Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Plumbers Licensing Board

Technical Note

Technical Advice Line 1300 360 897 **www.dmirs.wa.gov.au/building-and-energy**

Above-ground pipework using drainage principles

This technical note has been issued to clarify the requirements when installing sanitary plumbing systems using drainage principles. AS/NZS 3500.2021, part 2 Sanitary plumbing and drainage, clause 10.11 specifically relates to the installation of above-ground pipework and connection of fixtures using elevated drainage principles (EDP).

Installation

Sanitary plumbing systems using EDP, as the name suggests, uses drainage principles in elevated positions and relies on larger pipe sizes used in drainage design to provide a smooth flow to prevent siphonic action and the resulting loss of fixture trap seals.

These principles are found in AS/NZS 3500.2:2021, clause 3.10 for unvented branch drains and table 3.10.2 where the following basic unvented limits apply:

- Ten metres (10 m) maximum length.
- Two (2) water closet pans (maximum).
- Thirty (30) fixture unit maximum loading.

If any of the three (3) points above are exceeded, additional venting is required.

Other requirements in AS/NZS 3500.2:2021, clause 10.11.4(a) prohibit connections into the vertical pipework, unless it is the top floor connection or a vented sanitary stack. This means that all junctions shall be connected into the graded pipework.

Upstream vents shall be connected downstream of any fixture or drainage trap or at the vent extension of a sanitary stack as per AS/NZS 3500.2:2021, clause 3.9.2.

Pipes on grade of different sizes shall be connected using eccentric taper fittings or unequal junctions as per AS/NZS 3500.2:2021, clause 6.6.2.1(a) see diagram 7.

AS/NZS 3500.2:2021, clause 6.6.2.4.2 requires the branch of a junction used to make the connection of a DN 100 branch pipe to another DN 100 pipe on grade be elevated at an incline of not less than 15° above the horizontal, see diagram 8. The 15° provision does not apply if there are no soil fixtures connected upstream on either the branch or main pipe.

AS/NZS 3500.2:2021 clause 6.6.2.4.3 Other installations means the 15° provision does not apply for repairs, maintenance or extensions to existing sanitary pipes.

Multi storey buildings

EDP in multi storey buildings may serve a maximum of four floor levels above ground level and the top floor of a building. EDP branches serving fixtures on the first four floors shall only connect to the graded sections of pipework.

Only vented stacks are permitted to connect to vertical sections of pipework. The branch on the top floor may either connect as branches to stacks or as EDP discharge pipes.

Restricted zones in EDP

Any vertical pipe extending through no more than one floor level is not considered a stack, therefore restricted zones for the connection of branches within the graded sections of the EDP are as follows:

- No connections shall be made in the graded sections of the elevated drainage within 450 mm of the lower bend as per AS/NZS 3500.2:2021, clause 8.6.2.5(b), see diagram 1.
- No connections shall be made in the graded sections of the elevated drainage within 500 mm of the upper bend as per AS/NZS 3500.2:2021, clause 6.8.1(b), see diagram 1.
- If a sanitary stack is connected to a vertical section of the EDP, the connection shall not be within 600 mm of the lower bend on the vertical section as per AS/NZS 3500.2:2021, clause 6.8.2(a).
- The stack connection shall not be within 600 mm of the upper bend on the vertical section as per AS/NZS 3500.2:2021, clause 8.6.2.4, see diagram 1.
- If continued as a stack after the four floor levels of EDP, connections near base of stacks shall apply as per AS/NZS 3500.2:2021, clause 6.8 and figure 6.8.1, see diagram 1.

