Engineering

Technical Standard

TS 0514 – SA Water Supplement to Pressure Sewer Code: WSA07

Version: 1.0
Date: 01 December 2023
Status: Final

Document ID: SAWS-ENG-0514

Government of South Australia

Copyright

Application & Interpretation of this Document

It is the responsibility of the users of this Standard to ensure that the application of information is appropriate and that any designs based on this Supplement are fit for SA Water's purposes and comply with all relevant WSA Standard, Australian Standards, Acts and regulations.

Users of this Standard accept sole responsibility for interpretation and use of the information contained in this Standard. Users should independently verify the accuracy, fitness for purpose and application of information contained in this Supplement.

Only the current revision of this Supplement should be used which is available for download from the SA Water website.

Documents Superseded by this Document

- SA Water Supplementary Documentation, Pressure Sewerage Code – Introduction and Parts 1, 2, 3 & 4
- Engineering and Water Supply 1983 Sewerage Technical Instructions

Significant/Major Changes Incorporated in This Edition

This is the first issue of this Technical Standard.

Document Controls

Revision History

Revision	Date	Author	Comments
1.0	01/12/23	C Brock / J Skirrow	Final.

Template: Technical Standard Version 6.00, 10/05/2016

Approvers

Role	Signature and Date
Principal Engineer, Reticulation Networks John Skirrow (Acting)	1/12/2023 X Signer's Name Signed by: SK6771
Manager Engineering Quality and Innovation Matthew Davis	1/12/2023 X Signer's Name Signed by: DA003681
Senior Manager Engineering Services Mark Papadimitriou (Acting)	1/12/2023 X Mark Papadimitriou Signer's Name Signed by: PA004117

Reviewers

Role	Name	Revision	Review Date
Manager Engineering Quality & Innovation	Matthew Davis	1.0	01/12/2023

Contents

1 Introduction

SA Water is responsible for the construction and commissioning of an extensive amount of engineering infrastructure such that it is safe and fit for purpose.

This Supplement has been developed to assist in the design, construction, operation, maintenance, and management of pressure sewer and associated infrastructure.

1.1 Purpose

The purpose of this Technical Standard is to provide supplementary detail to WSA 07-2007 V1.1 (Pressure Sewage Code of Australia) based on SA Water's unique context and suite of Technical Standards, which supersede parts of the Code.

1.2 Glossary

All glossary terms and abbreviations shall be as per WSA 07-2007 V1.1 Part 0, unless noted otherwise.

The following glossary items are used in this document:

Term	Description
AC	Asbestos Cement
ADWF	Average Dry Weather Flow
AEP	Annual Exceedance Probability
CMH	Control Maintenance Hole
DAFI	Development Agreement Formal Instrument
EP	Equivalent Population
FoS	Factor of Safety
Ha	Hectare
L	Litre
L/s	Litre per second
MH	Maintenance Hole
NPV	Net Present Value
PDF	Peak Daily Flow
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
SA Water	South Australian Water Corporation
SCM	Sewer Construction Manual (SA Water Standard Drawing Set)
SiD	Safety in Design (refer TS 0101)
TDRF	Technical Dispensation Request Form
TG	SA Water Technical Guideline
TS	SA Water Technical Standard
WH&S	Work Health and Safety
WSA(A)	Water Services Association (of Australia)
WWF	Wet Weather Flow

1.3 References

1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents referenced in this document:

Number	Title
WSA02	Gravity Sewerage Code of Australia
WSA04	Sewage Pumping Station Code of Australia
AS 2124	General conditions of contract
AS 3000	Electrical Installations
AS 4300	General conditions of contract for design and construct

1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Number	Title
SCM	Sewer Construction Manual (SA Water Standard Drawing Set)
TG 0530	Sewer Network Hydraulic Design Considerations to Minimise Network Odour Impact
TG 0531	Gravity Network Ventilation Design
TS 0101	Safety in Design
TS 0109	Infrastructure Design
TS 0130	As Constructed Data Requirements for Linear Assets
TS 0132	Operations and Maintenance Manuals
TS 0134	Requirements for Automated Assessment
TS 0136	Pipework Access and Protection
TS 0210	Pressure Testing of Pipelines
TS 0260	Requirements for Flow Meters
TS 0300	Supply and Installation of Low Voltage Electrical Equipment
TS 0350	SCADA Systems
TS 0360	PLC and HMI Systems
TS 0502	Authorised Products – Gravity Sewer and Pressure Pumping Main Systems
TS 0507	Authorised Products – Pressure Sewer Systems
TS 0510	SA Water Supplement to WSA02 (when published)
TS 0512	SA Water Supplement to WSA04 (when published)
TS 0523	Requirements for Technical Drawings in Land Development Projects (when published)
TS 0620	Decommissioning and Demolition of Assets (when published)
TS 0622	Pipeline Design Requirements (when published)
TS 0631	Fine Materials for Pipe Embedment
TS 0710	Concrete
TS 0711	Concrete Remedial Works
TS 0712	Temporary Works (when published)

1.4 Acts and Regulations

The following table identifies the relevant Acts and Regulations referenced in this document:

Acts and Regulations
Water Industry Act and Regulations 2012
Environmental Protection Act 1993
Work Health and Safety Act 2012

1.5 Definitions

The following definitions are applicable to this document:

Term	Description
Accepted	Determined to be satisfactory by the Representative
Contract Documents	A set of documents supplied to Constructor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Designer	The organisation responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or a Constructor, or an in-house entity. A Designer is a person who effects design, produces designs or undertakes design activities as defined in the *Work Health and Safety Act 2012 (SA)*.
Designer's Representative	For works delivered under a Development Agreement Formal Instrument (DAFI), is the person accountable for the design (or their representative)
Representative	The Representative shall be either one of the following: • For Works delivered under a Developer Agreement Formal Instrument (DAFI), this shall be the Designer's Representative. ○ Where witness or hold points on site are required under this standard, SA Water's Representative shall also be provided with notice to attend at their discretion. • For works delivered directly for SA Water under a Contract or engagement, this shall be SA Water's Representative This definition shall replace the terms "Superintendent" or "Superintendent's Representative" provided in WSA07.
Responsible Discipline Lead	The engineering discipline expert responsible for TS 0514 defined on page 3 (via SA Water's Representative)
TDRF	Technical Dispensation Request Form. This form is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure compliance, with SA Water's technical requirements may seek dispensation from those requirements.
SA Water's Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): • Superintendent's Representative (e.g. AS 4300 & AS 2124 etc.) • SA Water Project Manager • SA Water nominated contact person
'Shall' and 'Should'	In this Standard the word 'shall' indicates a requirement that is to be adopted in order to comply with the Standard. The word 'should' indicates practices which are advised or recommended.

2 Scope

2.1 Scope and Application of this Supplement

In February 2020, WSAA Codes were gazetted by the Office of the Technical Regulator to become the mandatory minimum water infrastructure standard in South Australia.

This Supplement is to be read in conjunction with the following:

- SCM - Sewer Construction Manual (SA Water Standard Drawing Set)
- WSA 07-2007 V1.1.

Section 3 provides the details of the SA Water requirements where there is a variation to WSA 07-2007 V1.1 and describes how this supplement should be read in conjunction with WSA 07-2007 V1.1.

Where a WSA 07-2007 V1.1 Section or Clause is not listed within this document, SA Water requirements shall be assumed to be equal.

2.2 Works Not in Scope

This Supplement only applies to WSA 07-2007 V1.1.

2.3 Hierarchy of Documentation

The following hierarchy of documentation will apply in the event of a contradiction:

- This document
- SA Water Technical Standards and Construction Manual Drawings
- WSAA codes (including figures)
- Australian Standards
- International Standards
- Any conflicting information should be raised with SA Water.

2.4 Technical Dispensation

Departure from any requirement of this Technical Standard shall require the submission of Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of SA Water Principal Engineer listed in Page 3, on a case-by-case basis.

The Designer shall not proceed to document/incorporate the non-conforming work before the Principal Engineer has approved of the proposed action in writing via the Technical Dispensation Request Form (TDRF).

SA Water requires sufficient information to assess dispensation requests and their potential impact. The onus is therefore on the proponent to justify dispensation request submissions and provide suitable evidence to support them.

Design works that are carried out without being appropriately sanctioned by SA Water shall be liable to rejection by SA Water and retrospective rectification by the Designer/Constructor.

3 Supplementary Requirements to WSA 07-2007 V1.1

This section outlines supplementary requirements which elaborate on, or deviate from, those presented within WSA 07-2007 V1.1.

3.1 Part 1 - Planning and Design

This section outlines supplementary requirements which elaborate on, or deviate from, those presented within WSA 07-2007 V1.1 Part 1 – Planning and Design.

WSA 07 Section	SA Water Supplementary Information
1.5 **Planning and Design Responsibilities and Interfaces/ 1.5.1 General**	**Insert after 1.5.1** **The Design/Approval Process** The Developer (and their Designer), of a Pressure Sewerage system, are required to enter into the following two stage process to gain SA Water Approval. **Stage 1** Hold an initial meeting with SA Water to agree the key parameters for a study of the potential technologies that can be used to service the development. The Developer and/or the Designer are required to bring the following to that initial meeting: • A clear indication of the preferred type of Pressure Sewerage technology for the development. • A preliminary Pressure Sewerage layout drawing. • The Designer's preliminary notes, including a summary of capital and operational costs, clearly demonstrating that Pressure Sewerage will be more cost effective than conventional gravity sewerage, based on a 100-year NPV basis. All assumptions made in that process shall be identified, and it must also include the Developer's contributions towards the on-property costs. • Details of the flows likely to be discharged into SA Water's sewerage system and these should also set out all of the stages of the development, so that a discharge point can be determined into SA Water's sewers. • Details of the Designer's experience with Pressure Sewerage systems, including examples of where they have designed these systems previously. • Adjoining land zonings (including any flood overlays) • Topographic considerations, including catchment boundaries and contour information. • Past and future development profiles, including land release projections, etc. • Likely study area description. • Information on any large non-domestic discharges including commercial, industrial and schools. • Any other information that may be pertinent to the proposed development and future surrounding developments.

WSA 07 Section	SA Water Supplementary Information
	Following the initial meeting, SA Water will indicate in writing if Pressure Sewerage can be pursued in the Development Application. **Stage 2** Second meeting with SA Water to discuss final approval to use Pressure Sewerage in the Development Application will be given, conditional upon: • The production of a final design that meets the design requirements, as set out in WSA 07- 2007 V1.1 and this SA Water Supplement TS 0514. • A system-specific hydraulic computer model of the Pressure Sewerage system, which identifies and confirms pipe sizes, and details the anticipated pressures at the differing contour points for the development. The hydraulic modelling software used shall be approved by SA Water prior to commencement of design. The model shall consider climate change impacts as per TS 0109. • Calculation of the maximum hydraulic retention time in the system, evidence of compliance with TG0530, and details of any in main treatment or odour suppression equipment. • Confirmation of the pumping units to be used in the development, and the type and number of spare equipment being provided. These units will need to meet the requirements spelt out in WSA 07- 2007 V1.1 and TS 0514. • Environmental impacts of the proposal. • Sustainability consideration and measures incorporated into the design to reduce carbon emission during the life cycle of the proposed system. • How the remainder of the subdivision is to be serviced, if the application is only for part of the development. • Details of flushing points and the preparation of a flushing program during the growth of the development. The frequency of this flushing needs to be indicated, in the form of a full flushing program. • Details of pipes, valves and fittings in a scheduled format. Final Approval will be given by SA Water in writing. Detailed design of the pressure sewer system is the responsibility of the Developer. SA Water will determine the design review gates required for approval.
1.5.2 **Planning Responsibilities**	**Supersede the section with the following:** SA Water is responsible for overall network master planning of its sewage collection network, including catchment area, flows, flow estimating methodology, the discharge location and identification of any project-specific requirements. Use of pressure sewer systems requires the Developer (and their Designer), to satisfy the requirements of Section 1.5.1 above, which includes additional planning inputs to model the pressure system and its interface/s with SA Water's gravity collection network.

