STANDARD
PRESSURE SEWER SYSTEMS

Hunter Water Supplement To Code WSA 07-2007

JULY 2026

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DOCUMENT INFORMATION

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Part 0: Glossary of Terms, Abbreviations and References

Reference	Amendment to WSA 07- 2007 version 1.1
Part 0 – Glossary of Terms, Abbreviations and References	
INTRODUCTION	*Insert the new section at the end of the Introduction text on page 10:* **Drawings and Figures** In reading this design guideline, reference is to be made to Hunter Water's version of the PSS-1000 series of standard drawings. In the event of an inconsistency between details shown in a standard drawing compared to a figure within the body of the Code, the standard drawing takes precedence.
I GLOSSARY OF TERMS	*Include the following at the end of the pressure sewer system definition:* A pressure sewer system can be divided into two distinct parts, being: On property works – being infrastructure works within private property for the purpose of servicing that specific property. This can further be divided into: Note: Private property works Note: Hunter Water property works Reticulation works – being infrastructure downstream from individual property boundary kits all the way to the pressure sewer system discharge. The distinction between private property works and Hunter Water works for single residential developments is shown on PSS-1101-V.
FIGURE I	Replace Figure I with PSS-1100-V.
FIGURE II	Replace Figure II with PSS-1101-V.
II ABBREVIATIONS	Replace "OH&S" with "WH&S – Work Health and Safety"
III REFERENCED DOCUMENTS	Hunter Water versions of WSA 02 and WSA 03 Codes and Drawings to be referred to. *Insert the following heading list after the last item on page 26:* Hunter Water Standard Technical Specifications • STS 101 - Construction and Pipe Bedding Materials • STS 103 - Valves, Hydrants and Associated Components • STS 104 - Concrete Supply (Operations and Minor Works)

Reference	Amendment to WSA 07- 2007 version 1.1
Part 0 – Glossary of Terms, Abbreviations and References	
	• STS 403 - Construction of Sewer Rising Mains • STS 500 - General Requirements for Electrical Installations • STS 903 - WAC Information • STS 906 - Operation and Maintenance Manual Requirements • STS 911 - Preparation of Civil, Structural and Mechanical Engineering Drawings

Part 1: Design

Reference	Amendment to WSA 07-2007 version 1.1
General	
1.1 Planning	*Insert the following at the end of the 4th paragraph of this clause:* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline for specific planning and design requirements.
1.2.2 Application of pressure sewerage	*Replace the first sentence of this clause as follows:* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline for specific guidance on circumstances where the servicing of a particular site with pressure sewer can be considered as an option. As a guide, pressure sewer may be suitable for investigation in one or more of the following circumstances:
1.2.3 Description of the system	*Insert the following at the end of the 1st paragraph:* Only grinder pump pressure sewer systems are accepted by Hunter Water. New STEP systems are not permitted.
1.5 Planning and design responsibilities and interfaces	*Remove clauses 1.5.1, 1.5.2, and 1.5.3. Clause 1.5.4 remains.* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline and Pressure Sewer Systems Hydraulic Design Guideline for further detail on planning and design responsibilities for pressure sewer.
1.6.1 System design life	Replace the nominal pump life in Table 1.1 with 10 years.
1.6.2 Objectives of the system design	*Amendment for item (f):* replace "OH&S" with "WH&S".
1.6.3 Design output	*Replace the first sentence with:* The design output shall satisfy the requirements of this Code, the requirements of the Hunter Water documents "Pressure Sewer Systems Planning and Design Guideline" and "Pressure Sewer Systems Hydraulic Design Guideline", and any other requirements indicated by either Hunter Water or the equipment manufacturer.
1.7 Design responsibilities	*Remove this entire section (inclusive of clauses 1.7.1, 1.7.2, and 1.7.3).* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline for design responsibilities.

Reference	Amendment to WSA 07-2007 version 1.1
2 Concept Design	
2.1 Life Cycle Considerations	*Remove this entire clause.* Refer to Hunter Water for specific guidance on the requirements for undertaking an economic review of pressure sewer as a servicing option.
2.2 Functionality	*Amend item (d) as follows:* Pump design flows across the expected normal operating pressures. *Remove the last paragraph of this clause.* The requirements for investigating system response to wide-spread failure are detailed in Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline.
2.5 Due Diligence	*Remove this entire clause.* Requirements in this section that apply and are relevant to the Designer are captured elsewhere (either in this document, or in Hunter Water's Pressure Sewer Systems Planning and Design Guideline or Pressure Sewer Systems Hydraulic Design Guideline).
2.6 Materials Design	*Replace paragraph 2 with the following:* Only pressure sewer products approved by Hunter Water may be specified. For products that are not on a pre-approved list, a written application must be submitted to Hunter Water.
2.7 Staging	*Insert the following paragraph:* Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for details of the required investigation and reporting of likely system performance at interim stages of development.
2.9 Odour Control	*Insert the following paragraphs at the start of this clause:* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline for the requirements for investigation, reporting and mitigation (if required) of system odour and septicity potential.
2.12.1 General	*Insert the following at the end of this clause:* The design process and outputs shall comply with requirements detailed in Construction Hazard Assessment Implication Review (CHAIR) – Safety in Design Tool published by WorkCover (available at www.workcover.nsw.gov.au). Outputs from the CHAIR sessions shall be addressed/incorporated into the design. A copy of the meeting minutes from the CHAIR 1 workshop are to be included in

Reference	Amendment to WSA 07-2007 version 1.1
	the final Concept Design Report, and a copy of the meeting minutes from the CHAIR 2/3 workshop in the final Detailed Design Report.
2.13 Commissioning	*Replace clause 2.13 (inclusive of 2.13.1, 2.13.2 and 2.13.3) with the following:* Commissioning of pressure sewer shall be undertaken in two phases and be in-line with the construction model adopted by Hunter Water for single residential pressure sewer installation in greenfield developments. This construction model involves the Contractor installing upfront on every lot of the subdivision all on-property components within the exception of the pump unit, control panel, and associated electricals. The Developer will provide Hunter Water with a bond for these components, and Hunter Water will install and commission these assets at a later date once the lot owner is ready to connect. Refer to Hunter Water for the commissioning requirements for other types of pressure sewer installations. The requirements for each phase of commissioning is as follows: *Phase 1* Phase 1 commissioning is to be undertaken by the construction contractor. The Contractor is to test the following components in accordance with Clause 21.4 Pressure Testing: - Street reticulation pipework - Property laterals (pipework from street retic to boundary kit) - Property boundary kits - Property discharge lines (pipework from boundary kit back to pump unit) *Phase 2* Phase 2 commissioning is to be undertaken by Hunter Water. It will cover the remaining components to be owned by Hunter Water and will occur following the installation of the pump, control panel and connection of the customer sanitary drain. The following components will be tested in accordance with standard Hunter Water electrical and mechanical checklists: - Pump unit - Electrical panel - Associated control and electrical connections

Reference	Amendment to WSA 07-2007 version 1.1
3 General Design	
3.2 Design Tolerances	*Insert the following at the end of this clause:* Hunter Water requires coordinates to be referenced to the *Map Grid of Australia (MGA94)* as applied to GDA94. Hunter Water's area of operations fall within MGA94 Zone 56.
3.5 Impact of Consequential Damage	*Insert the following before the 1st paragraph:* The Designer is to confirm with Hunter Water whether a Consequential Damage Assessment is required.
3.6.5 Tidal Zones	*Insert the following at the end of this clause:* Collection tanks are to be located above the greater of either the King Tide or recorded storm surge mark (as identified by Australian tide charts and flood mapping from the local council).
3.7.1 Reticulation Sewers	*Delete the 4th paragraph of this clause, as begins with the following words "Typical situations where…", and replace with the following:* Hunter Water will only consider easements on private property in exceptional circumstances.
3.7.2 On-Property Components	*Remove reference to Appendix B and insert the following:* Every property serviced by a pressures sewer system is required to have a Public Positive Covenant (PPC) on the land. Details of these requirements are contained within Hunter Water's Pressure Sewer Planning and Design Guideline.
3.10 Mechanical Protection of Pipelines	*Insert the following paragraph at the end of this clause:* Specifically, Hunter Water requires the installation of all pressure sewer laterals crossing roads to be located within a DN100 PVC conduit as per WSA-03 drawing WAT-1107-V.