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Level 1, Mason Bird Building, 303 Sevenoaks Street (entrance Grose Avenue), Cannington WA 6107
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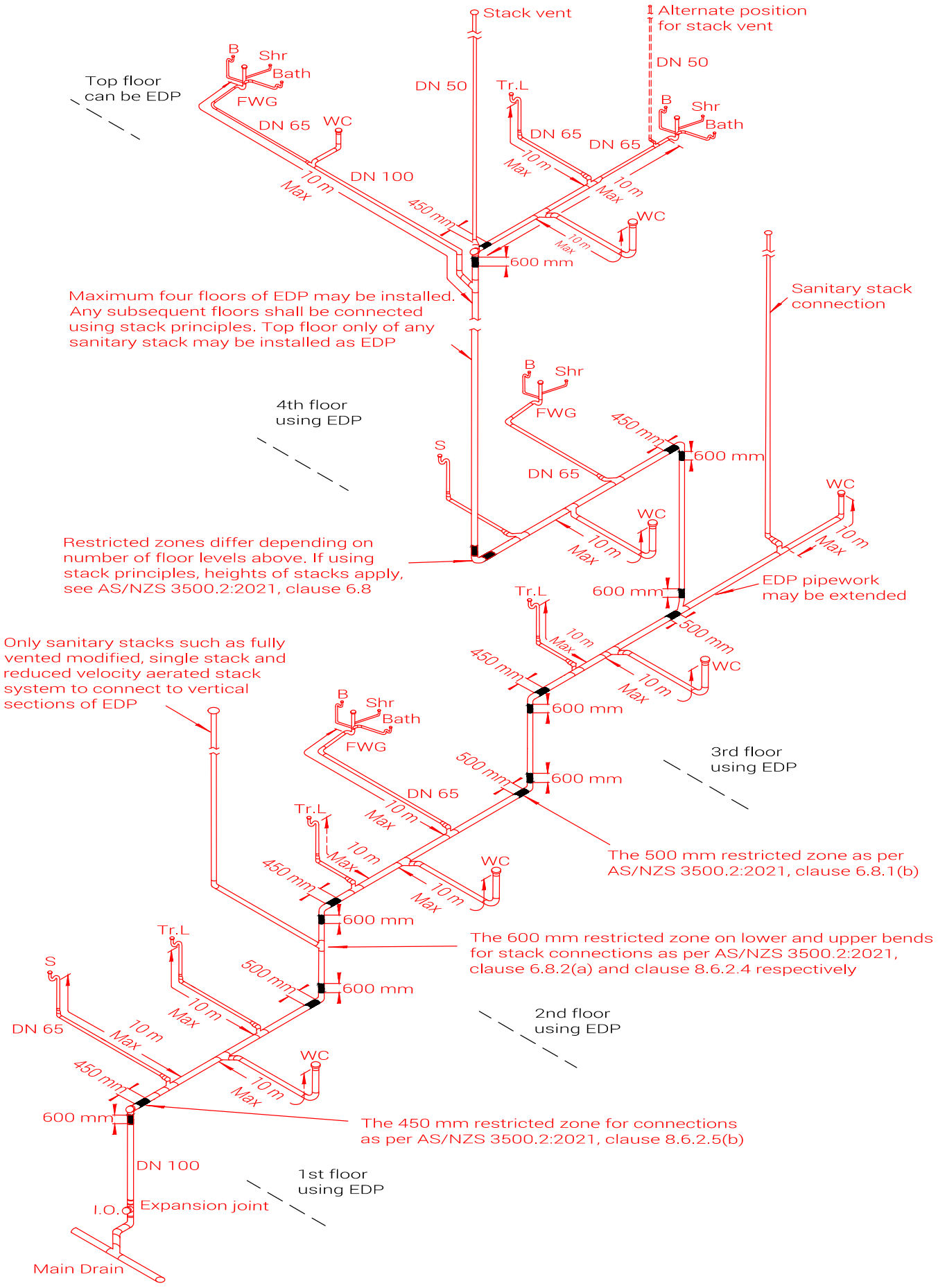

Diagram 1: Maximum four floors as well as the top floor of a sanitary system using elevated drainage principles

Typical double storey Class 1 buildings

When using EDP on a typical double storey Class 1 building (dwelling) branches may connect to the discharge stack because it is simply the top floor configuration as shown in AS/NZS 3500.2:2021, figure 10.11.4. This is permitted because there are no other floors and fixtures above that will place adverse hydraulic pressure on the top floor fixture trap seals. The discharge stack must be vented because it exceeds the vertical unvented limit of 2.5 m in AS/NZS 3500.2:2021, clause 3.10.3.