WSA 07 Section	SA Water Supplementary Information
1.5.3 **Design Responsibilities**	**Insert the following text after the list ending "(vii) (H) delivery pipe connection locations.":** • A hydraulic computer model of the pressure sewerage system, which identifies and confirms pipe sizes, and details the anticipated pressures at the differing contour points for the development, • Details of any odour mitigation equipment • Confirmation of the pumping units to be used in the development, and the number of spare units being provided. These units will need to meet the requirements spelt out in WSA07, and SA Water's Technical Standards. • How the remainder of the subdivision is to be serviced, if the application is only for part of the development, • Details of flushing points and the preparation of a flushing program to accommodate all stages of the development. • Details of pipes, valves, and fittings. Final acceptance will be provided by SA Water in writing.
1.6.1 **System Design Life**	**Supersede Section 1.6.1 with the following text:** Design Life requirements for SA Water infrastructure shall be in accordance with TS 0109.
1.6.2 **Objectives of the system design**	**Insert at the beginning of the Section 1.6.2:** The primary goals/objectives required of any pressure sewerage installation shall be as follows: • Ensure the reticulation and property mains remain clear of any solids accumulation, • Retain the sewage in the mains for a minimum time to avoid it becoming septic and thus more difficult to treat, • Ensure that the pressure head in the pipeline does not exceed its pressure rating, • Ensure that vacant properties can be connected with relative ease at a later date, • Ensure the on-property installation results in minimal inconvenience to the resident, by having a once on and off the property approach from the installation to the commissioning of the pumping unit, • Ensure the involvement of the property owner in the design of the property layout to meet their reasonable expectations, whilst still complying with the requirements of WSA 07-2007 V1.1 and this Technical Standard, • Ensure there is minimal general inconvenience in the areas where the system is being installed, • Ensure the system will operate satisfactorily when only a minimum number of properties are connected. This needs to be particularly focussed on in new subdivisions, where development may take some time to reach the critical numbers the system was designed on,

WSA 07 Section	SA Water Supplementary Information
	• Minimise overall costs to the community in the installation of the system whilst still meeting the design objectives and requirements for the particular technology, • Ensure the technology is supported by appropriate maintenance arrangements, spare parts availability, and onshore manufacturer support so that the installation of such a system will not disadvantage those that have pressure sewerage systems in comparison with conventional gravity systems. • Ensure that adequate and adjacent clearances around each property or commercial/industrial zone's boundary kit(s), including parking exclusion zones, is allowed for. This is for safe access for operation and maintenance activities. These clearance zones shall be reviewed during the SiD process and agreed with SA Water's O&M team.
2.4 **Reliability**	**Insert at the end of Section 2.4**: Refer Appendix A of TS 0514 for pump redundancy requirements.
2.7 **Staging**	**Insert at the end of Section 2.7:** Staging of developments should be considered during planning and design to ensure the performance requirements are met at all stages of development. Where relevant, addressing the following considerations should be considered: • Lot connection dates, • Upgrades to downstream wastewater infrastructure, • Sewage detention time, • Impact on system odour, • Pipe flow velocities, • Dead end sections, and • Low number of connections to the main, • Flushing point locations at the end of the reticulation main, • Flushing programs. Where the area to be serviced is planned for large increases in future system growth the Designer shall, in conjunction with SA Water, consider the use of dual mains to reduce detention times of sewage in the pressure main in the initial stages of operation. Where the loads on the pumped mains, particularly rising mains may fluctuate considerably during the year, the Designer shall consider the use of dual/different sized mains. Examples of these applications include, but are not limited to, caravan parks and camping areas (particularly in beachside areas), where the population will vary considerably with season and special events.

<table>
<tr><th>WSA 07 Section</th><th>SA Water Supplementary Information</th></tr>
<tr><td>2.13.1
General</td><td>Insert at the end of Section 2.13.1:
For SA Water's Operations and Maintenance Manuals requirements, refer to TS 0132.
Ownership of on-property components (up to but not including the property boundary kit) will not transfer to SA Water; they remain the property owner's responsibility.</td></tr>
<tr><td>3.2
Design Tolerances</td><td>Supersede (b) (i) with the following text:
(i) Minimum cover shall satisfy the requirements of TS 0136.</td></tr>
<tr><td>3.4
Unforeseen Ground Conditions</td><td>Supersede Section 3.4 with the following:
Where ground conditions not identified on the Design Drawings and/or Design Documentation are encountered, the Constructor shall refer to the Designer for review of the structural design. The Designer shall make appropriate amendments to the Design Drawings as required, and reissue with version control to supersede previous versions.</td></tr>
<tr><td>3.6.4 Contaminated Sites</td><td>Replace item (a) with:
(a) Need for site contamination assessment.</td></tr>
<tr><td>3.6.5
Tidal Zones</td><td>Insert the following at the end of Section 3.6.5:
Consideration for impacts of climate change in design levels shall be incorporated in accordance with TS 0109.</td></tr>
<tr><td>3.6.6
Flood Prone Areas</td><td>Insert after Section 3.6.5:
<u>3.6.6 Flood Prone Areas</u>
To prevent stormwater infiltration within the system, the following levels shall be observed:
<table>
<tr><th>System Component</th><th>Minimum clearance above 1% AEP flood level</th></tr>
<tr><td>Top of storage tank</td><td>At least 300mm</td></tr>
<tr><td>Base of alarm/control panel</td><td>At least 300mm</td></tr>
<tr><td>Pump station vent</td><td>At least 300mm</td></tr>
</table>
Areas prone to flooding and AEP levels may be sourced from Local Government and Catchment Management Authorities and shall be incorporated into the Design/Approval process as detailed in Section 1.5.
Infrastructure located in the Murray River floodplain shall comply with the requirements of TS 0109.</td></tr>
</table>