Reference	Amendment to WSA 07-2007 version 1.1
3.12.4 Clearance Requirements	*Replace Table 3.1 with the following:*

Utility (Existing service)	Minimum horizontal clearance [3,10] (mm)	Minimum vertical clearance [1] (mm)
Sewers ≤DN 300	300	150[2] / 300
Sewer ≥DN300	600	300
Gas mains	300[3]	150[2] / 300
Telecommunications conduits and cables	300[3]	150[2] / 300
Electricity conduits and cables	500	225[2] / 300
Stormwater pipes and drains[4]	300	150[2 and 5] / 300 [5]
Water mains	1000[6] / 600	500 [5]
Kerbs	150[7]	NA

Reference	Amendment to WSA 07-2007 version 1.1
3.12.4 Clearance Requirements	Table Notes: 1. Vertical clearances apply when sewers cross one another, except in the case of water mains when a vertical separation shall always be maintained, even when the sewer and main are parallel. The sewer should always be located below the main to minimise the possibility of backflow contamination in the event of a main break. 2. A minimum vertical clearance of 300 mm applies if the size of either the existing service or proposed sewer is >DN 300. 3. For sewers ≤DN 300 clearances can be further reduced to 150 mm for distances up to 2 m when passing installations such as poles, pits and small structures, providing the structure is not destabilised in the process. 4. Sewers should always cross under water mains and stormwater drains. If this requirement cannot be met consult Hunter Water in respect of alternatives such as adjusting the water main or stormwater drain. Where a sewer crosses a water main at or close to 90 degrees, the vertical clearance may be reduced to not less than 200 mm provided that the sewer is concrete encased and a 50 mm compressible material is placed over the encasement. The encasement shall not have any joints within 1000 mm either side of the water main and shall conform to Drawing SEW–1205-V. 5. When the sewer is at the minimum vertical clearance below the water main (500 mm) maintain a minimum horizontal clearance of 1000 mm. This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance increases to 750 mm. 6. Clearance from kerbs shall be measured from the nearest point of the kerb. Horizontal clearances for sewers ≤DN 300 may be reduced to 150 mm. 7. Horizontal clearances for sewers ≤DN 300 may be reduced to 600 mm. 8. For high pressure gas mains consult owner for requirements. 9. For optic fibre cables consult owner for requirements. 10. For water mains and sewers >DN 375 confirm clearance with Water Agency.
3.14 Disused or Redundant Pipelines	*Insert the following paragraph at the end of this clause:* Hunter Water is to be consulted with regard to disused or redundant pipelines.

Reference	Amendment to WSA 07-2007 version 1.1
3.15.1 Septicity	*Replace item (iii) of this clause with the following:* Provide protective surface coatings complying with WSA 201 Manual for Selection and Application of Protective Coatings and Sydney Water's Supplement to WSA 201 to the discharge maintenance hole and a minimum of two new or existing downstream maintenance holes. Application of the coating systems shall only be performed by applicator's who are approved and endorsed by the supplier of the protective coating system. *Insert the following paragraphs at the start of this clause:* Refer to Hunter Water's Pressure Sewer Systems Planning and Design Guideline for the requirements for investigation, reporting and mitigation (if required) of system odour and septicity potential.

Reference	Amendment to WSA 07-2007 version 1.1
4 Hydraulic Design	
4.1 Introduction	*Remove the entire clause and replace with the following:* The Designer is to refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for hydraulic design criteria to be adopted and the scope of required investigations.
4.3 Design Inputs and Outputs	*Replace point (a) of this clause with:* (a) The design methodology for determining flows in pressure sewer areas shall be in accordance with Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline. *Insert the following sub-heading before the final paragraph of print page 66:* "4.3.1 Maximum System Pressures"
4.4.1 Sanitary Flows	*Replace this clause with the following:* Sanitary flows in pressure sewer areas shall be in accordance with Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline.

Reference	Amendment to WSA 07-2007 version 1.1
4.4.3 Peak Flows From Homes and Required Pumping Rates	*Replace the formula with the following:* $Q = \frac{(V - R)}{(t \times 60)}$ Where; Q = minimum required pump discharge rate (L/s) R = tank reserve volume (L) V = volume of peak wastewater produced from a household generated over time t (L) t = time over which peak wastewater volume is produced (minutes)
4.4.4 Design flows	*Remove this entire section, inclusive of 4.4.4.1, 4.4.4.2, and 4.4.4.3, it does not apply.* Refer to the Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for the acceptable methodology to be adopted for calculation of network design flows.
4.5.3.1 General	*Insert the following paragraph at the end of this clause:* Permissible sizes of PE100, PN16 pipe are listed in Clause 10.7.2. Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for further detail on acceptable methodology for pipe size analysis and required design considerations.
4.5.3.2 Head Losses	*Insert the following paragraph at the end of this clause:* Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for further detail on acceptable methodology for headloss calculations.
4.5.3.3 Hydraulic Roughness Values	*Remove this entire clause, it does not apply.* Refer to the Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for detail on the acceptable hydraulic roughness value to adopt.

Reference	Amendment to WSA 07-2007 version 1.1
5 Pressure Sewer Design	
5.2.1 Profile Design	*Insert the following at the end of the 1st paragraph*: Pipework shall generally be laid at minimum depth. However, depths and pipe alignment shall be engineered to ensure that the system remains fully pressurised at all times, siphoning is prevented, and the requirement for air valves is minimised. *Amend the 2nd paragraph of this clause as follows:* The profiles of the pressure sewer shall be shown in the Design Drawings. Profile information shall be presented in the form of longitudinal sections, which shall include the information as described in Hunter Water's Pressure Sewer Systems Planning and Design Guideline.
5.3.1 Valves Design	*Insert the following paragraph at the end of this clause:* Only those valves listed on the Hunter Water Approved Products and Manufacturers Register (http://www.hunterwater.com.au/Building-and-Development/Approved-Designers-Suppliers-and-Contractors/Approved-Products-and-Manufacturers.aspx) as being suitable for use with the PSS equipment can be used, unless a request is made to Hunter Water to use an alternate product.
5.4.2 Isolation Valve Locations	*Insert the following after point (c) in this clause, as an addition to criteria for the location of isolation valves:* - To create defined zones to enable isolation for fault rectification works, either within or downstream of the zone. - To facilitate isolation of the pressure sewer network from the downstream gravity system. - At sewer lateral tapping connections to the reticulation main. - Either side of flushing points.

Reference	Amendment to WSA 07-2007 version 1.1
5.5.1 Installation Design Criteria	*Replace the 3rd paragraph beginning with "the need for air release…" with the following:* Hunter Water requires automatic combination air-release/vacuum break valves to be placed at all significant high points in the system. In addition to this, the need for automatic air release/vacuum break valves at all significant changes in grade for downward sloping pipes shall be investigated. Refer to Hunter Water's Pressure Sewer Systems Planning and Hydraulic Design Guidelines for detail on the acceptable methodology for analysis of air movement in pressure sewer. *Insert the following at the end of this clause:* The Designer shall ensure that where practical the pressure sewer is designed to avoid the need to install air valves.
5.5.2 Types	*Insert the following at the beginning of this clause:* Air release/vacuum break valves shall be of the automatic type. Manual air valves are subject to Hunter Water approval, and will only be considered for instances where the need for the automatic release of air from the system is considered low, or if the valve is specifically for air movement associated with pipe filling/draining activities. Manual air valves are to be in accordance with Standard Drawing SCP-1004. Automatic air valves shall be located in pits with appropriate covers as shown in drawing PSS-1006-V. Flushing points shall not be used for the exchange of air from a pressure sewer system, except for the application of draining a section of line.

Reference	Amendment to WSA 07-2007 version 1.1
5.5.4 Locations	*Insert the following paragraph at the end of this clause:* In addition to the above the following factors are to be taken into account in the placement of automatic air valves: - proximity to properties - venting requirements and the potential odour impact on the surrounding residents (both existing and potential future residents) - aesthetics and safety of any odour control infrastructure required, including any venting or carbon odour filters - the potential visual impact on the surrounding residents (both existing and potential future residents) The proposed location of any air valve installation is to be approved by Hunter Water. Air release valve arrangements are as per HWC Drawing PSS-1006-V. Depending on the potential for nuisance odours, carbon canister odour control facilities may be required to be included in the design in addition to a mandatory vent shaft.
5.6.2 Flushing Points and Scours	*Replace paragraph 2 as follows:* All dead ends of a pressure sewer branches shall be provided with an end flushing point, regardless of the number of connections on the branch. *Insert the following paragraph at the end of this clause:* In locating flushing points, consider how mains will be flushed during the construction phase, and if there is likely to be staged connections to the system. Flushing points for interim development scenarios should be located to allow for cleaning the lines and minimising potential blockages and odour generation. Flushing fittings are to have Camlock connections and be sufficiently robust to avoid damage through normal operational use and be listed on Hunter Water's Approved Products and Manufacturers List.