Venting options for a single branch on the top floor of any system

Where any unvented limits for branches in AS/NZS 3500.2:2021, clause 3.10 are not exceeded, a single vent off the discharge stack is a minimum requirement. The vent may be relocated to the upstream end of the branch either for aesthetics or building design requirements, see diagram 2. The vent must be placed on the upstream end of the branch if unvented limits are exceeded.

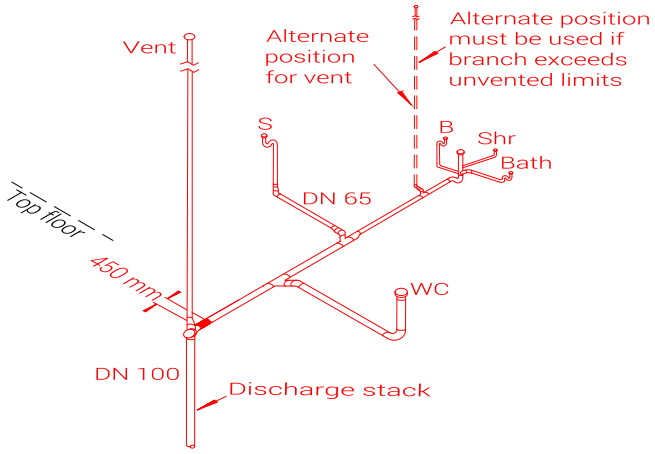

Diagram 2: Vent off the discharge stack or upstream end of the branch

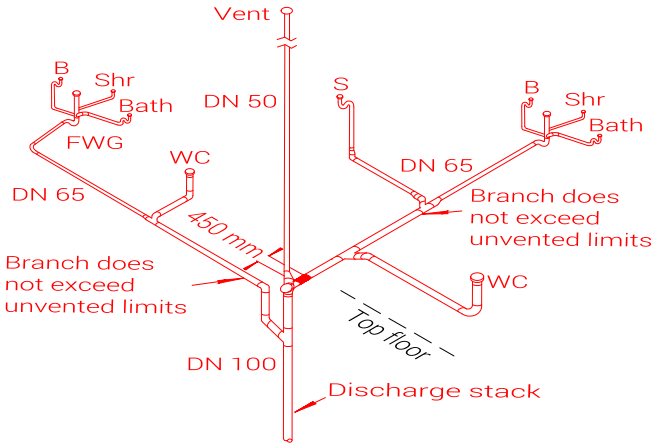

Diagram 3: Vent off the discharge stack with branches under unvented limits

Venting options for branches connected independently on the top floor of any system

Branches may be connected independently using separate junctions with a vent off the discharge stack. The vent off the discharge stack may be relocated to the upstream end of the uppermost branch, see diagram 3.

If any branch exceeds unvented limits it must have a vent at the upstream end. If the stack system is a reduced velocity aerator stack system (RVASS), an aerated junction must be used to connect discharge pipes on the top floor, see diagram 6.

