Standard

Sydney WATER

Engineering Competency Standard

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Revision details

Version No.	Clause	Description of revision
1	-	First Issue
2	All Clauses	Minor Amendments
3	Clauses 6 & 7	• Clarifications added to roles and responsibilities, • Geotechnical competency requirements and structural competency requirements
4	All Clauses	• All clause numbers and wording updated to provide more clarity. • No significant changes to competency requirements; except for Electrical Engineering discipline. • Additional clarifications included in all clauses. • Additional of sub-categories included in the competency requirements tables to provide more clarity. • Competency Category table has been removed and more details added under Competency Requirements of each engineering discipline, to avoid repetition • Requirement for Independent Verification certificate included together with template Appendix B. • Electrical Engineering Categories of design work have been expanded to acknowledge the different skill levels and experience that are required for each activity. • The minimum qualifications and experience classifications for Electrical Engineering have been updated to reflect the changes to the categories of work.

Foreword

This Standard is for the design, supply, construction and protection of Sydney Water assets.

Sydney Water makes no warranties, express or implied, that compliance with the contents of this Standard shall be sufficient to ensure safe systems or work or operation.

It is the user's sole responsibility to ensure that the copy of the Standard is the current version as in use by Sydney Water.

Sydney Water accepts no liability whatsoever in relation to the use of this Standard by any party, and Sydney Water excludes any liability which arises in any manner by the use of this Standard.

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Acronyms

Acronym	Definition
CGD	City Growth and Development, Business Development, Sydney Water
CPEng	Chartered Professional Engineer registration with Engineers Australia
ETS	Engineering and Technical Support, Asset Lifecycle, Sydney Water
IECA	International Erosion Control Association
NER	National Engineering Register, Australia
SAP	System Assurance and Planning, Asset Lifecycle, Sydney Water
WSUD	Water Sensitive Urban Design

General Terms & Definitions

Term	Definition
Competence	the ability to apply knowledge and skills to achieve intended results.
Complying Section 73 Developer works	minor developer works, with low-risk rating as per Work Instruction “Processing a Complying Application Package for a Section 73 Certificate”
Design (*Verb*)	the process of converting defined project objectives into design documentation ready for asset procurement. Design covers concept design and detail design development.
Design (*Noun*)	the product of the process of designing that typically includes drawings and specifications describing the solution (conceptual or detailed) of the system or system elements. In Sydney Water’s context it also includes reports and data sets produced in investigation activities undertaken during design such as engineering appraisal, survey and geotechnical investigations.
Design Personnel	those involved in the design process making decisions affecting the design and includes designers, verifiers, independent verifiers, design managers and others that provide information and recommendations on which designs are based.
May	indicates the existence of an option.
Must	indicates that a statement is mandatory.

1. General

1.1 Introduction

Sydney Water relies on professional engineers providing services to create, maintain and operate Sydney Water's assets. To optimize public value, Sydney Water requires engineers providing engineering design services to be appropriately competent. This will ensure assets are designed to achieve planned outcomes and are fit for purpose.

1.2 Scope

This Standard provides the requirements for assessing a person's competence to carry out specific engineering tasks for design and protection of Sydney Water's infrastructure assets and associated works.

The requirements of this Standard apply to all personnel involved in design of Sydney Water assets, regardless of whether they are employed by Sydney Water or not.

In this Standard, design also includes all investigation activities undertaken in the course of design.

Personnel responsible for making design decisions on or about Sydney Water infrastructure are regarded as designers and must have their engineering competencies assessed.

This Standard does not apply to Complying-Section 73 developer works.

1.3 Purpose

The engineering competencies defined in this Standard have been developed to achieve Sydney Water's requirements under both the *Sydney Water Act* and the *Operating Licence*.

The *Sydney Water Act* sets objectives for Sydney Water to:

- provide, construct, operate, manage and maintain efficient, co-ordinated and commercially viable systems and services,
- operate at least as efficiently as any comparable businesses, and
- ensure that the systems and services meet the quality and performance standards specified in the Operating Licence.

In addition to these, Sydney Water's *Operating Licence* requires that Sydney Water develop and maintain both:

- an Asset Management System that is consistent with the International Standard ISO 55001, and
- a Quality Management System that is consistent with the Australian Standard AS/NZS ISO 9001.

To achieve the requirements of these systems, Sydney Water must determine the necessary competence of persons doing work that affects its asset performance. Similar requirements are also reflected in Sydney Water's Asset Management Policy and Asset creation policy.

In addition to compliance drivers, defining the competence of designers that undertake work on Sydney Water's assets is crucial to ensure that they are designed to achieve planned outcomes and are fit for purpose. This significantly contributes to meeting the objectives outlined in the Sydney Water Act listed above.

1.4 Statutory Obligations

Requirements specified herein must not be used to reduce nor remove any obligations the design organisation or personnel has as required by the appropriate regulations.

All Works must comply with the requirements of all federal and state laws and legislations in force in New South Wales. Where the Works are subject to the control of statutory or regulatory authorities, the works must comply with the requirements of the authorities.

1.5 Reference

Document type	Title	Document Reference (Section, clause)
Compliance obligations	AS/NZS ISO 9001 Quality management system AS/NZS ISO 55001 Asset Management	- Management System Requirements
Policies and procedures	Sydney Water's Asset Management Policy Sydney Water's Asset Creation Policy	- -
Other Documents	Sydney Water Management Specification	Section 4

2. Roles and Responsibilities

2.1 Lead Engineer

Lead Engineer referenced in this Standard is Sydney Water's Lead Engineer for each Engineering Discipline, who are part of Specialist Engineering teams in Engineering, ETS, Asset Lifecycle as listed below.

Engineering Discipline	Lead Engineer Contact
Civil Engineering, Stormwater & WSUD	Lead Engineer- Civil
Structural Engineering	Lead Engineer- Structural
Geotechnical Engineering	Lead Engineer- Geotechnical
Mechanical Engineering, Hydraulic Engineering	Lead Engineer- Mechanical
Electrical Engineering, Instrumentation and Control, Building Services Engineering	Lead Engineer- Electrical
Treatment Process Engineering	Lead Engineer- Process

Lead engineers for their engineering disciplines and must:

- determine required competencies and levels applicable to discipline specific engineering tasks listed in this standard,
- assist project managers, project engineers and case managers where required, to review and accept or reject allocation of competencies to design personnel,
- exercise authority to reduce or withdraw competence levels assigned to internal or external design personnel when performance falls short of expected levels of performance.