WSA 07 Section	SA Water Supplementary Information
3.7 **Easements**	**Supersede Section 3.7.1 Reticulation sewers with the following:** All sewerage easements shall be vested in the name of the South Australian Water Corporation. Normally boundary kits are located approximately 1 m inside the property boundary. If this is not the case, and the boundary kit is to be located further inside the property, this may only be undertaken after approval has been obtained from SA Water via the TDRF process. In such cases, an access easement is to be provided for the pressure sewer lateral and the boundary kit. Access and easement sizes are to be sufficient to allow maintenance vehicle access (the size is to be approved by SA Water). Guidance shall be obtained from TS 0136. SA Water easements may only be shared with council stormwater pipes and shall comply with the requirements of TS 0136. Other authorities and utilities (especially power, gas, telecommunications etc.) are not permitted to share the SA Water sewer easement to accommodate their respective facilities, due to WH&S implications for SA Water maintenance and operational personnel, or personnel contracted by SA Water. **3.7.1.1 Location of Sewers/Easements** All pressure sewers and appurtenances shall normally be located in roadways in accordance with the requirements of TS 0136. Where this is neither practical nor possible to achieve (e.g. due to topographical or road layout design), pressure sewers may be located in easements (taken specifically for that purpose). Pressure sewers shall not be located in easements to achieve capital cost minimisation where satisfactory routes in roads are available and viable, as this adversely affects SA Water's access and ongoing maintenance requirements. Easement alignments may be located as follows: • across the front of an allotment • across the rear of an allotment • along the side of the allotment • any other agreed alignment (e.g. crossing parks and reserves) Sewer easements shall generally be located in the allotment served by that sewer, or if the property adjoins a park/reserve, the sewer may be located in the park/reserve, providing: • suitable vehicle access to the sewer can be demonstrated to SA Water (and is accounted for during safety in design per TS 0101) • the sewer pipeline is well clear of existing or proposed locations of trees and shrubs, in accordance with the minimum clearances specified in TS 0136 • the minimum horizontal clearance between the outside face of the sewer and an existing or proposed building or structure shall be as detailed in TS 0136 • easement width is as specified in TS 0136.

WSA 07 Section	SA Water Supplementary Information
	3.7.1.2 Cover in Easements The minimum and maximum cover to mains shall comply with TS 0136 **3.7.1.3 Categories of Easements** Easements are divided into two categories: • Category 1: Not shared with stormwater pipes. • Category 2: Sewer and stormwater pipes sharing an easement. For further details regarding these categories and the location of SA Water infrastructure refer to TS 0136 and SCM drawing 4005-20002-03. Where a sewerage easement is shared with a stormwater pipeline, the Council/Developer shall obtain their own stormwater easement from the landowner. The stormwater easement may overlap either a portion or the whole width of the SA Water sewer easement. The shared easement arrangement must be approved by the Council (or whoever is the owner of the stormwater pipeline). Under no circumstances shall the sewer and stormwater pipeline arrangement (as shown in SCM drawing 4005-20002-03) be reversed, resulting in the sewer being closer than the prescribed distance from the allotment boundary/ edge of easement. SA Water takes no responsibility for the stormwater pipeline, other than any damage caused to the stormwater pipeline by SA Water personnel or personnel contracted by SA Water. To facilitate sub-divisional activity and to accommodate Council requirements for back-of-block or side-of-block stormwater pipelines, SA Water has typically (but is under no obligation to) acquired wider sewer easements to accommodate sewer and stormwater pipelines. For the following special situations, SA Water shall determine easement widths as well as pipeline alignments within easements, on a case-by-case basis: • at SA Water's discretion for situations where site specific conditions warrant additional evaluation (e.g. excessive depth of sewer, angle of repose considerations, difficult access requirements, etc.). • for large diameter stormwater pipelines (greater than DN375) • where butt jointed concrete stormwater pipes are used: o leakage from the stormwater pipes into the single size granular sewer embedment media is very likely, thereby unnecessarily exacerbating the existing 'French drain' effect associated with sewers. o replacing a section of sewer adjacent to a discontinuous stormwater pipeline (e.g. butt jointed concrete pipes) is unnecessarily difficult and expensive, requiring special side support for the individual concrete pipe lengths. **3.7.1.4 Easements Obtained Under Development Contracts** The Developer shall be responsible for all costs associated with the acquisition of sewer easements that are required within the development.

