Technical Bulletin: Safe Access System for SA Water Assets

Purpose

The purpose of this Technical Bulletin is to provide designers, constructors, asset managers, and others, with clear instruction to engineer out; or as far as is reasonably practical, minimise risks associated with working at heights through the design and construction process.

Reference to; and application of, this Technical Bulletin should ensure the provision of safe access to infrastructure for regular inspections, maintenance activities, and water quality testing by SA Water personnel, alliance partners and approved contractors, without (or with minimum) use of administrative control and/or personal protective equipment (PPE).

The aim of the bulletin is to provide greater clarity on SA Water's requirements to improve safety outcomes for works constructed prior to the release of an update to TS 0720.

Background

SA Water owns and operates numerous liquid retaining structures, raised platforms, buried assets and chambers which vary in size and physical/material characteristics. This infrastructure typically exposes workers to falls from height. Different forms of access infrastructure may also introduce additional risks, depending on the application.

SA Water is committed to minimising risk of falls to people who are required to access these areas and make the means of access as simple as possible, through engineering of the access arrangement.

Advances in technology, work health and safety (WHS), operational practices, and maintenance capabilities have developed and changed over the last several years; such changes have yet to be formally incorporated within SA Water's Technical Standards, guidelines or drawings. Therefore, there is a need to standardise safe access requirements for both new and existing assets to provide consistent benefits to stakeholders, customers, people and communities.

Current situation

Technical Standard TS 0720 (Access Infrastructure for Water Tanks) currently only encompasses access infrastructure for water tanks. SA Water recognises that many other critical assets, further to water tanks, require clarification as to SA Water's safe access requirements.

To capture these requirements, SA Water intend to update TS 0720 to include standard criteria applicable to all assets, as well as asset-specific requirements for surface water storage tanks and tanks on elevated platforms, elevated platforms, earth bank storages and water tanks with floating covers, valve chambers, wet wells and associated valve chambers and pipeline trestle bridges.

Actions

Updating Technical Standards

SA Water is currently taking the opportunity to revise and make updates to the existing TS 0720 (Access Infrastructure for Water Tanks), with the aim to expand the document to encompass other SA Water assets common across the network.

This work is expected to take approximately 6 months, with release expected in the first half of 2025.

Providing interim guidance

To reduce confusion and rework regarding upcoming updates, this Technical Bulletin forms an interim document until such time that a new version of TS 0720 has been finalised.

1 Scope

1.1 Scope and application of this Technical Bulletin

This Technical Bulletin applies to the design and construction of all infrastructure owned or managed by SA Water where a person may be exposed to a fall greater than 300mm. This standard also applies to the modifications of existing infrastructure.

Applications encompassed within this Technical Standard include, but are not limited to, the following:

- Surface water storage tanks.
- Water storage tanks on elevated platforms.
- Elevated platforms.
- Earth bank storages (EBS).
- Surface water storage tanks with floating covers.
- Valve chambers.
- Wastewater wet wells and corresponding valve chamber.
- Pipeline trestle bridges.
- Safe access - related civil works.

1.2 Works not in scope

This Technical Bulletin does not cover the following access infrastructure, nor the following systems or processes:

- Tank internal fixed ladders and platforms.
- Building roofs (pump stations, depots, storage sheds, etc.).
- Temporary access arrangements.
- Movable/mobile access systems.
- Processes associated with entry into high-risk environments (i.e. confined spaces).

1.3 Technical dispensation

Departure from any requirement of this Technical Bulletin and design standards referenced herein shall require the submission of a Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of the SA Water Principal Engineer on a case-by-case basis.

The Designer shall not proceed to document/incorporate the non-conforming work before the Principal Engineer has approved the proposed action in writing via the 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.

1.4 Design standards and references

The design, materials, construction shall be in accordance with the following standards and references.

Reference	Title
AS 1657	Fixed platforms, walkways, stairways and ladders – Design, construction and installation
AS 3996	Access covers and grates
AS 5100.2	Bridge design – Design loads
TS 0101	Safety in design
TS 0104	Design quality management
TS 0105	Quality requirements
TS 0121	Physical security site standards general definitions
TS 0502	Authorised products – Gravity sewer and pressure pumping main systems
TS 0720	Access infrastructure for water tanks, revision 1.1, dated 20/07/16
TYP-07 Series	Tank rehabilitation program typical drawings

The design of the safe access system shall be developed in consultation with Engineering and Operations and Maintenance team prior to the completion of the Concept Design.