2.2 Project Manager or Project Engineer or Case Manager

All personnel referred as in this clause are Sydney Water personnel, with nominated authority to act on behalf of Sydney Water.

Project Manager referenced in this Standard are project managers from Program Delivery or Major Project teams in Asset Lifecycle.

Project Engineer referenced in this Standard are personnel from Project Engineering team in SAP, Asset Lifecycle.

Case Manager referenced are personnel from CGD, Business Development.

Project Manager or Project Engineer or Case Manager; in the course of delivering projects must:

- review and accept or reject allocation of competencies to design personnel,
- seek appropriate advice from Lead Engineers, in review of design personnel competency,
- ensure competency assessment records are kept for design personnel.

2.3 Design Manager

Design Manager referenced in this Standard is a person who manages all the processes in relation to producing a design. The nominated Design Manager must have had significant design management experience on at least three comparable projects and have at least level 2 competency in the critical portion of the work as determined by Sydney Water.

Design Manager must:

- plan and coordinate the delivery of the overall design,
- allocate competent resources for all categories of design work,
- provide evidence of each design personnel to the project engineer or project manager or case manager, prior to commencing any design work, for example using form Appendix A,
- where appropriate, manage multi-discipline design teams,
- collect all evidence for verification and independent verification and present Sydney Water, when requested,
- certify the overall design as being fit for purpose and meeting Sydney Water's requirements on behalf of the organisation engaged to undertake the design.

2.4 Designer

Designer referenced in this Standard is a person responsible for a category of design work for an organisation engaged to prepare a design. The designer must be the discipline design lead and may use multiple engineering personnel to assist in developing the design. The designer must not be the verifier.

Designer must:

- gather evidence of competence for the role or task they will perform,
- provide evidence of relevant competency to the design manager, prior to commencing any design work,
- carry out engineering tasks within the limitations imposed by assessed level of competence and for the intended purposes,
- keep up to date with advances and changes in their area of expertise.

2.5 Verifier

Verifier referenced in this Standard is a person responsible for the verification of the technical quality of engineering tasks carried out by the designer.

Design verifiers must:

- gather evidence of competence for the role or task they will perform, prior to commencing any verification work,
- provide evidence of relevant competency to the design manager, prior to commencing any design verification work,
- oversee engineering tasks within the limitations imposed by assessed level of competence,
- verify designs as being fit for purpose and meeting Sydney Water's requirements within the limitations imposed by assessed level of competence.

2.6 Independent Verifier

Independent Verifier is a person or a team of verifiers; independent of the organisation that carry out the design and verification.

Independent design verifiers must:

- gather evidence of competence for the role or task they will perform, prior to commencing any independent verification work,
- carry out a comprehensive examination of all aspects of the concept and detailed design,
- carry out analytical and design calculation works that are independent of that of the designer and without exchange of calculation sheets or similar information with the designer,
- verify the calculations are translated accurately into the design details and drawings, specification clauses or assessed capacities,
- verify the applicability and accuracy of all computer programs used in the check and must ensure the validity of the program for each application,
- not await for the completion of the design, to start the verification. Both activities may proceed in parallel as far as is practicable,
- prepare an independent verification report documenting outcomes of the independent verification and present to Sydney Water when requested,
- independently certify each category of design work requiring independent verification as meeting Sydney Water's requirements using the certificate template in Appendix B and submit to Sydney Water when requested.

3. Competency Requirements

3.1 Overview

The Lead Engineer for each engineering discipline determines the design competencies required for various aspects of design pertinent to their respective engineering discipline.

Competencies are made up of:

- Qualifications or units of competence recognised by the Australian Qualification Framework (AQF). These include qualifications issued by universities, TAFE, schools and other registered training organisations.
- Knowledge and skills.
- Experience in the *specific* engineering task listed.

Where professional qualification such as memberships of Engineers Australia are nominated, equivalent qualifications of other professional bodies who have reciprocal arrangements with Engineers Australia may also be acceptable.

3.2 Category of Design Work

The specific requirements for each Category of Design Work is defined in Tables 1 to 20.

Where a particular design task is not listed in the standard, competency requirements for such work category must be agreed with the relevant Lead Engineer.

3.3 Engagement of Professional Engineers

Competent designers, verifiers and independent verifiers must be engaged for each relevant work category.

Depending on complexity, some categories of design work may require input from multiple engineering disciplines. For example, mechanical, electrical, civil, structural, geotechnical, hydraulics and other engineering disciplines may be involved in design of pumping stations.

Inputs from various disciplines must be coordinated by the design manager.

3.4 Civil Engineering Competency Requirements

Table 1 - Civil Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Pipelines - Minor	Buried sewer reticulation pipes ≤ DN300 and < 6m in depth where covered by prescriptive standards	C1	C2	Not required
	Buried water reticulation pipes and sewer pressure mains ≤ DN300 where covered by prescriptive standards	C1	C2	Not required
	Low pressure sewerage systems serving up to 5 properties	C1	C2	Not required
Pipelines - Medium	Buried water/sewer/stormwater pipes DN375 - DN750 at depth ≤ 15m	C2	C3	Not required
	Pipes ≤ DN300 and design pressure > 120m	C2	C3	Not required
	Trenchless installations (e.g. HDD, micro-tunnelling etc) ≤ DN300	C2	C3	Not required
	Pipes in mine subsidence areas ≤ DN300	C2	C3	Not required
	Reticulation sewers in basements ≤ DN300	C2	C3	Not required
	Aqueducts ≤ DN300	C2	C3	Not required
	Pipes ≤ DN300 in soft or compressible soils prone to significant settlement and/ or instability such as landslide risk	C2	C3	Not required
	Pipes in contaminated ground ≤ DN300	C2	C3	Not required
	Asset impact assessment and structural assessment of existing buried pipes ≤ DN300	C2	C3	Not required
	Trenchless rehabilitation of existing buried pipes ≤ DN300	C2	C3	Not required
	Pipes ≤ DN300 at depth 6 - 15m	C2	C3	Not required
Pipelines - Major	Buried water/sewer/stormwater pipes DN750 – DN1200 at depth ≤ 15m	C3	C4	C4 (Note 1)
	Pipes DN375 - DN750 and design pressure > 120m	C3	C4	C4 (Note 1)
	Pipes in mine subsidence areas DN375 – DN750	C3	C4	C4 (Note 1)
	Trenchless installations DN375 – DN750	C3	C4	C4 (Note 1)
	Aqueducts DN375 – DN750	C3	C4	C4 (Note 1)
	Pipes DN375 – DN750 in poor/unstable ground soft or compressible soils prone to significant settlement and/ or instability such as landslide risk	C3	C4	C4 (Note 1)
	Pipes in contaminated ground DN375 – DN750	C3	C4	C4 (Note 1)