WSA 07 Section	SA Water Supplementary Information
	Easements within the development shall be established based on the Final Plan of the Development. The final plan shall be prepared and lodged with the Development Assessment Commission by the Licensed Surveyor engaged by the Developer. Where easements external to the development are required, the Developer may acquire the easements independently or may request that SA Water acquire the easements at the developers cost.
3.9 **Special Design Consideration**	**Supersede Section 3.9 with the following:** Crossings shall comply with the requirements of TS 0136.
3.10 **Mechanical Protection of Pipelines**	**Supersede Section 3.10 with the following:** Mechanical protection of pipelines shall comply with the requirements of TS 0136.
3.12 **Obstructions and Clearances**	**Supersede entirety of Section 3.12.3, 3.12.4 & 3.12.5 with the following:** Minimum clearances to obstructions shall be in accordance with TS 0136.
3.13 **Trenchless Techniques**	**Supersede Table 3.1 and the associated notes with the following:** Refer to TS 0136 for SA Water's requirements regarding minimum clearances to services and other obstructions.
3.14 **Disused or Redundant Pipelines**	**Replace the second paragraph starting "The Specification shall specify action …" with:** Decommissioning of disused or redundant pipework shall be in accordance with TS 0620.
3.15.1 **Septicity**	**Insert to the end of the sentence "Where the risk of ….. the type of dosing." the following:** Dosing may be considered in the pressure main, collection tank, and/or discharge maintenance hole. The Designer shall consider the following odour control methods (referencing TG 0530). Any dosing systems shall be approved via a TDRF. (a) Gas phase treatment (b) Liquid phase treatment
4.3 **Design Inputs and Outputs**	**Insert the following items to the list currently ending (vi) in Section 4.3:** (vii) No point in the pressure sewerage system shall have the ability to drain during normal operation. (viii) During planning and concept design stages, system analysis shall be undertaken (inclusive of scenarios listed below) to ensure the system is robust. 1. Dry weather operation 2. Dry weather sensitivity (20% higher and lower flows) 3. Wet weather operation with consideration of climate change. 4. Power outage recovery

WSA 07 Section	SA Water Supplementary Information
4.4.1 **Sanitary Flows**	**Replace clause with:** Sanitary flows are to be determined as per Appendices A and B of this Supplement and Clauses 2.3.1, 2.3.2, 2.3.3 and Section 3 of WSA-02.
4.4.2 **Infiltration and inflows**	**Add:** For residential properties: (a) Refer to Appendix A. (b) Pump pressures not to exceed manufacturers recommended maximum operating pressure for a 5% probability.
4.4.3 **Peak flows from homes and required pumping rates**	**Supersede the text of Clause 4.4.3 with:** 4.4.3.1 Swimming Pool or Spa Drainage Any properties with a swimming pool or spa will not be permitted to drain their pool directly to the pressure sewer unit without relevant controls. In such situations, the customer shall: • Retain their existing pool drainage arrangement (if applicable), local council and EPA permitting or; • Have a licensed plumber install a system (i.e. flow restrictor) to ensure that discharge from the pool does not exceed the capacity of the pressure sewer pump well or; • Install a soakage pit to drain the pool to stormwater, local regulations permitting. 4.4.3.2 Swimming Pool or Spa Filter Backwash Swimming pools and spas with backwash facility require sufficient storage for when the discharge from the backwash pump exceeds the pump capacity, and the pump operates for sufficient time to fill the pressure sewerage pumping unit to a level, that causes an alarm to be generated. In these instances, an additional storage with a controlled discharge of less than the pump capacity shall be placed by the property owner between the pool's discharge pump and the sewerage pumping unit, unless the pool pump's discharge is fixed such that it shall always be less than the sewerage pump capacity.
4.5.2 **Minimum pipe sizes**	**Replace this section with the following:** Allowable pressure sewer system piping shall be in accordance with TS 0507.
4.5.3.1 **General**	**Insert at the end of Section 4.5.3.1:** The allowable pressure sewer system pipework and materials shall be in accordance with TS 0507. Residential property delivery lines for all SA Water applications shall be DN40 Class PN16 polyethylene pipe.
5.1.4 **Alignment of pressure sewers**	**Replace item (b) with the following:** (b) Located to maintain adequate clearance from structures and other infrastructure as detailed in TS 0136.

WSA 07 Section	SA Water Supplementary Information
	Insert item (d) to the list: (d) located to avoid 90° bends where possible. Alternatives to using 90° bend fittings include bending pipe (in the case of smaller diameters, and to the radii limits specified by the manufacturer) and the use of 2 No. 45° bends with a minimum of 300mm between bends.
5.3.1 **Valves design**	**Insert the following text at the end of Section 5.3.1:** Valve supply shall be in accordance with TS 0507.
5.4.2 **Isolation valve locations**	**Insert following after item (c):** (d) At incoming reticulation pressure lines (i.e., at Tee's), excluding property laterals. (e) One upstream and one downstream of scour valves, when the system volume between scour points exceeds 9 m^3. (f) At flushing points (so that the flushing point can be turned off when not in service). (g) Boundary kit for inspection/flushing purposes.
5.5.2 **Types**	**Insert at the beginning of Section 5.5.2:** The use of air valves and details of their use (or their non-use) must be provided to SA Water with the proposed design, using only valve models authorised in TS 0507. This shall include their locations on vertical long sections. The type and location of air valves shall be endorsed by the pump unit supplier (to ensure they are compatible with the pumping units). All odour control arrangements to be used must also be detailed by the Designer. These details shall be discussed and agreed with SA Water at the concept design stage, as a priority.
5.5.4 **Locations**	**Insert at the end of Section 5.5.4:** In determining the location of air release valves, the following factors shall be considered: • Proximity to properties and the requirements of TS 0136. • Inputs from key stakeholders (e.g., operations, maintenance etc.), during the SiD process, in accordance with TS 0101. • Venting requirements and potential odour impact on surrounding residents (both existing and potential future residents as well as at high points above the discharge MH invert level) per TG 0530 and TG 0531. • Aesthetics and safety requirements of any odour control infrastructure required, including any venting or carbon odour filters. • Potential visual impact on the surrounding residents (both existing and potential future residents).
5.7 **Flow Meters**	**Add the following text to the end of the first paragraph in Section 5.7:** Flow meters shall be provided in accordance with the requirements of TS 0260.