Reference	Amendment to WSA 07-2007 version 1.1
[New Clause] 5.8 Discharge Maintenance Holes	*Insert new clause after clause 5.7:* The pressure sewer system shall discharge to the specified connection point, which will be either a gravity sewer system maintenance hole, or pump station collection maintenance hole. The turbulent discharge of effluent from the system into the downstream sewer system is to be avoided. For a system that discharges to a gravity reticulation system maintenance hole, the maintenance hole lid is to be sealed by means of a Gatic cover (or approved equivalent) and the discharge pipe work general arrangement shall be as outlined in the PSS-1008-V. Protection of the receiving maintenance hole from corrosive gases is to be achieved by lining of the maintenance hole with a protective surface coating complying with WSA 201 Manual for Selection and Application of Protective Coatings and Sydney Water's Supplement to WSA 201.

Reference	Amendment to WSA 07-2007 version 1.1
6 On-Property Design	
6.3 Vacant Lots	*Replace this entire clause with the following:* Vacant lots are to be provided with a collection tank (fenced for protection), property discharge lines, property boundary kit, and pressure sewer lateral to the street reticulation. The pump unit, control panel, associated electrical cables, and customer sanitary discharge line to the tank, are not to be installed until the property is ready to utilise the sewer connection.
6.5 Design and Layout of New On-Property Components	*Insert item (8) below after listed item (7) and its associated follow-on note:* 8. To maximise the area of the property that can drain to the collection/pump unit, whilst being within the bounds of the location requirements as specified in Clause 7.3 (inclusive of Hunter Water's amendments). *Delete the last paragraph of this clause (beginning with "On properties where…"). It does not apply.*

Reference	Amendment to WSA 07-2007 version 1.1
6.6 Control and Alarm Panels	*Replace the 1st and 2nd paragraph of this Clause with the following paragraphs:* A Hunter Water approved combined control/alarm panel is to be located in a clearly visible location in a direct line-of-site and within 10m of the collection tank. It is preferable that the panel is attached to the external wall of the main building on the property being serviced near to the switchboard, at a height of between 1.2 and 1.5m above the ground. Where this is not possible, the control panel is to be mounted on a free-standing fully galvanised post located within 4 m of the centre of the collection tank and at a height between 1.2 and 1.5m, and compliant with requirements of AS 3000:2007 Electrical Installations. For all installations, an IP56 rated local isolation switch is to be installed at a distance no greater than 300 mm from the control panel. General requirements for the layout of the control panel and electricals with respect to the collection tank are shown on Drawing PSS-1103-V. Typical details for a free standing control panel mounting post are shown by Drawing PSS-1104-V. The control/alarm panel shall be located in a weatherproof enclosure and in the case of flood-prone areas the weatherproof enclosure shall be suitably rated for full immersion. Attachment of the control panel to the support structure is to be made using stainless steel screws.
6.7 Signage	*Replace the 1st paragraph with the following:* Traffolyte labels shall be specified for both identification and WH&S proposes on the outside of the control panel. Labelling is to include Hunter Water's emergency contact details.
[New Clause] 6.8 Property Discharge Line	*Insert new clause after clause 6.7:* The property discharge line is the pressurised pipe that connects the collection tank to the boundary kit assembly. The property discharge line for a given property shall not cross on to any adjacent property, or collect the discharge from any other property. Exceptions may include where the property discharge line crosses a common area (e.g. as for townhouse developments).

Reference	Amendment to WSA 07-2007 version 1.1
7 Collection/Pump Units	
7.1 General Design Requirements	*Insert the following paragraphs at the beginning of this clause:* The pressure sewer pumping unit comprises the following key components: - A dedicated sewer grinder pump/s to reduce all of the incoming sewage to slurry capable of being passed through small diameter pipelines. - Pump and motor protection devices to protect against overheating, overpressure and no-flow conditions. - A leak proof storage vessel that is round in shape and made of lightweight materials in accordance with WSA 129. - Anti-buoyancy measures to prevent the collection tank floating out of the ground. - An alarm system that warns by both an audible and visual alarm that the storage volume in the pumping unit is above the reserve storage level, indicating a pump/system failure. - Valves to ensure the pressure sewer pumping unit can be isolated and to prevent siphoning. - Lid lockable with HWC standard lock. *Replace paragraph 2 with the following:* Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for requirements for emergency storage volumes, and the methodology by which the available storage is to be calculated.
7.2.1 General	*Replace paragraph 1 with the following:* Hunter Water requires an allowance for emergency storage to be provided within the collection tank sufficient to reduce the risk of overflow to an acceptable level. Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for requirements for provision of emergency storage.
7.3 Location	*Replace the last paragraph of this clause with the following:* The collection tank is to be located at the front of the property at a maximum distance of 3 m (to the centre of the tank) from the council approved front building setback (the minimum distance a building or other structure must be set back from the front property boundary). The collection tank is to be located on a nominated side of the property, and at a minimum distance of 1.5m (to the outer edge of the tank) from the side boundary and a maximum distance of 5m from the side boundary. For corner

Reference	Amendment to WSA 07-2007 version 1.1
	lots, the tank may also be positioned on the street corner (instead of the side boundary) with positioning following the same rule of a maximum distance of 3m past the property set-back (set-back as applicable to corner blocks). Within these bounds, the collection tank shall be positioned; - On the side of the property (or corner, for corner lots) that maximises the area of the lot able to drain to the tank. - At least 2m from buildings and other structures including retaining walls, or a greater distance as required to clear a 45 degree foundation zone of influence. - At least 3m from open windows. - Outside of any drainage path or depression which may become flooded in wet-weather. If unavoidable, then the tank lid is to be sealed and a new vent pipe from near the side wall of the tank routed to the building wall to a vent point above the roofline (refer to AS 3500). Any sewer wells requiring horizontal venting shall only use a propriety vent stub. - Outside of any tidal zone (King Tide), or recorded storm surge zone. - Outside of any buildings or other enclosed area. - With a clear 3m vertical clearance from the top of the tank inclusive of the concrete work apron width. - Within 10 metres of the control / alarm panel achieving a direct line of site between the two (refer to Clause 6.6 with Hunter Water amendments for further detail). - If positioning of the collection tank to meet all the above requirements is not practical, then consult with Hunter Water. These placement requirements should be considered in developing sub-division lot layouts, particularly with regard to implementing arrangements such that rear drainage to lots is eliminated.
7.6 Covers and Frames	*Insert the following paragraph at the end of this clause:* To minimise the risk of children entering the collection tank, the lid shall be lockable with a Hunter Water approved lock. The lid shall have a confined space Traffolyte label visible on the closed lid. To facilitate access for maintenance, the cover shall be girt by a 100 mm wide moat of gravel encircled by a minimum 500 mm wide concrete apron sloping away from collection tank cover. Refer to standard drawing PSS-1103-V and PSS-1101-V for details.
7.8 Grinder Pump Identification	*Insert the following paragraph at the end of this clause:* Each pump unit is to be assigned a unique serial number that is to be obtained from Hunter Water. A label made of Traffolyte

Reference	Amendment to WSA 07-2007 version 1.1
	with this serial number is to be installed on the pump unit. The serial number is also to be recorded in the property installation information and Work-As-Constructed drawings.
[New Clause] 7.9 Pump Operating Levels	The pumping unit shall be controlled by pressure switches; ultrasonic sensors; or conductive level sensors. Float switches are not permitted as primary level sensors. Refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for a discussion on the storage components and requirements for individual pressure sewer collection tanks. Based on discussion in this guideline, the associated switch levels that shall be set are as follows: • **Pump off (or BWL) switch**, which shall be set as low as possible, to minimise the volumes of sewage stored in the pumping station after the pump ceases to operate. • **Pump on (or TWL) switch**, with the storage volume between "pump off" and "pump on" to be of a limited volume. • **An alarm switch**, which activates if the "pump on" switch fails to operate. • **Redundant switches** for if the initial "pump on" switch fails.