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Pipelines - Major… Cont.	Asset impact assessment and structural assessment of existing buried pipes DN375 – DN750	C3	C4	C4 (Note 1)
	Trenchless rehabilitation of existing buried pipes DN375 – DN750	C3	C4	C4 (Note 1)
Pipelines - Complex	Buried water/sewer/stormwater pipes > DN1200 at depth ≤ 15m	C3	C4	C4
	Pipes > DN750 and design pressure > 120m	C3	C4	C4
	Pipes in mine subsidence areas > DN750	C3	C4	C4
	Trenchless installations > DN750	C3	C4	C4
	Aqueducts > DN750	C3	C4	C4
	Pipes > DN750 in poor/unstable ground soft or compressible soils prone to significant settlement and/ or instability such as landslide risk	C3	C4	C4
	Pipes in contaminated ground > DN750	C3	C4	C4
	Asset impact assessment and structural assessment of existing buried pipes > DN750	C3	C4	C4
	Trenchless rehabilitation of existing buried pipes > DN750	C3	C4	C4
	Pipes at depth > 15m	C3	C4	C4
General civil	Minor access roads to/within network and treatment facilities <10% slope	C2	C3	Not required

Note 1: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or CGD Case Manager.

Table 2 - Minimum Qualifications and Experience for Civil Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of specific, comparable jobs
C1	Diploma of Civil Engineering, Diploma of Civil Construction Design, Diploma of Surveying or equivalent, or	Not Required	2	5
	Equivalent professional experience (Note *)	N/A	5	15
C2	Bachelor's degree in civil engineering	Not Required	5	3
C3	Bachelor's degree in civil engineering	CPEng & NER (Civil)	7	4
C4	Bachelor's degree in civil engineering	CPEng & NER (Civil)	10	5

Note *: In lieu of a formal academic qualification, competency level C1 may be achieved where the designer is deemed by Sydney Water to have obtained equivalent professional experience.

3.5 Structural Engineering Competency Requirements

Table 3 - Structural Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Minor Structures	Buildings and suspended equipment floors up to 4m height and 100m^2 footprint with no prestressed concrete elements.	S1	S2	Not required
	Access platforms, ladders, stairs and hatches not designed for vehicular loading.	S1	S2	Not required
	Retaining walls up to 3m height.	S1	S2	Not required
	Access shafts up to 6m depth.	S1	S2	Not required
	Ground supported valve chambers and liquid holding tanks p to 3m depth and 100m^2 footprint.	S1	S2	Not required
	Pumping station wells up to 4m diameter and 6m depth.	S1	S2	Not required
	Stop boards and bulkheads up to 3m span and 3m liquid pressure.	S1	S2	Not required
	Culverts without vehicular traffic loading up to 4m span.	S1	S2	Not required
	Ventshafts up to DN300 and 9m height	S1	S2	Not required
Medium Structures	Buildings and suspended equipment floors up to 8m height and 200m^2 footprint with no prestressed concrete elements.	S2	S3	Not required
	Retaining walls up to 6m height.	S2	S3	Not required
	Access shafts up to 15m depth.	S2	S3	Not required
	Pumping station wells up to 6m diameter and 12m depth.	S2	S3	Not required
	Stop boards and bulkhead up to 6m span and 6m of liquid pressure.	S2	S3	Not required
	Culverts with vehicular traffic.	S2	S3	Not required

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Medium Structures…Cont.	Ground supported and elevated liquid holding tanks up to 400m^2 footprint and 9m height.	S2	S3	Not required
	Simply supported road bridges, pipe bridges and aqueducts up to 20m span.	S2	S3	Not required
	Ventshafts up to DN600 and 18 m height	S2	S3	Not required
	Simply supported prestressed concrete roofs up to 10m span.	S2	S3	Not required
Major Structures	Buildings and suspended equipment floors over 8m height and 200m^2 footprint.	S3	S4	S4 (Note 1)
	Retaining walls over 6m height.	S3	S4	S4 (Note 1)
	Pumping station wet wells over 6m diameter and 12m depth.	S3	S4	S4 (Note 1)
	Stop boards and bulkhead over 6m span and 6m of liquid pressure.	S3	S4	S4 (Note 1)
	Ground supported and elevated liquid holding tanks over 400m^2 footprint and up to 15m height.	S3	S4	S4 (Note 1)
	Simply supported road bridges, aqueducts and pipe bridges with spans up to 30m.	S3	S4	S4 (Note 1)
	Ventshafts over DN600 or 18 m height	S3	S4	S4 (Note 1)
Complex Structures	Prestressed concrete liquid holding tanks.	S3	S4	S4
	Elevated liquid holding tanks over 15 m height such as reservoirs.	S3	S4	S4
	Continuous road bridges, pipe bridges and aqueducts involving prestressed concrete.	S3	S4	S4
	Appraisal of dams.	S3	S4	S4
	Structural assessment of existing plain concrete and masonry assets such water, wastewater and stormwater carriers	S3	S4	S4

Note 1: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager

Table 4 - Minimum Qualifications and Relevant Experience for Structural Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of specific, comparable jobs
S1	Bachelor's degree in civil or structural engineering	Not required	2	2
S2	Bachelor's degree in civil or structural engineering	Not required	5	3
S3	Bachelor's degree in civil or structural engineering	CPEng & NER (Structural)	7	4
S4	Bachelor's degree in civil or structural engineering	CPEng & NER (Structural)	10	5