1.5 Definition of a safe access system

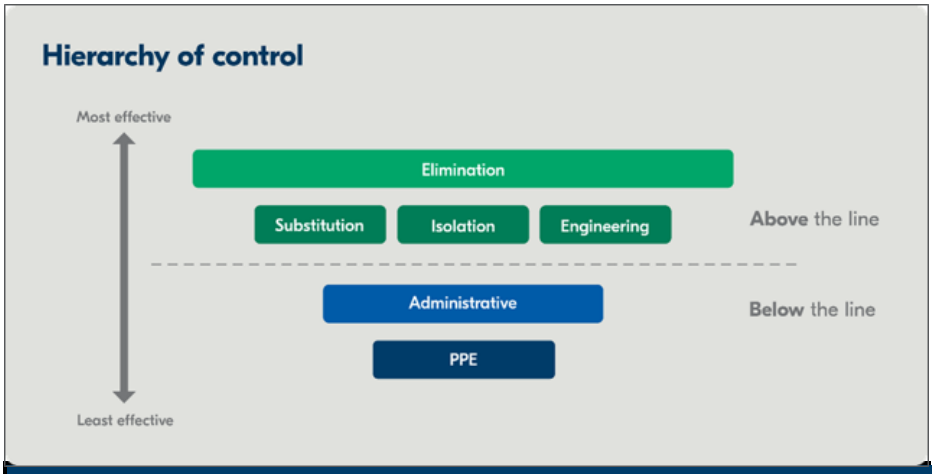
Safe Access System is an engineering design that eliminates (or as far as is reasonably practical minimises) the use of administrative controls and personal protective equipment (PPE).

It includes three distinct activities:

1. Access from ground to top of a structure.
2. Working on top of a structure.
3. Internal access.

1.6 Hierarchy of control

This Technical Bulletin and future updates of TS 0720 target above the line safe access design, as depicted below.



HIERARCHY OF CONTROLS	
Elimination	Permanent solution where the hazard is completely eliminated or removed (e.g. discontinuing the work process, removing hazardous plant or equipment from use etc).
Substitution	Achieved by replacing hazardous plant, equipment, substances, etc., with a safer alternative (e.g. using a less hazardous cleaning chemical).
Isolation	Physically separating the hazard from people (e.g. using physical barriers) and/or by distance (e.g. remote operations).
Engineering controls	Involves making engineering changes or physical modifications which reduce exposure to the hazard (e.g. mechanically restricting the speed limit on forklifts).
Administrative controls	Establishing policies, procedures and work practices designed to reduce a worker's exposure to a risk. It can also include the provision of specific training and supervision.
Personal Protective Equipment	PPE is anything used or worn by a person to reduce the consequence of being exposed to a hazard and any resultant injury (e.g. safety glasses, safety gloves, safety boots).

Figure 1: Hierarchy of control

1.7 Safety in design

Designers are reminded that in applying the requirements of this Technical Bulletin to SA Water projects, they are not absolved of any Safety in Design as per TS 0101, detailed design or statutory obligations to which they may be subject.

2 Standard requirements for a safe access system

2.1 Activity 1: Access from ground to top of a structure

2.1.1 General

Access to a structure's top/roof may be required for the following reasons:

- Inspection and maintenance.
- Maintenance of roof-mounted accessories.
- Water quality testing.
- Emergency rescue and recovery.
- Diver access into a water tank for cleaning and inspection.

2.1.2 Standard requirements

Access from ground to top of a structure shall be via a stairway.

2.2 Activity 2: Working on top of a structure

To Safely work on top of a structure, the following requirements shall be included in an engineered safe access system:

1. Service platform with physical edge protection and gates to access the structure roof and associated hatch.
2. A hatch with physical edge protection in the open position and ability to slide open ergonomically while behind the edge protection. Sliding hatch is most preferred.
3. Flush floor mount Davit arm sleeve for entry/retrieval and fall arrest applications. The sleeve shall be located near the access hatch.
4. Full perimeter physical edge protection around the structure where drop height exceeds 300mm.
5. Locate top-mounted instruments near or within the service platform.
6. Where required, install non-slip roof walkways. Examples of roof walkways include:
    a. Dual hatch water tanks.
    b. Water tanks interconnected by air bridge.
    c. Instruments outside the service platform.

2.3 Activity 3: Internal access

2.3.1 General

Access into the interior of a structure may be required for:

- Inspection and maintenance (either in a drained condition or using divers).
- Cleaning (either in a drained condition or using divers).
- Initial disinfection of the interior of a tank.
- Refurbishment of internal coatings in steel tanks.
- Repair or replacement of tank liners.
- Repair of internal structure.
- Emergency rescue and recovery.

2.3.2 Standard requirements

Access to the interior of a structure shall be undertaken as planned activities.

No permanent access infrastructure shall be provided for the following reasons:

- Being in corrosive water or wastewater environment, the structural condition of the safe access and its fixings cannot be ascertained and as such become unsafe to use.
- Very challenging to comply with the requirements of AS 1657 and SA Working at Height standards in terms of height, slope, cage, levelling of top rung with top landing and extension of stiles above top landing.
- The permanent access may obstruct large footprint of the access hatch.

2.3.3 Means of planned internal access

Internal access can be gained as part of planned works by:

- Divers and Remotely Operated Vehicle (ROV).
- Floating pontoons.
- Scaffolding.
- Crane-lifted work box.
- Elevated working platforms (EWP).

3 Asset-specific safe access requirements

3.1 Surface water storage tanks and tanks on elevated platforms

3.1.1 General

Safe access system for surface water storage tanks and tanks on elevated platforms shall comply with the standard requirements stipulated in Section 2.