Reference	Amendment to WSA 07-2007 version 1.1
8 Service Connection Pipework	
8.1 Property Discharge Line	*Replace this clause with the following:* The property discharge line shall connect the collection tank /pump unit to the property boundary kit. The property boundary kit is to be located 1m from the front property boundary line, and in alignment with the collection tank location, and perpendicular to the street reticulation pipework. Refer to Standard Drawing PSS-1102-V for Hunter Water's required arrangement for a property boundary kit. The assembly shall consist of the following fittings from the street side to the house side (sewer lateral to property discharge line): - Isolation valve (street side) - Plugged tee maintenance fitting positioned vertically (for testing and bypass) - Non-return valve (suitable for sewage, no spring mechanisms). - Isolation valve (house side) Alternate arrangements are subject to approval by Hunter Water. Dependant on any other agreements between the customer (typically non-residential) and Hunter Water, such as Trade Waste Agreements, a sewage flow meter may also be required within the boundary kit. For metered discharges the boundary kit shall be constructed above ground including approved meter spacings and a trade waste test tee.

Reference	Amendment to WSA 07-2007 version 1.1
Appendix A: Air Management in Pressure Sewer Systems	
A3 Required Flow Velocities	*Delete all of clause A3, it does not apply*. The Designer is to refer to Hunter Water's Pressure Sewer Systems Hydraulic Design Guideline for requirements for calculating air movement in pressure sewer pipes.

Part 2: Products and Materials

Reference	Amendment to WSA 07-2007 version 1.1
10 Products and Materials Overview	
10.1 Purpose	*Insert the following paragraph at the end of this clause:* Only those products listed by the Hunter Water Approved Products and Manufacturers Register (http://www.hunterwater.com.au/Building-and-Development/Approved-Designers-Suppliers-and-Contractors/Approved-Products-and-Manufacturers.aspx) and as being suitable for use with the pressure sewer systems equipment shall be used.
10.3.3 Constructor	*Amend this clause as follows:* Constructors should use only such products that are nominated in the Specification, Hunter Water's Approved Products and Manufacturers Register, and approved Design Drawings.
10.7.2 Polyethylene (PE) Pipes and Fittings	*Replace the 4th paragraph with the following:* Available sizes of PE100 PN16 (Series 1) pipe and electrofusion fittings approved for use by Hunter Water are DN 40, 50, 63, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, and 315.

<table>
<tr><th>Reference</th><th>Amendment to WSA 07-2007 version 1.1</th></tr>
<tr><td>10.7.3 Pipeline Identification</td><td>

Replace 1st paragraph with the following:

PE pipes and fittings shall be plain cream in colour in accordance with Table 4.1 of WSA 02-2014-3.1 Hunter Water Edition Version 2 and complying with product specification WSA PS–207 for PE 100 pressure pipe.

PE fittings shall be PE 100 and either mechanical and/or electrofusion fittings complying with product specification WSA PS–208. Fabricated PE 100 fittings suitable for butt welding complying with WSA PS–208 are also permissible.

Replace Table 10.2 with the following:

TABLE 10.2 - INTERNAL DIAMETERS OF PE PIPES

Pipe Size DN	**Mean Internal Diameter for PE100 PN16 pipe material (mm)**
40	32.3
50	40.4
63	51
75	61
90	73
110	89.4
125	101.5
140	113.9
160	130
180	146.3
200	162.5
225	182.9
250	203.4
280	227.8
315	256.3

For readily available sizes refer to Clause 10.7.2.

</td></tr>
<tr><td>10.10 Additional Product and Material Information</td><td>

Insert the following paragraph at the end of this clause:

Only those products listed by the Hunter Water Approved Products and Manufacturers Register (http://www.hunterwater.com.au/Building-and-Development/Approved-Designers-Suppliers-and-Contractors/Approved-Products-and-Manufacturers.aspx) and as being suitable for use with the pressure sewer systems equipment shall be used.

</td></tr>
</table>

Part 3: Construction

Reference	Amendment to WSA 07-2007 version 1.1
11 General	
11.2 Interpretation	*Amend as follows:* **"Part"** means the Pressure Sewerage Code of Australia Part 3: Construction with Hunter Water Supplement. **"Purchase Specification"** means the WSAA Product Specification for Products and Materials, Hunter Water Version. **"Standard Drawings"** means the Pressure Sewerage Code of Australia Part 4: Standard Drawings Hunter Water version. **"Water Agency"** means Hunter Water.

Reference	Amendment to WSA 07-2007 version 1.1
13 General Construction	
13.1 General	*Amend the 4th paragraph of this clause as follows:* Keep on site at all times a copy of the Specification, all relevant Design Drawings, Standard Drawings and *Product* Specifications and *Hunter Water's Approved Products and Manufacturers Register*.
13.5.3 Disused / Redundant Sewers, Drains and Tanks	*Replace this clause with the following:* Disused Sewer Reticulation Works The Contractor is responsible for executing any treatments to disused Hunter Water sewers as shown in the Contract Drawings and / or detailed in the Specification (e.g. part demolition, capping etc.). Where action associated with a sewer that is to be disused as a result of the contract works is not defined, Hunter Water shall be consulted for instruction. Disused Private Property Works The lot owner is responsible for taking any necessary action to manage sewer infrastructure not owned by Hunter Water that is to be made redundant or disused as a result of the contract works. This includes on-property assets such as disused sanitary drains and septic tanks and required works such as removal, filling, capping at points of disconnection, and removing surface fittings. Disused/redundant sewers, drains and tanks are to be disposed of in accordance with local requirements as specified/approved by the relevant authority including all applicable fees.

Reference	Amendment to WSA 07-2007 version 1.1
13.7 Alteration of Existing Services	*Replace this clause with the following:* **13.7.1 Location of Services** Details of services shown on the Contract Drawings are not to be taken as indicating all existing services or exact locations. 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. Notify the owner of any services that may be affected by construction activities in accordance with the notification requirements of the particular service owner. Adhere to any work and reporting requirements the Service Owner instructs on. **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 Clause 3.12.4 of WSA 07. **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. The costs of these repairs are to be borne by the Contractor. Obtain from the Service Owner a certificate stating that the repair has been carried out to their satisfaction. If the service is not under the control of an authority and the Service Owner cannot be located within a reasonable time, report the damage, and arrange or perform repair to an approved standard. Do not backfill, cover up or make the repair inaccessible prior to obtaining approval from the Superintendent.
[New Clause] 13.11 Method Statements	*Insert a new clause heading after clause 13.10:*

Reference	Amendment to WSA 07-2007 version 1.1
[New Clause] 13.11.1 General	*Insert the following under new clause 13.11:* All activities shall be consistent and compliant with the Contractor's management systems. Prior to construction, the Contractor shall submit to the Hunter Water's Superintendent, Method Statements detailing descriptions of the construction activities. These are to be submitted 3 weeks prior to commencement of the works. Works shall not commence until direction to do so is received from Hunter Water's Superintendent. Below further detail is provided on information to be included in method statements for the following types of construction activities; - Horizontal directional drilling - Open trench excavation - Connection to existing services For general requirements and design guidelines for jacking precast concrete and other rigid pipes refer to the CPAA publications, Pipe jacking—Design guidelines and concrete pipe jacking—Technical Bulletin.
[New Clause] 13.11.2 Horizontal Directional Drilling (HDD)	Work procedures for pipeline installations employing Horizontal Directional Drilling (HDD) technology shall include the following information as a minimum: - General description of method and sequence of operation. - Necessary licences and approvals, if required. - Programmed daily works and duration for the operation. - Specialist subcontractors to be utilised. - The layout of the dimensions and set-up at all the HDD rig launch sites and the receiving shaft sites. - Methods of construction for shafts, shoring and support, access and WHS requirements. - The proposed HDD rig, supporting equipment and personnel. - The proposed cutting/boring assembly and the anticipated soil formation and conditions to be encountered. - Details of any temporary or permanent casing to support the HDDs. - The proposed method of survey, guidance and control and frequency of readings to achieve the specified tolerance from grade or target. - The method and set-up for the installation of the product pipe into the HDDs. - Calculations of the maximum installation force on the product pipe likely to be induced during installation. - The estimated total volume and type and properties of drilling fluids to be used in the HDDs.

