

Sewage Pumping Stations Need Specification Guide and Q&As

What is a Needs Specification?

The Needs Specification sets out Sydney Water's requirements for the design, construction and commissioning of a sewage pumping station, its pressure main and other associated infrastructure and ancillary works.

The Needs Specification also communicates the objective, intended function and performance requirements of the proposed facility or proposed modification of an existing facility.

What is the purpose of the Needs Specification?

The fundamental purpose of the Needs Specification is to communicate the needs that must be met by the facility, specific sizing, objective, process and functional requirements of the facility to meet those needs.

The Needs Specification is also an important reference and historical document for the asset that Planner and Operators will use over the life of the asset. It will be referred to when planning and designing upgrades or renewals in the future. It will normally be the very first document that designers and planners look for at the beginning of a renewal or upgrade project.

The Needs Specification is not a Concept Design Report or Basis of Design. Its focus is on the specific function and objective of the facility, rather than how the specific function and arrangement of the facility was developed. Deliverables that are produced as part of the concept or detail design may be included in the Needs Specification as attachments.

The Needs Specification is not intended to be a record of the design rationale or report on the background story of the facility's design development.

The Needs Specification should be used for both brownfield and greenfield projects.

What content should be generated as an input to the Needs Specification?

Specific original content should be entered into the Needs Specification template. Standard details such as those mandatory requirements within the Sydney Water specifications should not be repeated in the Needs Specification.

The development of the specific content would typically be the result of sizing calculations, planning and design activities to determine the EP loadings, design flows and ultimately the size of the pump station structures, mechanical, electrical assets and controls.



The following attachments should also be developed and provided:

- Location Plan
- Network catchment diagram
- Site plan
- General arrangement plan and section
- Pressure main alignment plan (with long section if available)
- System curves and duty point
- Flow / EP calculation

How should the 'Instructional Text' in the template be used?

The template includes an instructional key which guides which text/input is required. The instructional text will not print and can be made visible or hidden by holding down **Ctrl+Shift+***.

Red italic (guidance notes): # Examples #

Black text (normal text): Official SWC wording, should refrain from editing.

Green text (normal text): Suggested SWC wording, to be edited for specific project.

Red text (normal text): < Input specific information relating to specific project >