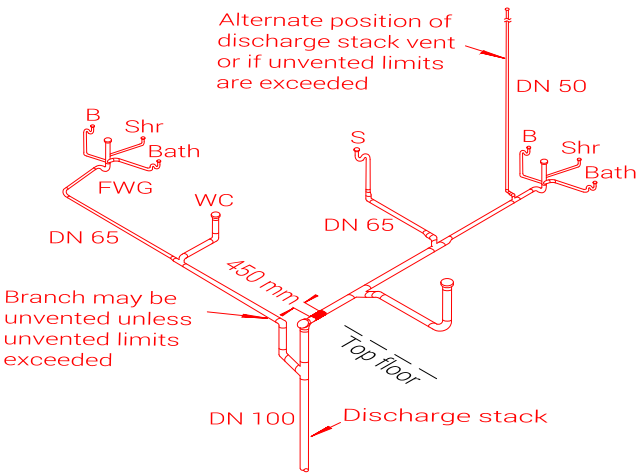

Diagram 4: Alternate position of vent on the upstream end of uppermost branch

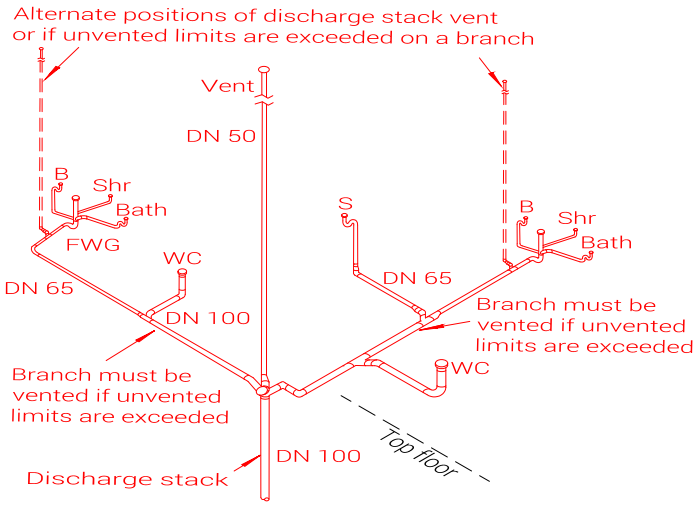

Diagram 5: Vent on the upstream end of either branch where a double junction is used

Commencement of EDP

The requirements of EDP apply to the first four floor levels only above either the invert level of the connection point to the boundary trap riser or inspection shaft. However multi-storey buildings may have pipework passing through basements below ground level before the EDP commences. In these circumstances the pipework below ground level is considered drainage plumbing, as per the definition in the Plumbers Licensing and Plumbing Standards Regulations 2000, regulation 4. Sanitary plumbing, in this case EDP, commences where the pipework rises above the ground level as shown below.