3.6 Geotechnical Engineering Competency Requirements

Table 5 - Geotechnical Engineering Competency Requirements

Category of Design Work (Note 1 &2)	Sub-Categories and Description of design element or works (Note 3)	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Geotechnical investigations- Fieldwork & Factual Reporting - Simple geology	Geotechnical investigation logging on site and Factual Reporting of investigation logs for sites with simple and reasonably uniform geology.	G1	G3	Not Required
Geotechnical - Fieldwork & Factual Reporting - Complex geology	Geotechnical site walkovers, identifying high risk areas, geological mapping and logging excavated material for sites with complex or highly variable ground conditions.	G3	G4	Not Required
Geotechnical Investigation Scoping, Interpretation and Design Minor Structures in Simple Geology	Scoping and managing geotechnical investigations for minor structures or minor pipelines or medium pipelines in simple geology	G1	G3	Not Required
	Geotechnical interpretation and geotechnical design inputs for minor structures or minor pipelines or medium pipelines in simple geology	G1	G3	Not Required
	Geotechnical interpretation and geotechnical design inputs for earth retaining structures ≤3m in simple geology	G1	G3	Not Required
	Geotechnical interpretation and geotechnical design inputs for fill embankments or cut slopes with effective retained height ≤3m in simple geology	G1	G3	Not Required
	Geotechnical interpretation and geotechnical design inputs for General Civil Works in simple geology	G1	G3	Not Required
Geotechnical Investigation Scoping, Interpretation and Design input for Medium Structures in Simple Geology	Geotechnical inputs for reinforced concrete box culverts in Simple Geology	G2	G4	Not Required
	Geotechnical inputs for inground tanks with < 6m effective depth; in Simple Geology	G2	G4	Not Required
	Geotechnical inputs for earth retaining structures, excavation, fill embankments and cut slopes with effective retained height ≥ 3m and < 6m; in Simple Geology	G2	G4	Not Required

Category of Design Work (Note 1 &2)	Sub-Categories and Description of design element or works (Note 3)	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Geotechnical Investigation Scoping, Interpretation and Design input for Medium Structures and Major Pipelines in Simple Geology…cont.	Geotechnical inputs for pipes laid in trenches and have diameter >750mm and less than 1200mm dia.; in Simple Geology	G2	G4	Not Required
	Geotechnical inputs for pipes tunnelled and with outer bore diameter <750mm; in Simple Geology	G2	G4	Not Required
Tunnels - Condition assessment	Rock tunnels condition assessment.	G2	G3	Not Required
Geotechnical Investigation Scoping, Geotechnical Interpretation and Design Input of Major Structures in Simple Geology	Geotechnical inputs for inground tanks with > 6m depth; in Simple Geology	G3	G4	G4 (Note 4)
	Geotechnical inputs for foundations for above ground water retaining structures, in Simple Geology	G3	G4	G4 (Note 4)
	Geotechnical inputs for stability risk assessments on existing assets, in Simple Geology	G3	G4	G4 (Note 4)
	Geotechnical inputs for pipelines ≥1200mm dia., laid in trenches; in Simple Geology	G3	G4	G4 (Note 4)
	Geotechnical inputs for pipes tunnelled and with outer bore diameter of >750mm and less than 1200mm dia.; in Simple Geology	G3	G4	G4 (Note 4)
	Geotechnical inputs for project sites with Bringelly Shale and existing natural slopes steeper than 3:1 (Horizontal to Vertical)	G3	G4	G4 (Note 4)
	Geotechnical inputs for fill embankments and cut slopes with effective retained height ≥ 6m; in Simple Geology	G3	G4	G4 (Note 4)
Complex works- Scoping geotechnical investigations, geotechnical interpretation and geotechnical design inputs	Geotechnical Design checks of retaining walls with effective retained height ≥ 6m	G3	G4	G4
	Ground improvement design	G3	G4	G4
	Geotechnical Design of Bridge foundations and abutments	G3	G4	G4
	Projects in sites with soft or compressible soils prone to significant settlement and/ or instability	G3	G4	G4
	Projects in sites with ground conditions prone to slope instability or landslide	G3	G4	G4

Category of Design Work (Note 1 &2)	Sub-Categories and Description of design element or works (Note 3)	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Complex works- Scoping geotechnical investigations, geotechnical interpretation and geotechnical design inputs…cont.	Projects in Landfill sites or sites with significant uncontrolled fill	G3	G4	G4
	Geotechnical Design inputs for tunnelled pipelines with outer bore diameter >1200mm dia.	G3	G4	G4
	Geotechnical design inputs for project sites subjected to mine-subsidence	G3	G4	G4
	Geotechnical inputs for elevated of Liquid Holding Tanks classified as Declared Dams, as per NSW Dam Safety Act or Regulation	G3	G4	G4
Geotechnical Assessment and modelling of Impact on assets	Geotechnical inputs, modelling and assessment of movements for minor structures or minor pipelines	G2	G3	Not required
	Geotechnical inputs, modelling and assessment of movements for medium structures or medium pipelines	G3	G4	G4 (Note 4)
	Geotechnical inputs, modelling and assessment of movements for major structures or major pipelines	G3	G4	G4 (Note 4)
	Geotechnical inputs, modelling and assessment of movements for complex structures or complex pipelines	G3	G4	G4
Liquid holding tanks classified as declared dams	Dam safety assessment of liquid holding tanks classified as declared dams as required by NSW Dam Safety Act or Regulation	As required by NSW Dam Safety Act or Regulation		

Notes:

1. Simple Geology = fairly uniform geology expected within site and ground conditions are expected to be pose low risk to assets proposed
2. Complex Geology = geology/ ground conditions expected to vary within site or expected to have significant impact to proposed assets
3. Refer Tables 1 & 3 for definition of works covered under Minor, medium, major structures or pipelines and General Civil works.
4. If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager

Table 6 - Minimum Qualifications and Relevant Experience for Geotechnical Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of Specific, relevant experience	Minimum number of comparable jobs
G1	Bachelor's degree in civil or	Not required	2	2
	Bachelor's degree in engineering geology	Not required	5 (1) Note *	2
G2	Bachelor's degree in civil or	Not required	5	5
	Bachelor's degree in engineering geology	Not required	7 (3) Note *	5 (2) Note *
G3	Bachelor's degree in civil or	CPEng & NER (Civil - Geotechnical) or	7	7
	Bachelor's degree in engineering geology	RPGeo (Geotechnical)	10	7
G4	Bachelor's degree in civil or	CPEng & NER (Civil - Geotechnical) or	10	10
	Bachelor's degree in engineering geology	RPGeo (Geotechnical)	15	10