Blue (guidance notes): # Instructional text #

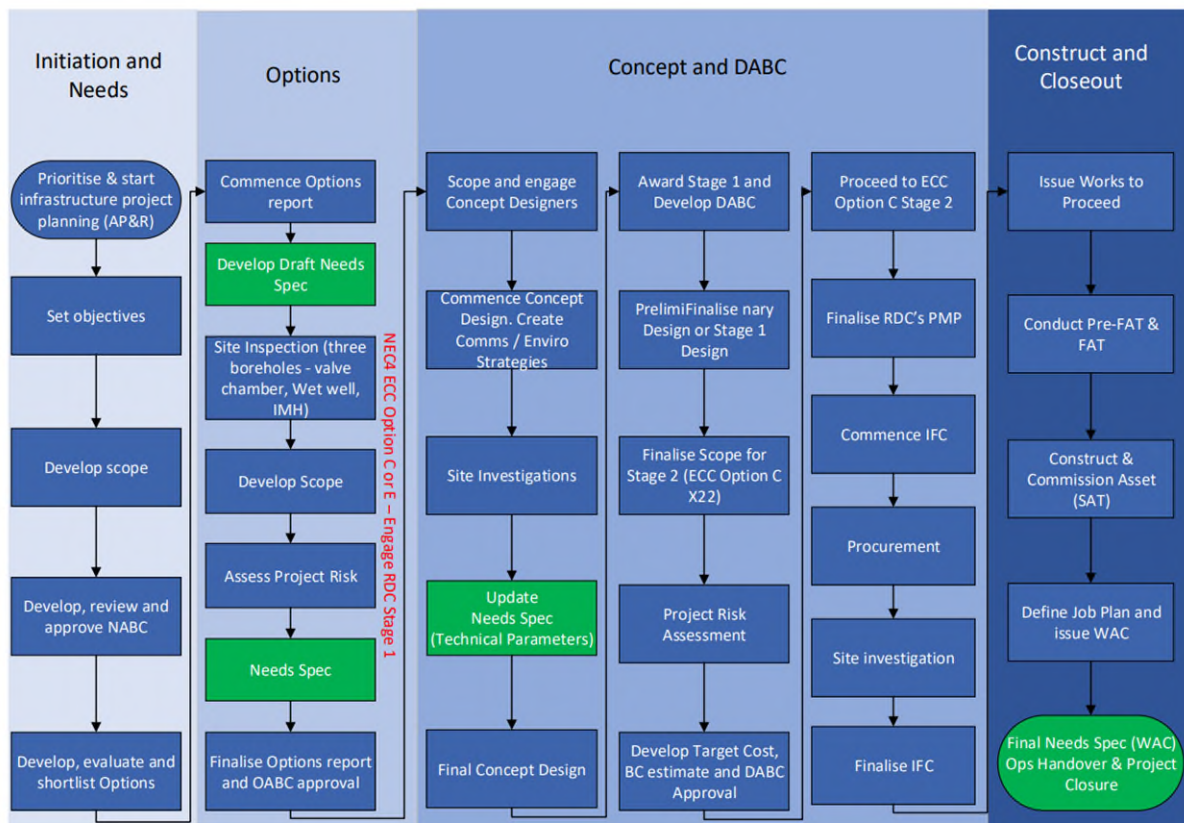
When is the Needs Specification published?

The first version of the Needs Specification should be published before the concept design is commenced (whether at the end of NABC or beginning of OABC approval milestone), as the Needs Specification defines the purpose, objective, key basis of design and performance requirements, objective and scope. However, the final Needs Specification will rely on some basic concept design and investigation.

For proposed modification to existing assets, the WAC or most recent Needs Specification (if available) should be referenced and the Needs Specification template adopted to address the proposed modifications.

As further investigation or findings during detailed detail and construction reveals any changes to the needs and requirements, the Needs Specification should be updated and issued as WAC.

Refer below, an adaptation of the Helix process for asset creation, which indicates typically when the Needs Specification is published, reviewed and amended:



Are Needs Specifications and Technical Specifications related?

The Needs Specification is not intended to be a 'catch-all' specification, and should refrain from duplicating specific Technical Specification clauses, copying or paraphrasing from Technical Specifications or Standards. The Needs Specification should be read in conjunction with the Sydney Water Management Specification and the full suite of technical Specifications.

The Needs Specification should include any necessary technical requirements which are not addressed within the Technical Specifications or any specific or unique requirements associated with the proposed facility (or proposed modification to an existing facility).

Any approved and project specific deviation to the Technical Specifications to be applied to the facility should be included in the Needs Specification. Any approved alternative requirements to the Technical Specification should be detailed within the Needs Specification or its attachments or referenced if provided in separate documents.

How have Needs Specifications (or Technical Data) Evolved?

The Needs Specification originally contained 'technical data' with some basic technical requirements, and typically was between 5 and 15 pages long with 3 to 5 attachments. At that time the concept and details designs were typically done in-house (by Sydney Water).



With increased use of external design resources, the Needs Specifications started to contain more detailed information and to act as a stand-alone project specific technical specification which was provided to contractors to for the design and construction.

Sydney Water then developed the technical specifications such as the civil, mechanical and electrical, IICATS, DTC drawings and editions of WSAA Codes. In theory this should avoid the need to include standard specification requirements within the Needs Specifications. However, in recent times (over last 5-10 years) there are many examples of Needs Specifications duplicating, paraphrasing or copying key clauses from the Technical Specifications and Codes or even replicating a concept design report. Such examples resulting in Needs Specifications of over 120 pages. This is unnecessary and introduces the risk of ambiguity or contradiction with the mandatory requirements provided within specifications. An exception may be where a deviation to the specification is approved.