Reference	Amendment to WSA 07-2007 version 1.1
	- The circulation and reclamation of drilling fluids. - The disposal of drilling fluids. - The estimated total amount of excavated materials and its disposal. - Means of transport and storage of pipes and equipment. - Sample HDD bore log and computer output data from survey, guidance and control systems. - Method of recovery of HDD equipment in case of obstruction, jamming or breakage. - The management of ground water conditions during the HDD process. - Actions upon loss or escape of drilling fluids and /or ground water. - Actions upon HDD failure. Compile and submit a contingency plan detailing the actions that will be taken should any of the following occur; a change in ground conditions is encountered; the angular deflection of the joints exceeds the allowable deflection; the horizontal or vertical tolerances are exceeded; any of the equipment fails or becomes stuck; groundwater is encountered.
[New Clause] 13.11.3 Open Trench Excavation	A Method Statement for pipeline installations employing conventional open trench technology shall include the following information as a minimum: - Method of excavation, dewatering and shoring if required. - Necessary licences and approvals, if required. - Means of transport and storage of pipes and materials. - Means of containing any sewage spillage (if applicable, i.e. connecting to live sewer/manhole). - Spoil disposal method. - Creek crossing method (if applicable).
[New Clause] 13.11.4 Connection to Existing Sewers	A Method Statement for pipeline installations requiring connections to existing sewers shall include the following information as a minimum: - Method of connection to live sewer pipes or maintenance holes. - Method of preventing construction debris entering live sewers or maintenance structures. - Means of containing any sewage spillage. - Sewage flow management plan, e.g. by-pass arrangements etc.

Reference	Amendment to WSA 07-2007 version 1.1
14 Products and Materials	
14.2 Authorised Products and Materials	*Replace this clause with the following:* Only those products listed on the Hunter Water Approved Products and Manufacturers Register (*http://www.hunterwater.com.au/Building-and-Development/Approved-Designers-Suppliers-and-Contractors/Approved-Products-and-Manufacturers.aspx*) and as being suitable for use with pressure sewer systems equipment can be used.
[New Clause] 14.6.11 Concrete Supply	*Insert new clause after clause 14.6.10:* The supply of concrete is to be in accordance with Hunter Water's Standard Technical Specification, STS 104 – Concrete Supply & Construction (General).

Reference	Amendment to WSA 07-2007 version 1.1
15 Electrical Works	
15.2 Scope of Work	*Insert the following sub-points after item (h):* Emergency Generator Connection Point All control/alarm panels installed, shall be wired to an adjacent emergency generator connection point, unless one already exists within the panel itself. Access to the generator connection point should be considered when deciding on panel location. Electrical Isolation Switch An IP56 rated local isolation switch is to be installed adjacent to the control panel, within in 300 mm. Placement of the Control Panel The control/alarm panel and emergency generator connection point shall be mounted on the building being serviced by the pressure sewer system, wherever possible. Where the pressure sewer pumping unit installation is required to be located more than 10 metres from the building being serviced, and there are no other suitable structures upon which to attach the panel, the panel must be mounted on a post as detailed in Standard Drawing PSS-1103-V. The control/alarm panel shall be located so that it can be safely accessed by maintenance personnel without obstructing the resident's access to the property.

Reference	Amendment to WSA 07-2007 version 1.1
	The control/alarm panel shall be located within line of site of the pressure sewer pumping unit, and shall be positioned in a location such that visible and audible alarms should be noticed during an alarm condition. Where possible, the control/alarm panel shall be mounted at a height of between 1200 and 1500 mm above ground level using stainless steel screws. Silicon shall be used to maintain a sealed unit. The connection diagram for the pump unit shall be adhered to the inside of the control panel door. *Insert the following new item (L) after item (k):* (L) All exposed and buried electrical and pump control cable shall be routed through a protective conduit and installed in accordance with the standards noted above. The cable between the pump and the control/alarm panel where it is located above ground shall be located in a PVC conduit and covered by a metal protection strip and earthed to meet the relevant Australian Standard. Further detail is provided Standard Drawing PSS-1102-V. No joints are permitted in the cable between the collection tank and control panel. <u>Essential Pre-connection Activities</u> The following activities must be carried out prior to connecting to the property's existing electrical supply. - Inspect existing electrical distribution box. If the existing electrical distribution box does not meet relevant standards noted above, it shall be upgraded or replaced, as required, by the property owner prior to proceeding with any further electrical installation work on-site. - Connect to existing electrical distribution box with a separate electrical circuit and breaker. Compliance with the requirements detailed above shall be confirmed in writing by a qualified electrician and records of this confirmation kept as part of the quality management records.

Reference	Amendment to WSA 07-2007 version 1.1
16 Excavation	
16.2 Limits of Excavation	*Insert the following after the 3rd paragraph:* Minimum trench widths and depths shall be in accordance with Standard Drawing PSS-1000-V. The Contractor must make an allowance for the widening of the trench at PE pipe weld locations and for concrete encasement.
16.4 Excavation in Root Zones	*Insert the following after the 3rd paragraph:* Obtain advice from an arborist where the stability of a tree may be impacted.
16.9 Surplus Excavated Material	*Insert the following at the end of this clause:* Surplus material and excess spoil must be stockpiled, tested, classified (in accordance with Schedule 1 of the Protection of Environment Operations Act 1997 (POEO Act)) and disposed of in accordance with the waste classification requirements.

Reference	Amendment to WSA 07-2007 version 1.1
17 Bedding for Pipes and Collection Tanks	
17.3 Placement of Bedding	*Insert the following after the 2nd paragraph:* Keep all dewatering systems operating during backfilling so that no fill material is placed or compacted under water. At all times ensure that the pipes are not damaged or moved during placement and compaction of fill. Where the pipe is supported on concrete or is concrete encased, do not place overlay material until the concrete has obtained its initial set and a minimum of 24 hours after pouring.

Reference	Amendment to WSA 07-2007 version 1.1
18 System Installation And Jointing	
18.4 Open Trench Installation	*Replace the 3rd paragraph with the following:* Where curvature of the pipe is to be achieved by cold bending, cold bend the pipe with a uniform radius along the length of the pipe in accordance with manufacturer's instructions. Do not exceed bending radii specified in the Plastics Industry Association of Australia Limited POP202 – 'PVC, PP, and PE Pipe Installation on Curved Alignments'. Under no circumstances is the curvature of a pipe to be more than 25 times the outside diameter of the pipe. Unless specified otherwise, 90-degree bends shall not be permitted. 90-degree bends shall be accomplished by installing two 45-degree bends with a separation of 300 mm, or by installing a long radius bend. Minimum ground cover shall be in accordance with Standard Drawing PSS-1000-V.
18.5 Trenchless Installation	*After the final paragraph of 18.5 insert the following content with specific coverage of HDD installation requirements:* **HDD INSTALLATION** <u>General</u> Undertake HDD works in accordance with the Method Statement as submitted to the Superintendent. Precautionary measures should be taken to avoid damaging the product pipe during installation. During installation, the installation force shall be regulated to avoid overstressing the product pipe. The installer should take into consideration the following: - Maximum installation force on the product. - Whether the main is capable of being installed to the design drawings and within the specified tolerances. - The calculated maximum tensile load permissible to be applied to the pipe during installation is within allowable limits. - Temporary works, retaining or supporting structures required for the installation of the pipework. - The coordinates and reduced levels of the HDD at launch and receiving points. - The location of underground services, which may be impacted by the pipelines. - Proposed drive lengths for HDD bores. - The entrance and exit angles, bend radius, setback distances. - The details of any temporary or permanent casing pipes that may be required to support the HDD.

