = ASCE Standard*