The template has been refined to remove this duplication with standards and to focus on the function and objective of the proposed facility (or proposed modifications to an existing facility) whilst highlighting key technical parameters or 'technical data'.

An example of the 'specification mapping' that was carried out during the development of the new template, with the objective of identifying and removing duplication, paraphrasing or contradiction of Sydney Water Standards, is shown below:

Section	Examples of edited content
Section H Description of Works	22. Supply and install covers and frames for access for pumps, personnel and instrument in the wet well, <emergency storage structure,> valve chamber, inlet maintenance hole and gas check maintenance hole as per WSA 04 and the Deemed to Comply drawings. The wet well< emergency storage>, inlet maintenance hole and gas check MH covers shall be of lightweight construction with gastight and watertight sealing tape. These shall be fitted with hinged stainless steel safety grilles and supported off stainless steel frame. Valve chamber covers shall be of an open grid serrated galvanized steel type with hinged access hatches above access ladders.
Section H Description of Works	#Where a CDU is required, include:# 36. Provide a chemical dosing unit (CDU) for septicity control of sewage in the pressure main as per Sydney Water CDU Standard Specification ACP0002. 37. Provide a suitably bunded, truck unloading area adjacent to the CDU with a drain from the bund to the inlet maintenance hole. 38. Supply and install two DN25 reduced pressure zone (RPZ) backflow prevention valves on the water service to the CDU.
Section K Arrangement of Pumping	Pumping Units <Number "n"> submersible pumps ("n" -1 duty and 1 stand-by) shall be installed in the wet well complete with all necessary pipes and fittings, supporting "duck-foot" discharge bends, guide rail, guide rail brackets, lifting chains and power and control cables. The discharge connections/bends shall comply with WSA101 and Sydney Water's Supplement to WSA101. (Mech-spec-M13.5.1)

Section	Examples of edited content
	<p>Pumping Operation</p> <p>All electrical equipment, including main distribution board, pump starters and telemetry equipment is to be installed in an electrical building / outdoor electrical kiosk constructed adjacent to the wet well, and above the 1% AEP flood level. (Elec Spec E9.3 and E3.2)</p> <p>The power of the motors shall be 15% greater than the maximum power required, from zero flow to 110% of duty flow and be non-overloading beyond the minimum head (flood) conditions close to zero head to ensure adequate motor life expectancy under all working conditions. (Mech spec M13.3.2)</p>
Section L Pressure Main and Receiving Asset	<p>The receiving system has enough capacity to receive the additional pumped flow from Asset No.. All internal concrete surfaces of the discharge maintenance hole and two MHS immediate downstream of the discharge MH shall have a protective coating to WSA-201 and Sydney Water Supplement to WSA-201. All pressure mains, gravity mains, and maintenance holes are to comply with WSA-02 Sewerage Code, and WSA-04 Sewage Pumping Station Code, and WSA-201 and Sydney Water's Supplement.</p>
Section M Bypass Pump Connection g	<p>A DN### by-pass pump connection arrangement shall be provided, suitable for ultimate peak dry weather flow. The by-pass shall be connected to the pressure main downstream of the pressure main isolating valve. The design of the by-pass pump connection shall comply with the WSA-04 Clause 9.4.</p> <p>The by-pass pump connection shall be installed above ground within a small concrete bund area and shall incorporate gate and non-return valves and a Camlock or Bauer hose connection with a dust cap. A pressure release cock and a bleed pipe shall be provided between the bypass coupling connection and the non-return valve. The valves and bypass coupling connection shall be installed horizontally, oriented towards the most suitable location for the by-pass pump (usual the MH).</p>
Section H Wet Well	<p>Wet well benching, capacity and structure to comply with WSA-04 Clause 5.4 and Technical Specifications -- Civil. Wet well protective coating to comply with WSA-201 and Sydney Water's Supplement. Wet well steel works to comply with Technical Specifications -- Mechanical.</p> <p>The wet well shall be benched below the pump operating levels to reduce solids sedimentation and to improve self-cleansing.</p> <p>The wet well capacity between cut-in and cut-out levels shall be approximately ###,### litres to limit the number of pump starts to 8 per hour.</p>
Section O Inlet Maintenance Hole & Emergency Relief System	<p>The inlet maintenance hole shall be constructed to ensure a minimum 1000mm x 1150mm clearance access opening. The inlet maintenance hole shall be fitted with a hinged lightweight access cover and a hinged safety grille under the access cover.</p> <p>The top of the inlet maintenance hole shall be raised to minimum 300mm above the 1% AEP WSA04 Clause 5.2.3 (note that this clause shows only 100 mm).</p>
Section R Ventilation, Odour, and Septicity Control	<p>The ventilation of sewage pumping stations dry wells must comply with SPS Dry Well Ventilation Design Specification (REF0897).</p> <p>The ventshaft shall conform to ACP0147 -- Ventshaft Guidelines, DTC-2300 (Delivery Portal - REF0879), DTC-2301 and DTC-2302.</p> <p>Refer to section 2.4.1 -- septicity in ACP0026.</p>