Reference	Amendment to WSA 07-2007 version 1.1
	The product pipe shall not be subjected to any hydrostatic pressure during installation that cannot be withstood by the specified product pipe. Once a section of pipe is pulled back through a HDD bore it must be securely capped off to prevent entry of debris, until the adjacent section is ready for connection. Do not exceed a bending radius as recommended in POP202**.** Electrofusion welding shall not be permitted on lengths of PE pipe pulled through a HDD bore unless an appropriate design for the coupling‘s oversize and stress has been carried out and approved. <u>Loading and Relaxation</u> The tensile capacity of the pipe shall not be overloaded during installation. After installation by HDD methods, the pipe will contract and is to be left unrestrained for a period of 24 hours, or such period that is observed to coincide with practical cessation of contraction, as recommended by the pipe manufacturer. Depending on temperature, the method of installation, etc. the length of time required for the pipe contraction can be quite significant. <u>Notch Effects</u> Where notch depth exceeds 10% of pipe wall thickness at any point in the circumference of the pipe exterior after installation, the pipe shall be replaced with a pipe that provides equivalent wall thickness to the originally designed pipe after subtracting the depth of anticipated notch. Notify the Superintendent immediately to inspect the section. Inspections of pipe exterior "scored" condition shall be undertaken periodically at the commencement of HDD operations in a location at least 1 metre clear of the winching nose cone, and from time to time where ground conditions are noted to become more aggressive in so far as the likelihood for scoring to occur. Record all observations and submit to the Superintendent. <u>Ground Water</u> Control, contain and manage the effects of the ingress of any ground water to the HDD bore. Provisions shall be made for the remedial treatment of joints, fractures and any other defects in the strata in the event of drilling fluid loss. <u>Drilling Fluids and Cuttings</u> If drilling fluids are used (during the drilling, reaming and product pipe installation operations to establish and maintain bore integrity, remove cuttings, and lubricate the bore) the type of drilling fluid shall be chosen to suit the soil conditions. Details of any drilling fluids proposed for use and the estimated volumes to be used are to be provided to the Superintendent in the Method Statement prior to commencement of drilling.

Reference	Amendment to WSA 07-2007 version 1.1
	Drilling fluids to be used shall be environmentally sound and bio-degradable. Returned fluids shall be properly contained, reclaimed and recirculated. The Contractor is to prevent the loss of drilling fluids into the ground or the environment. Precautionary measures shall be undertaken to minimise the impact of any inadvertent spillage of fluids on return or at exit of the HDD. Provide for a vacuum pump (truck or trailer-mounted) and tank for the purpose of preventing the discharge of drilling fluids to the surrounding environment. Classify and dispose all fluids and cuttings that are to be removed from site in accordance with the NSW Waste Management Guidelines (DECC, 2014).
18.6 Jointing	*Replace this entire clause with the following:* <u>General</u> All installation of PE pipe fittings and jointing is to be undertaken in accordance with AS/NZS 4129 Fittings for PE Pipes for Pressure Applications, and with manufacturer's requirements. PE pipes are to be joined by electrofusion techniques or flanged connections. Hunter Water may consider butt-welding of pipes for diameter greater than DN90 by persons with the appropriate qualifications, equipment and experience. Where butt-welding is used internal weld bead shall be removed. Personnel carrying out or supervising the installation of pressure sewer shall hold minimum qualifications as required by AS 2033 Installation of PE Pipe Systems. All jointing shall be performed under controlled conditions by skilled and experienced operators utilising approved equipment. All operators to be used on the work shall be accredited by a registered training organisation. The minimum PE accreditation is PMWELD301B and PMBWELD302B. Those carrying out pipe joining are to be capable of demonstrating their experience with this technique. <u>Electrofusion and Butt Welding</u> Undertake all pipe fusion processes above ground except in circumstances where it is demonstrated that it is not technically practical. Electrofusion welding shall not be permitted on lengths of PE pipe pulled through a HDD bore unless an appropriate design for the coupling‘s oversize and stress has been carried out and approved and where it can be demonstrated that deformations of the pipe are within the allowable range to allow for electrofusion welding. Electrofusion jointing shall be undertaken in accordance with the Plastics Industry Pipe Association of Australia Limited document (POP001) 'Electrofusion jointing of PE pipe and fittings for pressure applications'.

Reference	Amendment to WSA 07-2007 version 1.1
	Butt fusion jointing shall be undertaken in accordance with the Plastics Industry Pipe Association of Australia Limited's document 'Butt Fusion jointing of PE pipes and fittings - Recommended Parameters' in addition to AS 2033. The weld test requirements of WSAA Polyethylene Pipeline Code WSA 01-2004 for butt and electrofusion welding are to be strictly enforced, including destructive testing. Test welds shall be conducted at the commencement of the works and at frequent intervals throughout the works for both electrofusion welding and butt welding to confirm both weld procedures and personnel. <u>Compression Fittings</u> The use of compression fittings shall only be allowed for connection of pipework at the property boundary kits as shown in Standard Drawing PSS-1102-V. The pressure rating of the fittings shall be PN 16 as a minimum, or to match the class of the associated pipework. The fittings shall be installed and tightened to the manufacturers' recommendations.
18.8 Pressure Sewer Laterals, Property Boundary Assemblies	*Insert the following after the 1st paragraph:* <u>Property Boundary Kit</u> The property boundary kit shall be located as detailed in the Contract Drawings. The boundary kit should not be installed in a depression subject to inundation and silt deposition. The boundary kit should be aligned perpendicular to the front property boundary to minimise aesthetic impacts on the property. The boundary kits shall be installed at the correct depth using two 45 degree vertical bends upstream and downstream of the boundary kit to maintain minimum pipe cover for the property discharge line. Refer to Standard Drawing PSS-1102-V. <u>Pressure Sewer Laterals</u> Connection of pressure sewer laterals to pressure sewer reticulation shall be achieved by the use of electrofusion welded saddles (as manufactured by Plasson or approved equal) with reducer and coupler or similar arrangement, to make a 90 degree tee connection with the pressure sewer reticulation. Installation shall be in accordance with manufacturer's recommendations.
18.9 On-Property Items	*Insert the following above clause 18.9.1:* The on-property components shall be installed in the locations as detailed in the Contract Drawings. The general requirements for placement of the tank are as per Clause 7.3 including Hunter Water Amendments. The general requirements for placement of the control panel and electricals are as per Clause 6.6 including Hunter Water Amendments.

Reference	Amendment to WSA 07-2007 version 1.1
	All underground household services in the vicinity of the construction areas shall be located. This includes any existing sanitary lines, storm water, water supply, electrical, telecommunications and gas. The minimum clearances between underground water lines and any pressure sewer system component shall be as detailed in Clause 3.12.4 of WSA 07. Prior to construction, the intended layout for each individual property is to be submitted to Hunter Water on a Property Sewer Service Plan View Diagram complying with Hunter Water's STS 911 Preparation of Civil, Structural and Mechanical Engineering Drawings. The Property Sewer Service Plan View Diagram shall detail all restoration requirements as agreed to by the Property Owner and approved by the Superintendent.
18.9.1 Collection/Pump Units	*Insert the following before the 1st paragraph:* To prevent any potential of the collection tank floating, the following needs to be applied in installations: - The pressure sewer pumping unit shall not be installed in a ground depression where rainfall runoff water could normally pond. - A concrete ring beam or ballast is to be installed or poured around the base of the storage vessel. The size of the ballast will be in accordance with the manufacturer's requirements and assuming the water level reaches ground level. Where necessary the collection tank shall be filled up to the inlet pipe invert level with water, prior to pouring the concrete anchor to prevent the tank from "floating" before the concrete sets. Where the backfill material is not specified by the collection tank manufacturer, granular backfill material of a maximum particle size of 10 mm will apply. A concrete apron is to be constructed around the pump unit as detailed in Standard Drawing PSS-1103-V. All tank inlet, venting stubs, electrical stubs shall be proprietary. No drilling holes in the tank is permitted under any circumstances.

Reference	Amendment to WSA 07-2007 version 1.1
18.9.2 Customer Sanitary Drains	*Insert the following after the 1st paragraph:* During works on existing properties, the property owner is to maintain existing arrangement until the new system is commissioned. Connection of the customer sanitary drain (house plumbing) to the collection tank is the responsibility of the property owner and shall be undertaken by a licenced plumber. The division between property owner works and construction contractor works is shown in Standard Drawing PSS-1101-V. The inlet connection for the property sanitary line to the collection tank shall be to the vertical riser as shown in Standard Drawing PSS-1101-V. The connection shall be made at a level sufficient to allow connection of the customer sanitary drain. The inlet connection shall be PVC pipe (SN8) and have the same diameter as the property sanitary line, but as a minimum be 100 mm nominal diameter.
18.9.3 Property Discharge Lines	*Insert the following new items after item (c):* (d) Property discharge lines differ in diameter depending on the type of pressure sewer pumping unit configuration used. For single residential pump units the discharge line shall be DN40. For larger units refer to design drawings. (e) The property discharge line for a given property shall not cross onto any adjacent private property, or collect the discharge from any other property, unless all easement conditions are met and approved by Hunter Water's Superintendent. Exceptions may include special properties where the access driveway for a given property serves as access to additional properties.