Note *: Number of years and number of projects in brackets are only relevant for Geotechnical Investigation Fieldwork

3.7 Mechanical Engineering Competency Requirements

Table 7 - Mechanical Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Classification
Pumping stations - Small	Small sewage pumping stations (max 200L/s total capacity, PN16 pressure rating, and 125kW pump motors).	M2	M3	Not required
Interim sewage pumping stations	Interim sewage pumping stations as part of developers' interim operating plan (IOP).	M2	M3	Not required
Pumping stations - Medium	Medium size sewage pumping stations and small to medium water pumping stations (including boosters), recycled water and industrial water pumping stations (max 500L/s total capacity, PN16 pressure rating, and 215kW pump motors).	M3	M4	Not required
Pumping stations - Large	Large sewage and water pumping stations, individual pumping equipment and pumping systems (>500L/s total capacity, or >PN16 pressure rating, or >215kW pump motors).	M3	M4	M4
Ventilation and odour control	Natural and forced ventilation and odour control (network and treatment).	M2	M3	Not required
Treatment - Mechanical equipment	Sewage screening and handling, sludge thickening, dewatering and handling, compressed air service, aeration, digester mixing, waste gas burners and other water and wastewater treatment equipment.	M3	M4	M4 (Note 1)
General mechanical	Uncommon mechanical equipment not specifically related to particular assets (eg. surge/pressure vessels, lifting equipment, diesel/gas engines etc.)	M2	M3	M3 (Note 2)
Flow control - Minor	Flow control and isolation facilities up to DN750, including valves, penstocks, bulkheads and stop boards; electric, hydraulic and pneumatic actuators, pressure reducing and pressure sustaining valves, flow / pressure automatic control valves, air valves etc.	M2	M3	Not required
Flow control - Critical	Large or critical flow control and isolation facilities >DN750, including valves, penstocks, bulkheads and stop boards; electric, hydraulic and pneumatic actuators, pressure reducing and pressure sustaining valves, flow / pressure automatic control valves, air valves etc.	M3	M4	Not required
Low pressure sewerage systems	Low pressure sewerage systems, including property pump-outs, boundary kits, private lines and common pressure mains.	M1	M2	Not required

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Classification
Vacuum sewerage systems	Vacuum sewerage systems, including reticulation (vacuum pots, vacuum valves and vacuum lines), vacuum pumping stations and pressure mains.	M2	M3	Not required
Chemical dosing and handling	Chemical dosing plants / systems and chemical handling equipment.	M3	M4	M4

Note 1: Required for solids dewatering, handling and digester mixing equipment.
Note 2: Required for equipment where specialist expertise and/or potential hazards involved, eg. pressure vessels, lifting equipment, gas installations, chemical handling etc.

Table 8 - Minimum Qualifications and Experience for Mechanical Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
M1	Bachelor's degree in mechanical or civil engineering	Not required	2	2
M2	Bachelor's degree in mechanical or civil engineering	Not required	5	3
M3	Bachelor's degree in mechanical or civil engineering	CPEng & NER (Mechanical or Civil)	7	4
M4	Bachelor's degree in mechanical or civil engineering	CPEng & NER (Mechanical or Civil)	10	5

3.8 Electrical Engineering Competency Requirements

Table 9 - Electrical Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Nominal LV power reticulation design	Design of a LV system with one or two sources of supply (grid connection) with no auto-changeover and no other alternate sources of supply.	E1	E2	Not required
Complex LV power reticulation design	Design of a grid connected LV reticulation system with multiple power sources (e.g. no auto changeover facilities, radial distribution only, manual changeover on standby power sources)	E2	E3	E3 (Note 4)
Complex HV power reticulation	Design of a HV system with one or more grid connections, with interlocking systems and/or manual changeover facilities to alternate power sources (permanent or standby generator).	E3	E4	Not required
High complexity power reticulation design	Design of a system (LV or HV) or a site with multiple power sources (e.g. more than one incomer from Supply Authority, temporary or permanent standby generators, battery system [excluding UPS], renewable energy sources, auto changeover facility)	E3	E4	E4
Power system analysis	Modelling of the electrical reticulation network (including load flow, transient analysis, alternate sources, modelling changes in open point)	E1	E3	Not required
Protection system design	Protection design of a LV system with one or two sources of supply.	E1	E3	Not required
Complex Protection system design	Other systems not covered above (e.g. grading between HV and LV reticulation, multiple operating scenarios (alternate sources, change in open point))	E2	E3	E3 (Note 4)
Arc flash analysis and mitigation	System modelling, hazard analysis, mitigation design and implementation	E2	E4	E4
Auto change over design	Design of automatic changeover system design involving any of the following: • Multiple sources of grid supply • Anti islanding operation • Changeover to standby sources	E3	E4	E4

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Lightning protection system	Design of lightning protection system.	E2	E3	Not required
Lightning protection system	Lightning protection systems for hazardous areas	E3	E4	Not required
Nominal earthing systems	Design of an earthing system for an installation.	E2	E3	Not required
Complex earthing systems	Design of an earthing system involving any of the following: HV installations, supplies unable to be synchronised, generators, inverters, varying soil conditions and high risk locations (e.g. areas where public can be exposed to the risk due to location, an easily accessible area)	E3	E4	Not required
UPS/battery backup system	Design of a UPS/battery backup system.	E1	E3	Not required
Power factor/harmonic filter	Power factor/harmonic filter design.	E2	E3	Not required
Hazardous area	Hazardous area electrical installation design.	E2 (Note 1)	E3 (Note 1)	E3 (Note 1)
Electrolysis	Induced current and voltage from adjacent assets. Active cathodic protection systems.	E3	E4	Not required
Control system	Electrical design for control systems including PLC panels design, DC and UPS sizing.	E1 (Note 3)	E3 (Note 3)	Not required

Note 1: Requires statement of attainment from RTO for hazardous area design and classification.

Note 2: Appropriate Accredited Service Provider (ASP) certification required for Supply Authority work.

Note 3: Design to be reviewed by Sydney Water's Operational Technology Services (OTS) division.