WSA 07 Section	SA Water Supplementary Information
5.8 **Discharge Maintenance Holes**	**Insert a new section after Section 5.7:** The pressure sewer system shall discharge into a dedicated sewer maintenance hole or pumping station inlet maintenance hole. The discharge arrangement itself and the capacity of the receiving gravity sewer shall comply with SA Water's requirements for gravity sewers. An emergency relief system shall be constructed from the gravity sewer or inlet maintenance hole if/as required by WSA02 – Sewerage Code of Australia or WSA04 – Sewage Pumping Station Code of Australia. This shall be discussed/agreed with SA Water during concept design. Turbulent discharge which may exacerbate the generation of odours should be avoided. Refer to TG 0530 and TG 0531 as well as SA Water SCM Drawing 4005-20008-01 for requirements of pumped discharges into a maintenance hole. No gravity connections other than the pressure main shall be made to the discharge maintenance hole, although provision may be made for future duplication of the pressure main (where this is anticipated). The receiving structure shall be located as far as possible from residential properties.
5.9 **Operating Protocol**	**Insert a new section after Section 5.8:** Requirements for operational protocols that must be considering during the design of the pressure sewerage system include: a) Control of pump operation to reduce peak flows. b) Proactive pumping prior to wet weather periods to minimise the impacts of wet weather flows downstream. c) Wet weather operating protocol (change to operating parameters for properties not experiencing inflow/infiltration). d) Staged pumping during power recovery. e) Limitation on pump duration to protect pumps during wet weather periods or unintended valve closure. f) Flushing requirements. Some of the above requirements will require remote monitoring and control systems (including where privately owned systems discharge to SA Water infrastructure).
6.1.1 **Property Sewer Service Diagram**	**Supersede the final paragraph with the following:** The data collection version, design version, and the work-as-constructed version of the property sewer service diagram (in accordance with TS 0130 and TS 0134) shall be submitted to SA Water, prior to the final acceptance. Brand, model, and pump dimensions for the installed pressure pumps are to be provided as part of the as-constructed drawings. The Work as Constructed version shall be submitted in accordance with SA Water requirements including TS 0130.
6.2 **Clearances**	**Insert at the end of Section 6.2:** Minimum horizontal clearance between the property side boundary and any pressure sewer system component shall be 600mm for pipework and 1000mm for collection tanks. Minimum clearances from assets and infrastructure shall be in accordance with TS 0136.

WSA 07 Section	SA Water Supplementary Information
6.4 **Existing Property Data Collection**	**Add item (q):** (q) Electrical distribution box material (potential for asbestos). If the electrical distribution box contains asbestos, an Asbestos Management Plan will be required for the site.
6.6 **Control and Alarm Panels**	**Supersede paragraph 1 and 2 of this section with the following text:** For on-property design, the control and alarm panels shall be located within direct line-of-sight of the pumping unit and pump storage vessel and within 8 metres of the house. The panel shall be fixed to a wall of the house, garage, or shed etc. and mounted 1400mm above the finished surface level to the underside of the panel. Where this is not possible, the alarm panel may be more practically located remote to the house (in excess of 8 metres), requiring a remote mounted alarm panel. The control panel shall be mounted on a stand-alone post at 1400mm above the finished surface level to the underside of the panel. Posts and panels which blend into the environment should be considered. The alarm/control panel shall include the following: • A weather-proof surround that is corrosion resistant to a high order, • Stainless steel hinges on the door of the panel (with suitable isolation to any dissimilar metals), • A safety shield to prevent inadvertent contact with live wires, when the panel is opened by operators, • A lock to prevent unauthorised entry. This locking system to be common to all control and alarm boxes in a particular system, • Bottom mounted, gland sealed arrangements for the connection of the electrical control cables to the control and alarm panel, • An audible alarm with a resident activated kill switch to silence the audible component of the alarm, • A visual alarm that can only be switched off by the maintenance authority, • All wiring inside the panel and pump to be in accordance with TS 0300, TS 0350, TS 0360, and the appropriate Australian Standards, • A sticker, affixed to the outside Alarm and Control Panel, that includes the emergency contact numbers for the operational authority. Within the installation of the Alarm and Control panel to the building, the Constructor and their electrician are to: • Ensure the installation satisfies local electrical supplier requirements. • Affix the emergency phone contact numbers sticker when the installation is complete.
7.2.1 **General**	**Insert at the start of Section 7.2.1:** Refer Appendix A of TS 0514 for residential applications. Non-residential installations will range from the standard minimum 600-litre storage vessel to the largest of the multiple pump pressure sewerage units available, based on the nature of the water usage on the property.

WSA 07 Section	SA Water Supplementary Information
	The minimum storage can therefore only be determined on a case-by-case basis, and this will need to be done by the Designer, who shall certify that any storage is sized appropriately to the application. Also Refer Appendix B.
8.1 **Property discharge line**	**Insert at the end of Section 8.1:** Maximum distance from the tank to the property boundary assembly shall be 100m.
8.2 **Laterals**	**Insert at the end of Section 8.2:** Pressure sewer laterals shall only be directly connected to pressure sewers that are less than or equal to DN 160. Where connection to a pressure sewer greater than DN 160 is necessary, a separate smaller reticulation pressure sewer main (rider main) will be required to reduce the need to shut off a large main if maintenance is required on laterals or boundary assembly. Laterals crossing a retaining wall shall be protected by a carrier pipe.
9.2.2 **Pipe Cover**	**Replace item (e) with the following:** Minimum depth of cover shall be in accordance with TS 0136.
9.2.5 **Pipe Embedment**	**Insert at start of section:** Pressure sewer and mains are to be embedded in packing sand that meets the requirements of TS 0631.
Additional Requirements to WSA 07-2007 V1.1, Part 1	**Approval of Pumping Units** There are several Pressure Sewerage technologies available. Recognising the impracticality of supporting all technologies, SA Water will at any time only support a limited range of authorised technologies. SA Water will provide details of authorised pumping units on request. SA Water will not accept handover of any unauthorised pressure sewer technology. SA Water's TS 0507 – Approved Products – Pressure Sewer Systems provides detail of currently approved products. **Use of Pumping Units** As per TS 0507, SA Water will only allow one type/supplier of tank and pump units to be used in a development or local area, due to difficulties in managing maintenance and repair networks with multiple system types/manufacturers. **Installation of Pumping Units** Where pumping infrastructure is to be installed on what is public property, the lids to these structures are required to be locked in place to prevent entry by non-authorised personnel.