Reference	Amendment to WSA 07-2007 version 1.1
18.10 Pipeline Tracer Wires and Detectable Marking Tapes	*Insert the following after the 4th paragraph:* All pipelines installed by HDD shall be installed with a tracer wire. The trace wire shall be 316 stainless steel 3.2 mm diameter welding wire, as a minimum. The tracer wire shall be connected to the next available termination feature with a 316 SS 'U' clamp or similar. Splicing of two ends of tracer wire by hand twisting alone, or "twitching," is not permitted. Termination points for the tracer wire shall be located at in line fittings and features such as isolation valves, air valves, flushing points, pressure sewer pumping unit, and in the property boundary kit and shall be readily accessible at these points such as to allow energising of the trace wire for location purposes. The tracer wire shall be terminated in a BP connector.
18.13 Valves, Valve Chambers, Scours and Surface Fittings	*Insert the following after the 2nd paragraph:* When tightening isolation valves, the tightening sequence specified in WSA 03-2011-3.1 on drawing WAT-1313 (Flanged joints bolting details) must be followed. All isolation valves shall be clockwise closing and shall be buried, with surface fittings in accordance with WSA 03-2011-3.1 drawings WAT-1301-V, WAT-1303, WAT-1305. All isolation valves will be installed complete with permanent tags indicating the direction of closing. Valve units should be assembled at least one day prior to installation. At the time of assembly, the valve should be tightened to its limit, and then tightened again at the time of installation (at least one day later), as both the rubber gasket and the polyethylene in the isolation valve units have been observed to relax over time. Typically, the nuts on the gasket will turn an additional ¾ of one rotation when left overnight. Prior to installation and final tightening, valve units must be taken out of direct sunlight for at least 30 minutes. Both the gasket and the pipe are known to expand from heating due to sunlight, and once installed and buried the gasket and pipe cool down and contract – if the valve unit has been tightened in an expanded state, upon contraction integrity of the seal is compromised.

Reference	Amendment to WSA 07-2007 version 1.1
18.15 Location Markers	*Replace this clause with the following:* Indicator plates for isolation valves, air valves and flushing points shall be installed as per WSA 03 – 2011-3.1 Drawing WAT-1300. Indicator plates must refer to “SEWER” so they are not mistaken for water appurtenances. Provide approved 250 mm x 80 mm x 1.5 mm thick aluminium marker plates bearing orange reflectorised lettering "AV" for air valves, “FP” for flushing points, "SV" for stop valves and "Sc V" for scour valves opposite and facing each surface fitting. Where the distance from any existing wall, fence or post to which the notice plate could be conveniently fixed is greater than 10 metres, provide and set firmly in the ground a 100 x 100 x 1600 mm hardwood post. The top of the post is to be 1000 mm minimum above finished surface level. Below ground, apply two coats of tar paint or hot applied tar to the post. Above ground, prime the post and then paint with two (2) coats of white exterior enamel. Drive the posts 600 mm into the ground. In rock set the posts in a 200 mm diameter hole filled with Grade 20 concrete to a minimum depth of 300 mm. Mark distances to the surface fitting, on the marker plate accurate to a tolerance of 100 mm when measured from the centreline of the surface fitting with 12 mm high die stamps. Additionally, mark surface fittings by stencilling 100 mm high letters on the adjacent kerb using orange road marking paint.
[New Clause] 18.16 Traffolyte Tags	*Insert the following new clause after clause 18.15:* Traffolyte tags shall be installed on the underside of the surface fitting covers and be affixed epoxy bonding product. The tag shall read “PRESSURE SEWER” in orange lettering on a white background. Lettering will be 20 mm high and 3 mm in thickness. Traffolyte tags shall be installed on the outside of the collection tank and outside of the control panel annotated with the asset number and serial numbers of the pump and the collection tank.

Reference	Amendment to WSA 07-2007 version 1.1
[New Clause] 18.17 Connection to Existing System	*Insert the following new clause after clause 18.16:* <u>General</u> Work to make a connection to a live sewer should not take place unless approved by Hunter Water. Only undertake connection to existing live sewerage system on completion of all other Works. Give written notice, including full details of the proposed connection procedures, 10 working days prior to making the connection and comply with any directions regarding the method and timing of the connection which are necessary to meet operational needs of the existing sewer system. Perform the connection on the approved date and at the approved time. Do not commence the connection work unless all necessary materials and equipment are available on site. Undertake all work so as to minimise interruption to the operation of the existing sewer system and to prevent overflow of sewage. Escape of sewage from the live system is not permitted. If necessary, pump sewage around the point of connection. <u>Tapping Connection to a Live Pressure Sewer</u> All tappings to polyethylene pipe of the pressure sewer system shall be clean with no damage occurring to the surrounding structures. The tapping saddle fitting shall be a polyethylene tapping saddle with a rotatable outlet and a screw cap sealed by an o-ring as manufactured by Plasson or approved equivalent. Electrofusion cap type tapping saddles, shall not be used. The outlet shall be a minimum of 63 mm. The tapping saddles can only be used on sewer reticulation that is a minimum of 63 mm, as that is the minimum saddle size. The electrofusion weld shall be pressure tested prior to tapping into the pipe. Prior to testing, the property discharge line installation must be complete. This includes the installation of the collection tank, the property discharge line, the boundary kit and the connection to the reticulation line (without the tapping). Only after the pressure testing has passed, can the final tapping into the reticulation pipe proceed.

Reference	Amendment to WSA 07-2007 version 1.1
19 Pipe Embedment and Support	
19.4 Special Bedding and Embedment's / Geotextile Surround and Pillow	*Insert the following after the 1st paragraph:* Use geotextile surround in accordance with Trench Type 'E' from WAT-1203 drawing WSA 03-2011-3.1 where any portion of the pipe embedment zone is below the natural water table at the time of excavation. Provide 250 minimum overlap at fabric joints. Geotextile filter fabric must be approved for inert material, BIDIM A14, manufactured by Geofabric Australia Pty Limited or approved equivalent.

Reference	Amendment to WSA 07-2007 version 1.1
20 Fill	
20.1.2 Material Requirements	*Replace this clause with the following:* The trench fill material shall comply with the Specification and relevant Design Drawings. Use excavated material in the trench fill zone provided it has: - a particle size no greater than 75 mm across the largest dimension, - is free from organic matter and other deleterious materials, - can be placed into a dense mass free of voids and cavities, and - has a Californian Bearing Ratio (CBR) of greater than or equal to 5%. Excavated material such as silty sand, sand, or gravelly sand can be used as trench fill if it satisfied the above requirements. For trafficable areas use: - crushed rock dust in accordance with Standard Technical Specification STS 101. - crushed rock in accordance with Standard Technical Specification STS 102.

Reference	Amendment to WSA 07-2007 version 1.1
21 Inspection and Acceptance Testing	
21.7 Collection/Pump Unit	*Insert the following at the end of this clause:* Testing and commissioning of the pumping unit shall be in accordance with the following: - Any commissioning instructions from the manufacturer. - Hunter Water's PSS commissioning operation check list. The manufacturers may have their own requirements before they will formally certify the pump is commissioned, and any installer will need to make themselves aware of these requirements before commissioning commences. Where the installation of the control panel and pump is undertaken separately from the collection tank then commissioning of the pump and control unit shall be done separately. All operational tests are to be conducted using potable or recycled water with the pressure sewer pumping unit only being connected to the sewer system after these tests have been successfully carried out. The tests required for the on-property testing are to include, but are not be limited to: - Liquid leakage Test - Simulated Power Failure Test - A time-based operational test to confirm pump performance - An alarm test - A Pump Protection Test - Visual Inspection Quality Assurance records shall be prepared and submitted to the Hunter Water's Superintendent prior to acceptance of a lot for connection. An electrical and plumbing Certificate of Compliance is required for each individual pump installation and all records shall be collated and submitted to Superintendent prior to handover of the system to Hunter Water.