Note 4: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager

Table 10 - Minimum Qualifications and Experience for Electrical Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
E1	Bachelor's degree in electrical engineering or	Not required	5	2
	Certificate IV in a relevant electrical field	Electrical Contractor Licence	10	10
E2	Bachelor's degree in electrical engineering	Not required	7	3
E3	Bachelor's degree in electrical engineering	Preferred CPEng & NER (Electrical)	10	4
E4	Bachelor's degree in electrical engineering	Preferred CPEng & NER (Electrical)	15	5

3.9 Hydraulics Engineering Competency Requirements

Table 11 - Hydraulic Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Closed conduit hydraulics	Simple hydraulics of pipes and conduits flowing full, including head-loss calculations and flow analysis.	H1	H3	Not required
Networks hydraulics	Complex closed conduit network hydraulics including modelling.	H2	H3	Not required
Open channel hydraulics	Simple free surface flow analysis, including spatial flow and interim operating plan (IOP) facilities.	H2	H3	Not required
Water hammer analysis	Surge transient modelling and analysis including mitigation.	H3	H4	H4 (Note 1)
Computational fluid dynamics modelling	Free surface and close conduit fluid dynamics modelling and analysis.	H3	H4	H4 (Note 1)
Treatment plant hydraulics	Complex design of hydraulic elements of flow control, flow distribution and flow measurements using design of water and wastewater treatment plant unit process requirements.	H3	H4	H4

Note 1: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager

Table 12 - Minimum Qualifications and Experience for Hydraulic Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
H1	Bachelor's degree in civil or mechanical engineering	Not required	2	2
H2	Bachelor's degree in civil or mechanical engineering	Not required	5	3
H3	Bachelor's degree in civil or mechanical engineering	CPEng & NER (Civil or Mechanical)	7	4
H4	Bachelor's degree in civil or mechanical l engineering	CPEng & NER (Civil or Mechanical)	10	5

3.10 Instrumentation and Control Competency Requirements

Table 13 - Instrumentation and Control Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Telemetry communications infrastructure	Design of telemetry network architecture.	IC2 (Note 1)	IC3	Not required
Control and data networks	Design of local control and data networks.	IC1 (Note 1)	IC3	Not required
SCADA architecture	Design of SCADA architecture and Interfaces.	IC2 (Note 1)	IC3	Not required
Security infrastructure	Design of security infrastructure for control systems.	IC3 (Note 1)	IC3	Not required
Control logic	Design of logic for PLCs, RTUs and other control devices (including smart equipment such as VSD, smart starter).	IC1 (Note 1)	IC3	Not required
Monitoring and control	Design of monitoring and control requirements for process control including preparation of Functional Design Specifications.	IC2 (Note 1)	IC3	Not required

Note 1: Design must be based on Sydney Water Instrumentation and Control or Treatment Plant SCADA standards. Design to be reviewed by Sydney Water's Operational Technology Services (OTS) division.

Table 14 - Minimum Qualifications and Experience for Instrumentation and Control

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
IC1	Bachelor's degree in electrical engineering or equivalent (System Engineering, Telecommunications, Mechatronics, Electronic, Computer Systems)	Not Required	2	2
IC2	Bachelor's degree in electrical engineering or equivalent (Systems Engineering, Telecommunications, Mechatronics, Electronic, Computer Systems)	Not Required	5	3
IC3	Bachelor's degree in electrical engineering or equivalent (Systems Engineering, Telecommunications, Mechatronics, Electronic, Computer Systems)	Preferred CPEng & NER (Electrical)	7	4
IC4	Bachelor's degree in electrical engineering or equivalent (Systems Engineering, Telecommunications, Mechatronics, Electronic, Computer Systems)	Preferred CPEng & NER (Electrical)	10	5

3.11 Building Services Engineering Competency Requirements

Table 15 - Building Services Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier classification
Fire Systems	Design of fire suppression and protection systems, fire indication panels, detection components etc. for Sydney Water facilities buildings.	B1	B3	B4 (Note 1)
HVAC	Design of ventilation and air conditioning systems for Sydney Water facilities buildings including switch rooms.	B1	B3	B4 (Note 1)

Note 1: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager

Table 16 - Minimum Qualifications and Experience for Building Services Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
B1	Bachelor's degree in building services, electrical or mechanical engineering	Not Required	2	2
B2	Bachelor's degree in building services, electrical or mechanical engineering	Not Required	5	3
B3	Bachelor's degree in building services, electrical or mechanical engineering	CPEng & NER (Building Services) or NER (Fire Safety) as appropriate	7	4
B4	Bachelor's degree in building services, electrical or mechanical engineering	CPEng & NER (Building Services) or NER (Fire Safety) as appropriate	10	5

3.12 Treatment Process Engineering Competency Requirements

Table 17 - Treatment Process Engineering Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Wastewater treatment processes – assessment or renewal	Assessment of wastewater treatment asset unit processes. Simple design and staging plans for like-for-like renewals.	P1	P3	Not Required
Wastewater treatment – greenfield sites	Design of greenfield type processes. May be on an existing site but with limited or no interaction with existing process units.	P3	P4	P4 (Note 2)
Wastewater treatment – complex brownfield	Design of wastewater treatment with complex interactions between existing and new treatment processes.	P3	P4	P4 (Note 2)
Wastewater secondary treatment – design of new or augmentation of existing	Conventional activated sludge, BNR, granular, integrated fixed film, and ballasted activated sludge systems.	P3	P4	Not required
Wastewater tertiary treatment – design of new or augmentation of existing	Coagulation, flocculation, clarification, filtration and disinfection, tertiary denitrification.	P2	P4	Not required
Wastewater biosolids treatment and disposal – design of new or augmentation of existing	Aerobic and anaerobic digestion, autothermal thermophilic aerobic digestion (ATAD), sonication, thermal hydrolysis, thickening and dewatering, wet air oxidation, drying and pelletisation.	P3	P4	Not required
Emerging technologies	Anammox, Nereda, sonification, ballasted sludge processes, etc.	P3 (Note 1)	P4 (Note 1)	P4 (Note 2)
Water treatment processes – assessment or renewal	Assessment of water treatment asset unit processes. Simple design and staging plans for like-for-like renewals.	P1	P3	Not Required
Water pre-treatment	Aeration, pH correction, flotation.	P2	P4	P4 (Note 2)
Water conventional treatment	Coagulation, flocculation, clarification, filtration and disinfection.	P3	P4	P4 (Note 2)

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Water advanced treatment	Membrane, UV, ozonation, activated carbon.	P3	P4	P4 (Note 2)
Recycled water	Treatment and control system for recycled water systems.	P3	P4	Not required

Note 1: No. of comparable jobs may not apply due to potentially limited number of applications; relevant master's level academic qualifications may substitute for number of jobs.
Note 2: If required based on project specific risk assessment, to be determined by Sydney Water Lead Engineer or Project Engineer or Project Manager or Case Manager. The complexity of project (renewal, greenfield, brownfield) and type of process must both be considered.