3.2 Part 2 – Products and Materials

This Section outlines supplementary requirements which elaborate on or deviate from those presented within WSA 07-2007 V1.1 Part 2 – Products and Materials.

WSA 07 Section	SA Water Supplementary Information
10 **Products and Materials Overview**	**Supersede Sections 10.4, 10.5, 10.6 and 10.7 with the following text:** All products and materials shall be as per those approved within TS 0500, TS 0502, and TS 0507. The use of alternative products and materials will require a submission of a Technical Dispensation Request Form (TDRF) in accordance with SA Water's Technical Dispensation Request Procedure.

3.3 Part 3 – Construction

This Section outlines supplementary requirements which elaborate on or deviate from those presented within WSA 07-2007 V1.1 Part 3 – Construction

WSA 07 Section	SA Water Supplementary Information
12.1.2 **Quality System**	**Insert at the end of Section 12.1.2** The Constructor shall indemnify the Representative from any losses resulting from delays in accepting the Works (or part of the Works) due to defects, debris or damage to the Works resulting from the Constructor's error or omission. These defects shall be rectified by the Constructor at the Constructor's expense.
12.2 **Personnel Qualifications**	**Insert at end of paragraph starting with "Personnel shall hold minimum qualifications…"** This shall also include the training requirements of any other SA Water Technical Standard which may be relevant to the works being undertaken.
13.5.3 **Disused / Redundant Sewers, Drains and Tanks**	**Supersede Section 13.5.3 and replace with the following text:** All demolition and decommissioning shall be in accordance with TS 0620.
13.5.4.6 **Private and public properties**	**Insert (h) at the end of the existing list in 13.5.4.6:** (h) Ensure the covers of pumping unit structures on public property can be locked in place to prevent entry by non-authorised personnel.

WSA 07 Section	SA Water Supplementary Information
13.7 **Alteration of Existing Services**	**Supersede Section 13.7 with the following:** **13.7.1 Location of Services** Details of services shown on the design drawings are not to be taken as indicating all existing services or exact locations. Constructors shall verify the exact location of all services which may be affected by construction activities, and positively locate in the field all services impacted by excavation works prior to commencing. Impacted service owners are to be notified, and works shall adhere to the requirements service owner. **13.7.2 Protection and Maintenance of Services** Protect and maintain existing services to the satisfaction of the service owner including, if necessary, relocation, temporary diversion, or support of the service. The clearance requirements of the proposed pipeline to existing services are as specified in TS 0136. **13.7.3 Repair of Services** If a service is damaged during excavation work, arrange, or perform repairs to the satisfaction of the service owner.
14.1 **Authorised Products and Materials**	**Supersede Section 14.1 with the following:** All products and materials shall be as per those approved within TS 0500, TS 0502 and TS 0507. The use of alternative products and materials will require a submission of a TDRF. Because the connection point(s) of the pressure sewer may be into existing sewer system materials, products authorised in TS 0502 and if appropriate TS 0503 may be used to facilitate the connection. Any special connection details shall comply with the requirements of SA Water's Technical Standards and Drawings and are to be shown on the Design Drawings.
14.6 **Concrete Works**	**Supersede Section 14.6 with the following:** Refer to TS 0710 for SA Water's requirements regarding the supply and placement of concrete. Any repairs of existing concrete structures shall be undertaken in accordance with TS 0711. Repair of newly constructed concrete infrastructure is not acceptable, and defective construction shall be completely replaced.
16 **Excavation**	**Insert after Section 16 and before Section 16.1:** The Constructor shall: • Provide a minimum of five (5) business days' notice in writing to the Representative of the Constructor's intention to commence work. • In accordance with Section 16.3, supply the Representative with written acknowledgment from the authority responsible for any improved services over which works are to be conducted (e.g., DIT or Local Government for roads etc.) of the Constructor's intention to carryout works before commencing work.

WSA 07 Section	SA Water Supplementary Information
16.5 **Blasting**	**Supersede Section 16.5 with the following:** Blasting shall not be used in the construction of SA Water infrastructure.
16.6 **Support of Excavations**	**Insert the following before the first sentence:** The Constructor shall be responsible for assessing the geotechnical and groundwater information provided by the Designer on the Design Drawings or other documents and implementing appropriate actions to facilitate sound construction. **Delete the last paragraph and replace with the following:** Shoring of excavations shall meet the requirements of TS 0712.
16.7 **Drainage and Dewatering**	**Insert the following at the end of Section 16.7:** The Constructor shall be responsible for: • The design, installation and operation of all groundwater and dewatering systems necessary to satisfy the requirements of SCM Drawing 4005-20003-04 • Obtaining any further geotechnical or groundwater information (including any specialist advice that may be necessary) for the design and operation of any groundwater or dewatering systems.
16.8 **Foundations and Foundation Stabilisation**	**Insert the following text after first paragraph:** The Constructor shall be responsible for confirming, during excavation, whether the geotechnical conditions found on the site are in accordance with those indicated on the Design Drawings or in accordance with any subsequent investigations undertaken by the Constructor. Where the foundation conditions are found to be not as indicated on the Design Drawings or by any subsequent investigations undertaken by the Constructor, the Constructor shall not proceed with the Works, but shall refer the design back to the Designer for appropriate action via the Representative. Construction work shall only proceed after the appropriate foundation treatment has been specified and approved by the Designer and accepted in writing by the Representative.
17.2 **Bedding Materials**	**Insert at start of Section:** Mains are to be embedded in packing sand that meets the requirements of TS 0631.
18.3 **PE Weld Prequalification**	**Supersede Section 18.3 with the following:** All welding of polyethylene pipe shall comply with the requirements of TS 0503.
18.4 **Open Trench Installation**	**Supersede the third paragraph with the following text:** Refer to TS 0622 for cold bending requirements.