<table>
<tr><th>Reference</th><th>Amendment to WSA 07-2007 version 1.1</th></tr>
<tr><td>[New Clause]
21.9 Electrical/Control System</td><td>Insert the following clause after clause 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 Item</th><th>Method</th><th>Acceptance Criteria</th></tr>
<tr><td>Conduit 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 Diagram</td><td>Inspect & 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>Functional Test Pump Start, Pump Stop, High Alarm, Overload</td><td>Simulation Box with 1.5 /2.4 kW load bank</td><td>Correct operation</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>
</table>

<table>
<tr><th>Reference</th><th>Amendment to WSA 07-2007 version 1.1</th></tr>
<tr><td colspan="2">23 Restoration</td></tr>
<tr><td>23 Restoration</td><td>Delete this whole clause (inclusive of 23.1 to 23.7) and replace with:

For restoration requirements refer to Clause 11 of Hunter Water’s Standard Technical Specification STS 403 Construction of Sewer Rising Mains.</td></tr>
</table>

Reference	Amendment to WSA 07-2007 version 1.1
24 Asset Documentation and Work As Constructed Details	
24.2 Work As Constructed Details	*Insert at the following at beginning of this clause:* Prepare Work As Constructed (WAC) Information in accordance with Hunter Water's STS 903 Work-As-Constructed Information, and/or STS 911 Preparation of Civil and Structural Engineering Drawings as applicable. WAC information for on property and reticulation components shall be submitted for each lot prior to Hunter Water acceptance of a lot. WAC drawings for all lots shall be submitted to Hunter Water's Superintendent a minimum of 4 weeks prior to handover of the system to Hunter Water *Insert the following at the end of this clause:* Where pipelines are installed by directional drilling, the contractor shall supply copies of the borehole profiles recorded by the drilling rigs. The borehole profiles shall form part of the as-constructed information, recording depths along the main. If the drilling rig is not equipped with a system for producing these profiles the contractor shall take depth readings to the "sonde" at a maximum of 20m intervals and include the depths and chainages on the as-constructed information.
[New Clause] 24.2.1 Pressure Reticulation WAC Information	*Insert the following clause after clause 24.2:* The following WAC information shall be documented: - A pipe schedule shall be produced indicating the individual pipe sizes, class, type and length of all pipes installed. - The drawing shall be marked up to show which lines were installed by HDD and which lines were installed by open trench excavation. - The pipeline shall be located by survey and the location marked up on the drawing. The location of the pipeline shall also be provided in MGA coordinates. - Chainages shall be shown along the pipelines. - Where the depth of the pipeline is different to the standard depth indicated in the drawings, the deviation from standard depth shall be noted. This maybe where the pipeline depth is changed to avoid obstructions, such as services, creeks, drainage paths, etc. - The fittings such as branch tees, pressure sewer lateral tees, reducers, isolation valves, air valves, flushing points, flowmeter pits, pressure monitoring pits, vent shafts, etc. shall be located by survey and the location marked up on the drawing. The location of the fittings shall also be tied to boundaries as well as provided in MGA coordinates.

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	- Record previously unidentified service details. This is, intersecting underground services not indicated at design stage but located during construction, with type, depth and chainage from starting point of main. - Non-standard conditions (e.g. non-standard material type, concrete encasing, etc.) shall be indicated by starting and finishing chainages and by MGA co-ordinates. - Date of completion of construction. - Tracer wire location and elevation or a general note indicating that the required location has been adhered to. Pressure sewer mains WAC surveys shall include recording of mains position at intervals not greater than 25 lineal metres, along with above-mentioned items.
[New Clause] 24.2.2 On-Property WAC Information	*Insert the following clause after clause 24.2.1:* Prepare WAC Information complying with Hunter Water's; STS 911 Preparation of Civil, Structural and Mechanical Engineering Drawings; and STS 903 WAC Information. All STS documents are available from the Hunter Water website. In addition to all the pipework, fittings and structure locations, the following information shall be documented: - Pressure sewer pumping unit location – dimensioned from at least two fixed points (Note: fences are not considered fixed points for this purpose). - Layout of new property discharge line and pressure sewer lateral – dimensioned from the nearest building and/or property line. - All fittings used to accomplish horizontal bends shall be located on the plans and dimensioned from at least two fixed points. - Location and coordinates of property boundary kit – dimensioned from the nearest two adjacent property lines. - Location of pressure sewer lateral and point of connection to pressure sewer main. - Pipe size and material types for all pipework. - Details of valves and tees which comprise the boundary kit. - Property asset number for the collection tank and pump. The following Electrical and Control Equipment WAC information shall also be documented on the WAC 'Property Sewer Service Diagram': - Location of control/alarm panel – dimensioned from at least one building comer, or if located on a post, from two fixed points.

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	- Layout of electrical cable routed from the electrical distribution box to the control/alarm panel. - Layout of the pump control cable from the control/alarm panel to the pressure sewer pumping unit, dimensioned from at least two fixed points located by MGA coordinates. - Confirmation that the electrical distribution box is compliant with relevant electrical codes and standards.

Part 4: Standard Drawings

Reference	Amendment to WSA 07-2007 version 1.1
26 Listing of Standard Drawings	
	Insert the following drawings after PSS-1007 in the table: PSS-1008-V – Discharge Maintenance Hole – General Arrangement PSS-1009-V – Reticulation Flowmeter - General Arrangement PSS-1010 – Air Valve Installation in ground PSS-1011 – Offset Air Valve Installation in ground *Remove the following drawing in the table PRESSURE SEWAGE NETWORK:* PSS – 1006 Typical Appurtenances – Valve and Vent Shaft Details *Insert the following drawings after PSS-1102 in the table:* PSS – 1103-V – On-Property Details - Electrical Layout; Collection Tank Concrete Surround PSS – 1104-V –Control Panel Mounting Post – Typical Detail

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27 Commentary of PSS-100 Series Drawings – Pressure Sewerage Network	
27.1 – General	*Insert the following before the 1st paragraph:* The requirements of the HWC supplementary drawings (as identified with a drawing number ending with 'V') shall take precedence over the WSAA WSA-07 Standard Drawings.
27.2 – PSS-1000 Embedment and Trench Fill – Typical Arrangement	*Insert the following before paragraph 2:* Hunter Water requires embedment to be sand in accordance with WSA PS-350. Refer to Hunter Water version.
27.3 – PSS-1001 Special Embedments - Concrete and Cement Stabilised Systems	*Insert the following before paragraph 2:* Hunter Water requires embedment to be sand in accordance with WSA PS-350. Refer to Hunter Water version.
27.5 – PSS -1005 - Typical Valve Installation – Shroud Pipe and Fittings Assembly	*Insert the following at the end of this clause:* Hunter Water requires a stainless steel backing plate to the valve flange. Refer to Hunter Water version.
27.6 – PSS – 1006 Typical Appurtenances – Valve and Vent Shaft Details	PSS – 1006 Typical Appurtenances – Valve and Vent Shaft Details is not adopted by Hunter Water. Please refer to PSS-1010 – Air Valve Installation in ground and PSS-1011 – Offset Air Valve Installation in ground.
27.7 – PSS – 1007 Typical Appurtenances – Flushing Point Details	*Insert the following after the 2nd paragraph:* Refer to Hunter Water version.
27.8 – PSS-1100 Design Layout – Typical Locality and Site Plan	Refer to Hunter Water version.
27.9 – PSS – 1101 – On-Property Layout – Typical Arrangement and Sanitary Drainage Details	*Insert the following before the 1st paragraph:* Refer to Hunter Water version.

Reference	Amendment to WSA 07-2007 version 1.1
27.10 – PSS – 1102 – Property Boundary Assembly – Typical Installation	*Insert the following before the 1st paragraph:* Refer to Hunter Water version.
[New Clause] 27.11 PSS–1103 – On-Property Electrical Layout	PSS-1103-V details the typical arrangements for the installation of on-property electrical components.
[New Clause] 27.12 PSS – 1104 – On-Property Electrical – Control Panel Support Post	PSS-1104-V is the typical arrangement for the support of the control panel when it is not mounted on to the house wall.
[New Clause] 27.13 PSS-1008 – Discharge Access Chamber	PSS-1008-V details the requirements for PSS discharging at the base of an existing or new maintenance hole. Refer to Hunter Water version.
[New Clause] 27.14 – PSS-1009 – Typical Flowmeter Arrangement	PSS-1009-V show the typical Hunter Water requirements for the installation of flowmeters within PSS. The flowmeter and electrical components are to be located within a pit – not to be direct buried. Refer to Hunter Water version.
[New Clause] 27.15 – PSS-1010 – Air Valve Installation in ground	PSS-1010-V show the typical Hunter Water requirements for the installation of flowmeters within PSS. The flowmeter and electrical components are to be located within a pit – not to be direct buried.
[New Clause] 27.16 – PSS-1011 – Offset Air Valve Installation in ground	PSS-1011-V show the typical Hunter Water requirements for the installation of air valves within PSS network.