Table 18 - Minimum Qualifications and Experience Treatment Process Engineering

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of experience	Minimum number of comparable jobs
P1	Bachelor's degree in civil, environmental or chemical engineering or master's degree in water & wastewater Engineering	Not required	2	2
P2	Bachelor's degree in civil, environmental or chemical engineering or master's degree in water and wastewater engineering	Not required	3 (5) (Note *)	3
P3	Bachelor's degree in civil, environmental or chemical engineering or master's degree in water and wastewater engineering	Not required	5 (7) (Note *)	4
P4	Bachelor's degree in civil, environmental or chemical engineering or master's degree in water and wastewater engineering	CPEng (Note +)	10 (15) (Note *)	5

Note *: Number of years of experience in brackets correspond to any other engineering degree other than that are nominated under minimum academic qualifications.

Note +: CPEng or minimum Experience in the brackets, with no CPEng.

3.13 Stormwater and WSUD Competency Requirements

Table 19 - Stormwater and WSUD Competency Requirements

Category of Design Work	Sub-Categories and Description of design element or works	Minimum Designer Classification	Minimum Verifier Classification	Minimum Independent Verifier Classification
Stormwater - System planning	Flood studies as per FRMP's process NSW. Follow the floodplain development manual. 2D flood modelling i.e. TUFLOW or other approved method.	SW2	SW4	SW4
Stormwater - Hydraulics	Open channel, closed conduit, CFD, TUFLOW or other approved method.	Refer to hydraulics engineering competency requirements.		
Stormwater - Pipes and structures	Stormwater pipes, access chambers, culverts, open channels.	Refer to civil, structural and geotechnical engineering competency requirements depending on the type of asset, site conditions and complexity of work to be undertaken.		
Stormwater - SQIDS	Stormwater Quality Improvement Devices (SQIDS) including gross pollutant traps, trash racks, booms etc.	SW2	SW4	SW4
Stormwater - Asset protection	Specialist engineering assessment required for building over or adjacent to stormwater assets.	Refer to civil, structural and geotechnical engineering competency requirements depending on the type of asset, site conditions and complexity of work to be undertaken.		
Stormwater - Rehabilitation	Structural appraisal and rehabilitation stormwater pipes, rectangular and oviform structures.	Refer to civil, structural and geotechnical engineering competency requirements depending on the type of asset, site conditions and complexity of work to be undertaken.		
Naturalisation/WSUD	Wetlands, bioretention systems, bank naturalisation. Water quality modelling i.e. MUSIC and hydrologic modelling.	ES2	ES4	ES4
Ecologist	Plant selection, ecological waterway health assessment.	ES1	ES3	ES3
Erosion and sediment control	Erosion and sediment control planning and implementation.	ES1	ES4	ES4
Landscape	Landscape design plans, plant selection, liveability and aesthetic aspects.	ES1	ES3	ES3

Table 20 - Minimum Qualifications and Experience Stormwater and WSUD

Classification	Minimum Academic Qualification	Minimum Professional Qualification	Minimum years of relevant experience	Minimum number of comparable jobs
SW1	Bachelor's degree in civil engineering or	Not Required	2	2
	other appropriate Bachelor's degree in engineering or related science	Not Required	5	2
SW2	Bachelor's degree in civil engineering or	Not Required	5	5
	other appropriate Bachelor's degree in engineering or related science	Not Required	7	
SW3	Bachelor's degree in civil engineering or	Not Required	7	8
	other appropriate Bachelor's degree in engineering or related science	Not Required	10	8
SW4	Bachelor's degree in civil engineering or	CPEng and NER (Civil) or appropriate professional membership	10	10
	other appropriate Bachelor's degree in engineering or related science	CPEng and NER (Civil) or appropriate professional membership	15	10
ES1	Bachelor's degree in environmental science / conservation / land management / urban design or related discipline	Not Required	2	2
ES2	Bachelor's degree in environmental science / conservation / land management / urban design or related discipline	Not Required	5	5
ES3	Bachelor's degree in environmental science / conservation / land management / urban design or related discipline	Not Required	7	8
ES4	Bachelor's degree in environmental science / conservation / land management / urban design or related discipline	Not Required (Note 1)	10	10

Note 1: Verifiers and Independent Verifiers for Erosion and Sediment Control plans require CPESC - Certified Professional in Erosion and Sediment Control from IECA or an equivalent qualification.

4. Competence Assessment Process

The general steps for the assessment of competence are:

- Step 1: Applicant gathers evidence of competence for the role or task to be performed;
- Step 2: Self-assessment against competency requirements;
- Step 3: Written submission to the Project Engineer with evidence for review and acceptance;
- Step 4: Review by Project Engineer;
- Step 5: Review by Senior Project Engineer if necessary[1];
- Step 6: Acceptance of competence levels.

5. Evidence of competence

This competence Standard requires evidence of qualifications, skills and experience to substantiate the self-assessment of competence by the applicant.

Evidence submitted to the project manager or project engineer or case manager may include the following:

- qualifications, training courses undertaken, skills, experience,
- information on previous designs undertaken including their complexity and feedback received on completed designs from clients, including referees
- current role, length of time in role and evaluated performance level in carrying out tasks of the role,
- career logbook.

A form that may be used by an applicant is shown in Appendix A. A Curriculum Vitae with generic experience without relevant details to specific tasks is not adequate.

6. Validity period of competence allocation

The validity of assessment is until the end of the design engagement or for a period defined by the Lead Engineer or the expiration of three years from the date of assessment, whichever comes first.

For continuing involvement in design tasks or to perform at a higher level of competence, a person must have his/her competency levels reassessed.