WSA 07 Section	SA Water Supplementary Information
18.10 **Pipeline Tracer Wires and Detectable Marking Tapes**	**Add the following text at the end of Section 18.10** SA Water requires detectable marking tape 300 mm (approx.) above the top of all plastic mains.
18.13 **Valves, Valve Chambers, Scours and Surface Fittings**	**Add the following text at the start of Section 18.13:** Only authorised valves, covers and frames as shown in TS 0502 are to be used in SA Water's infrastructure.
18.15 **Location Markers**	**Insert at the end of Section 18.15:** Location markers are required where pressure sewer pipes are laid in locations that may make it difficult to locate the pipes in the future. Location markers are required at changes of direction, valves, fittings and at maximum 200m centres.
19 **Pipe Embedment and Support**	**Supersede Section 19 with the following:** All pipe embedment/support and associated compaction testing shall be in accordance with TS 0622, TS 0631 and the SCM.
20.1 **Trench Fill**	**Supersede Section 20.1 with the following:** All pipe embedment/support and associated compaction testing shall be in accordance with TS 0622, TS 0631 and the SCM.
20.1.3 **Compaction of Trench Fill** **21.3 Compaction Testing**	**Supersede Sections 20.1.3 and 21.3 with the following:** All compaction testing, frequency of testing, and any required re-testing shall be in accordance with TS 0622
21.4 Pressuring Test **21.5 Test Procedure for PE** **21.6 Test Procedure for Other Materials**	**Supersede Sections 21.4, 21.5 and 21.6 with the following:** All acceptance testing (excluding that covered by Section 21.3) shall be conducted in accordance with TS 0210 and TS 0600.

<table>
<tr><th>WSA 07 Section</th><th>SA Water Supplementary Information</th></tr>
<tr><td>21.9
Electrical/Control System</td><td>Insert new clause after 21.8:
The following tests shall be carried out to ensure correct installation and proper functionality of the electrical/control system.
<table>
<tr><th>Test items</th><th>Method</th><th>Acceptance Criteria</th></tr>
<tr><td>Conduits and cables installed in accordance with AS 3000</td><td>Inspect by licensed electrician</td><td>AS 3000</td></tr>
<tr><td>Terminations tight and as per connection diagrams</td><td>Inspection and Test</td><td></td></tr>
<tr><td>Insulation Resistance Supply Cable</td><td>500 V Test</td><td>>2 Meg ohms</td></tr>
<tr><td>Insulation Resistance Motor Cable</td><td>500 V Test</td><td>>2 Meg ohms</td></tr>
<tr><td>Confirm voltage at Pump connection point under load conditions</td><td>Voltmeter on Simulation Box</td><td>216-264 Volts</td></tr>
</table></td></tr>
<tr><td>24.2
Work As-Constructed Details</td><td>Supersede Section 24.2 with the following:
As Constructed drawings shall be prepared in accordance with TS 0130, and Operation and Maintenance Manuals in accordance with TS 0132.</td></tr>
<tr><td>25.1
Introduction - General</td><td>Insert at the beginning of section 25.1 the following:
Drawings shall be prepared in accordance with TS 0523</td></tr>
</table>

Appendix A Key Design Requirements (Residential)

As referenced in supplement to Section 2.4 and 7.2.1.

	Single Dwelling	Single Dwelling (inc. Granny Flat) on single lot	Duplex/Triplex Terraces	Townhouse Development	Unit Development Medium Density	Unit Development High Density
Estimate of Sanitary Flows - ADWF (L/d) @150L/EP/day	3.5 EP/lot	5 EP/lot	3 EP/dwelling unit	3 EP/dwelling unit	3 EP/dwelling unit	2.5 EP/dwelling
Wet Weather Flow Contribution	Additional 0.015 L/s to be added to each pump unit (as flow into the tank) over the assessment period.					
Typical Collection Tank Type	Standard Single Tank	Standard Duplex Tank (1 pump)	Standard Single Tank per Dwelling	Development specific design	Development specific design	Development specific design
Pump Redundancy[1]	Standard Pump	Standard Pump	Standard Pump	Two Standard Pumps minimum	Two Standard Pumps minimum	Two Standard Pumps minimum
Operating Volume[2]	Designer to determine (nominally 200L)			Based on minimising volume and limiting pump starts to suit pump requirements.		
Emergency Storage	600L, or 24 hours at ADWF whichever is the larger volume			Designer to determine, 24 hours at ADWF minimum		

Notes

1. Standard pumps to be identified as part of an assessment/procurement process.
2. Operating volume between pump start and stop.

Appendix B Key Design Requirements (Non-Residential)

	Commercial	High Density Commercial	Educational Institutions	Clubs	Hospitals & Nursing Homes	Mixed Commercial/Residential	Light Industrial	Heavy Industrial	Recreational Areas
Estimate of Sanitary Flows - ADWF (L/d) @150L/EP/day	75 EP/Ha	300-800 EP/Ha	0.2 EP/student	0.25 EP/max occupants	3.4 EP/bed	Combine Commercial & Residential	30-50 EP/Ha	150 EP/Ha	20 EP/Ha
Wet Weather Flow Contribution	Refer to 4.4.2.								
Operating Volume	Based on minimising volume and limiting pump starts to suit pump requirements.								Varies, refer note 2
Emergency Storage	Designer to determine emergency storage volume, which shall be 24 hours at ADWF minimum.								
Pump Performance	Pumps to be semi positive displacement pumps or equivalent flow/head characteristics.								

Notes

1. Privately owned units will be required to have monitoring capability so that SA Water can remotely access data on agreed basis.
2. For relatively small facilities (e.g., flows less than 1000 L/day) adopt duplex units, otherwise a specific design is required.