Section	Examples of edited content
Section U Electricals and Controls	<p>Outdoor SCA</p> <p>The SCA shall be designed as a self-contained, freestanding, weatherproof cabinet complying with AS 3439.1 and the standards listed in Section AA. The cabinet shall be constructed from grade 316 stainless steel sheet of 2 mm minimum thickness. Equipment mounting plates shall be 3 mm thickness. The degree of protection rating shall be IP56 minimum. (E9.3 – also AS61439 and IP54)</p> <p>The SCA colour shall be Ocean Mist Dulux 96183250 or compatible with 'European colour standard no. RAL 9018' and be in accordance with WSA 201 and Sydney Water Supplement to WSA 201. (E9.9)</p>
Section V Electrical Supply	<p>External Lighting</p> <p>External lighting shall be provided to illuminate the wet well, the valve chamber, above-ground emergency bypass pump connection and IMH, so that maintenance can be carried out at night an under low light conditions.</p> <p>External lighting shall be vandal proof and tilt down light masts shall be used.</p> <p>External lighting shall be designed so that it does not spill over onto adjacent properties. (E4.3.3)</p>

Can the Needs Specification be used for other facility types, or only for Sewage Pump Stations?

The Needs Specification template has been developed based on a 'sewage pumping station'. This was considered a practical approach in the first instance. The SPS Needs Specification template will be 'piloted' or trialled on a number of selected projects. The Needs Specification template will be modified and adapted to address other network facilities such as:

- Water Pump Stations
- Reservoirs
- Pressure Relief (PRV's / PSV's)
- Other as applicable

In the meantime the SPS Needs Specification can be trialled and adapted to projects within the planning phase for other facilities. Treatment hasn't been considered at this stage due to the typical nature of treatment processes and systems.

Why hasn't the "table of contents" been changed much compared to Needs Specifications from over 50 years ago?

It should also be highlighted that the template has adopted the 'traditional' table of contents, and generally document that has been in use at Sydney Water for over 50 years (interestingly, there are examples of pump station Needs Specifications or 'Technical data' dating back to 1963). Although during the latest review and development of the SPS Needs Specification Template, there was some experimentation with the table of contents, but it was discovered that the 'traditional' table of contents is based on the hydraulic process flow and should be retained.

Any adaptation of the SPS Needs Specification template for other asset types, should attempt to follow the same principal for the document layout and table of contents.

Consistent layout of the template and adoption of the traditional 'table of contents' also facilitates adaption of the new Needs Specification Template for existing facilities (and projects which propose to modify an existing facility)