A competence allocation may be withdrawn or reduced if performance falls short of the expected levels of performance.

[1] in consultation with Lead Engineer, if necessary

Ownership

Ownership

Role	Title
Group	Asset Lifecycle
Owner	Engineering Manager
Author	Dinesh Dineshharan, Specialist Engineering Manager

Change history

Version No.	Prepared by	Date	Approved by	Issue date
1	Tony Petrevski, Milan Rubcic, Robert Lau, Christie Sebaratnam, Robert Loncar	11/06/2018	Ken Wiggins, Manager, Urban Design & Engineering	11/06/2018
2	Tony Petrevski, Milan Rubcic, Robert Lau, Christie Sebaratnam, Robert Loncar	28/08/2018	Ken Wiggins, Manager, Urban Design & Engineering	28/08/2018
3	Milan Rubcic, Christie Sebaratnam, Robert Loncar, Dinesh Dineshharan, Susan Kitching	08/10/2019	Ken Wiggins, Manager, Urban Design & Engineering	08/10/2019
4	Dinesh Dineshharan (Lead Engineer-Geotech), Milan Rubcic (Lead Engineer- Mechanical), Robert Lau (Lead Engineer- Electrical), Christie Sebaratnam (Lead Engineer- Structural), Robert Loncar (Lead Engineer-Civil), Ashley Smith (Lead Engineer- Process)	15/02/2021	Norbert Schaeper, Engineering Manager	19/02/2021

Appendices

Appendix	Title
A	Evidence of Competency Form - Example
B	Independent Verification Certificate

Appendix A. Evidence of Competency Form – Example

Individual Designer Qualifications and Relevant Experience

Name:	*Joe Bloggs*
Position Title:	*[eg.: Senior Civil Engineer]*
Organisation:	*[eg.: XYZ Consulting Pty Ltd]*
Role at Organisation:	*[eg.: Pipelines Design Lead for Civil Pipelines for the Water industry]*
Role on Project:	*[eg.: Civil Pipeline Lead Designer]*
Qualifications:	*[eg.: BEng (Civil), CPEng MIEAust NER (Civil)]*

Engineering Discipline	Proposed Category and Sub-Category of Design Work (as per Table 3)	Required Competency Level
[eg.: Civil Engineering]	*[eg.: Pipelines- Major - Buried water/sewer/stormwater pipes DN750 – DN1200 at depth ≤ 15m]*	*[eg.: C3]*

Comparable jobs

Project Name	Project Description	Client	Details of Design Tasks Carried out	Referee and Contact Details
[eg.: Prospect to Macarthur pipeline]	*[eg.: Concept Design of DN750 water main]*	*[eg.: Sydney Water]*	*[eg.: Civil pipeline designer carrying out design calculations, preparation of drawings and reporting]*	*[eg.: William Broms, Sydney Water]*
List additional jobs as necessary to demonstrate compliance with required competency classification level				

Competence Statement *Outline years of relevant experience and describe relevance of listed experience to the competencies requested)* *Attach detailed CV, with relevant details*	*[e.g. I have over 10 years of experience in various senior engineering roles across 20 projects directly related to design of major pressure and non-pressure DN750-DN1200 pipelines, and associated structures. I possess the necessary design skills through knowledge of and application of relevant industry pipe design and installation standards and engineering practices to successfully achieve required design outcomes. Design knowledge and skills include structural analysis and design of buried flexible and rigid pipes, interpretation of ground conditions, hydraulic analysis product/ material selection, corrosion protection, hydraulics (closed conduit/ open channel), trench design, thrust/ anchor block design, system planning and configuration design for safe and effective operation, connections, route selection/ vertical alignment, knowledge of conventional and trenchless construction methods, and application Safety in Design principles and inspection, testing and commissioning requirements.]*

Appendix B. Independent Verification Certificate

Project Details

Item	Details
Project Name	
Organisation accountable for Design/ Asset Impact Assessment	
Purpose of Independent Verification (Design/ Asset Impact Assessment)	
Verified Design Component/ Asset	
Independent Verifier Organisation	
Associated Engineering Disciplines	

Schedule of Certified Design Documentation *(List all verified documents)*

Name	Document Type	Revision/ Version
[Enter text]	*Example: Drawing/ Specification/ Report/ Calculations/ Impact assessment/ System Model/ Need Specification*	*[Enter text]*

Compliance Statement *(strikeout components when not relevant)*

I/ We certify that I/We have:

1. Undertaken an independent engineering verification in relation to the design/ impact assessment represented by the drawings / specifications/ report/ calculations provided by the designer as listed in the above schedule;
2. Carried out a detailed check of individual design elements and the proposed asset as a whole including specified material properties;
3. Reviewed all the relevant inputs in accordance with Sydney Water Technical Specifications Civil, Mechanical, Electrical;
4. Reviewed the proposed construction procedure and the aspects of associated impacts on the Sydney Water and other assets;
5. Fulfilled the role and responsibility of the independent verifier in accordance with Sydney Water's Engineering Competency Standard (BMIS number: D0000833).

In performing the function of Independent Verification, I/ We have used due skill, care and diligence and from my/ our review and in my/ our opinion as a professional engineer, I/ We consider that:

A. All relevant design actions and design criteria are covered by the design and that these actions and criteria and overall concept meet the requirements of the intent of the design/ impact assessment

B. The strength, stability, serviceability, durability and other Limit State requirements as defined in the Sydney Water technical specifications are met; and

C. The construction drawings and specifications accurately describe the following matters critical to the structural integrity:

    a. Detailing and dimensions,

    b. The required material properties and

    c. The construction procedure and temporary works.

Independent Verifier Personnel and Signatures *(List all relevant discipline independent verifiers)*

Name	Discipline	Relevant Engineering Competency Classification	Signature

References *(List relevant Standard, where compliance is checked against)*

Document Title	Version	Document Type	**Relevance**
[eg.: Technical Specification- Civil]	*[eg.: V9.0]*	*Technical Specification*	
[eg: Technical Specification Mechanical]	*[eg.: V11.0]*	*Technical Specification*	
[eg.: Technical Specification Electrical]	*[eg.: V12.0]*	*Technical Specification*	
BOA Guideline	*[eg.: V1.0]*	*Guideline*	