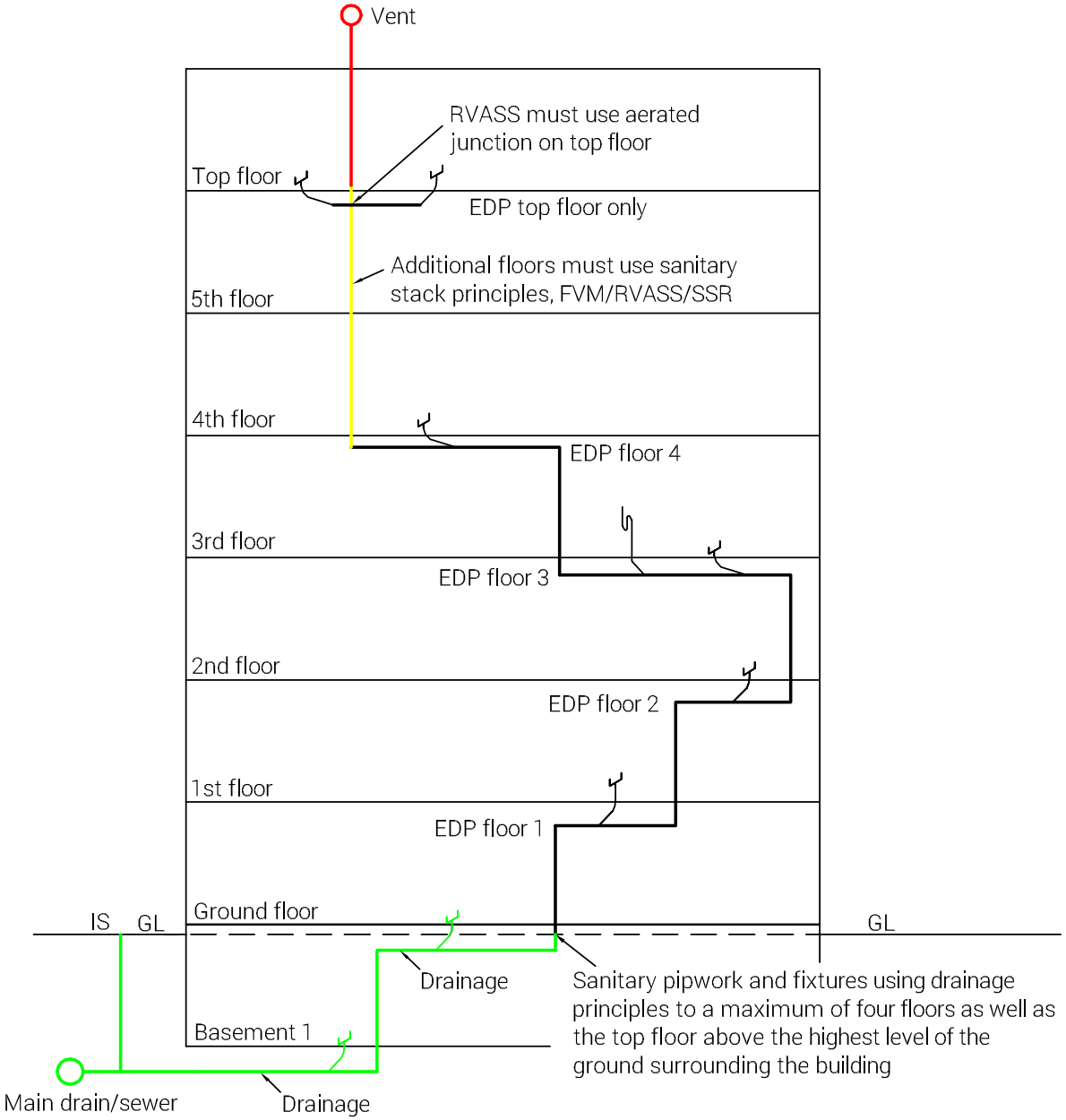

Diagram 6: Shows the point at which EDP commences when buildings have floors below the ground level

Connection of unequal pipes and DN 100 to DN 100 pipes on grade

The diagrams and photograph below show the correct methods of connecting pipes on grade using either unequal or equal 45˚ junctions.

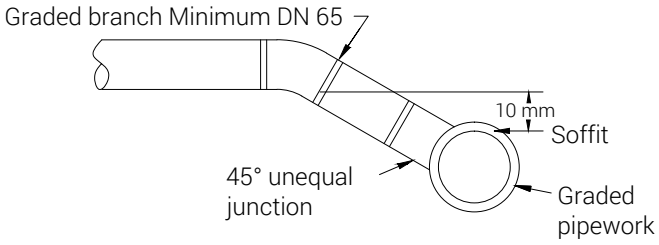

Diagram 7: Connection of a branches using an unequal 45˚ junctions

Photo 1: Connection of branches using unequal 45˚ junctions

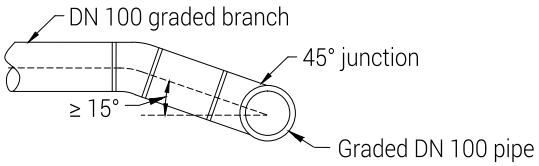

Diagram 8: Connection of DN 100 pipes with a 45˚ junction inclined at 15˚ where WC pans are connected upstream

NOTES:

1. If a RVASS is used to connect fixtures on floors above the first four floor levels, discharge pipes on the top floor must also be connected using an aerator junction fitting. For further information see Plumbers Licensing Board technical note on RVASS:
2. Connection of branches on grade using 88º junctions (sweep junctions) are no longer permitted.
3. 88º junctions are only permitted to connect branches into vertical stacks and risers.
4. The minimum size of drains and drains acting as vents is DN 65. Therefore a DN 65 bend shall always be used. Reduction in the vertical above the DN 65 bend to a DN 50 or DN 40 vent, waste pipe or fixture trap is then permitted.
5. Fixtures may be connected in DN 40 and DN 50 via floor waste gullies with a minimum DN 65 outlet and discharge pipe in accordance with AS/NZS 3500.2:2021, clause 4.6.7.

Notes

The technical note series is issued by the Plumbers Licensing Board to assist the plumbing industry to comply with the Plumbers Licensing and Plumbing Standards Regulations 2000 (the Regulations) applicable to plumbing work in Western Australia.

Each technical note is to be read in conjunction with Part 6 of the Regulations that currently adopt the Plumbing Code of Australia (PCA) and the deemed to satisfy provisions of AS/NZS 3500:2021, parts 0, 1, 2 and 4 but modified in certain matters to suit the State's building approach and other local conditions.

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