3.1.2 SA Water requirements

Minimum SA Water requirement for the safe access system for surface water storage tanks and tanks on elevated platforms are summarised in Table 1.

Table 1: Safe access requirements for surface tanks & tanks on elevated platforms

Structure	Ground to Top	Working on Top			
		Platform	Sliding Hatch	Davit Bracket	Full Perimeter Guard railing
Tanks Larger than 12m in diameter	Staircase	2.4 x 2.4m	2.4 x 2.4m Typical **Raw Water Tanks:** 2.4 x 2.4m one side & 2.4 x 4.8m other side	Yes	Yes
Tanks up to 12m in diameter#1	Staircase	1.2 x 1.2m	1.2 x 1.2m	Yes	Yes

Notes:

1. Given the relatively small surface area of tanks less than or equal 12.0m in diameter, allowance has been made for smaller footprint of service platforms and sliding hatches.

3.1.3 Typical safe access drawings

In developing the design for safe access, reference shall be made to SA Water's typical *Safe Access Drawings (Draft)* which will be made available upon request.

3.2 Elevated platforms/towers

3.2.1 General

Given the height of elevated work platforms/towers (EWP), access from the ground to the platform shall be generally via crane-lifted work box.

However, in some locations it may be more practical to install multiple flights of staircases.

The platform footprint shall accommodate:

- Supported tanks.
- Safe access staircase for roof of supported tanks.
- Landing of a crane-lifted work box.
- Adequate clearances for movement and maintenance activities.

In addition, the design shall allow for an EWP to service underside of the platform as well as the structural members of the tower. This is usually achieved by a dedicated bay without cross wind bracings.

3.2.2 SA Water requirements

Minimum SA Water requirement for the safe access system for elevated platforms are summarised in Table 2.

Table 2: Safe access requirements for elevated platforms

Structure	Ground to Top	Working on Top			
		Platform	Sliding Hatch	Davit Bracket	Full Perimeter Guard railing
Elevated Platforms	Crane-lifted work box	Refer Section 3.2.1	N/A	N/A	Yes

3.3 Earth bank storages and surface tanks with a floating cover

3.3.1 General

Non-solid roofs, such as structures covered by flexible floating covers, introduces a unique set of safe access challenges which mandate the use of PPE.

Typical PPE used for accessing floating covers include:

- Hi-vis inflatable life jacket.
- Dive knife.
- Whitewater helmet.
- Soft soled shoes- e.g. reef walking shoes.
- Working at heights PPE, harness etc.

3.3.2 SA Water requirements – Earth bank storages

Minimum SA Water requirement for the safe access system for earth bank storages are summarised in Table 3.

Table 3: Safe access requirements for earth bank storages

Structure	Ground to Top	Working on Top			
		Platform	Hinged Hatch	Davit Bracket	Full Perimeter Guard railing
Earth bank storages	Ramp	1.2 x 1.2m integral with the cover	1.2 x 1.2m & 1.8 x 1.2m high hatch	N/A	N/A

Notes:

1. Access hatches shall be hinged on one side, be of solid (non-permeable) construction, and be light weight to allow manual operation.
2. The floating cover shall have a minimum 600mm wide walkways to critical elements such as hatches, vents, sampling points, etc.
3. All cover-mounted instruments and equipment shall be located on or near dedicated cover walkways.

3.3.3 SA Water requirements – surface tanks with a floating cover

Minimum SA Water requirement for the safe access system for surface tanks with a floating cover are summarised in Table 4.

Table 4: Safe access requirements for surface tanks with a floating cover

Structure	Ground to Top	Working on Top			
		Platform	Hinged Hatch	Davit Bracket	Full Perimeter Guard railing
Surface tanks with a floating cover	Staircase	2.0m wide to top of stairs & 1.2 x 1.2m integral with the cover	1.2 x 1.2m & 1.8 x 1.2m high hatch	N/A	N/A

Notes:

1. Service platforms and access structures shall be fully independent from the floating cover (i.e. imparts no load into the floating cover), which cantilevers over the tank wall to allow for personnel access onto the floating roof.
2. Cantilevered platforms shall include provisions for portable ladders and davit arms to allow diver access.
3. Access hatches shall be hinged on one side, be of solid (non-permeable) construction, and be light weight to allow manual operation.
4. The floating cover shall have a minimum 600mm wide walkways to critical elements such as hatches, vents, sampling points, etc.
5. All cover-mounted instruments and equipment shall be located on or near dedicated cover walkways.

3.4 Valve chambers

3.4.1 General requirements

The following general requirements for valve chambers shall be adopted, as a minimum, for all new installations and/or modifications of existing infrastructure:

- Permanent access infrastructure shall preferably be incorporated, as required, to allow external access to the exterior of the valve chamber (Refer to Section 3.4.2).
- No permanent access infrastructure shall be installed within the valve chamber interior, except for multi-level chambers (Refer Section 3.4.3).
- Permanent edge protection is not required where chamber height above surrounding ground does not exceed 300mm.
- Anchor points and fall arrest PPE are not permitted to be used as the primary means of permanent access.

3.4.2 External access

The area immediately around all chambers are to be made as safe as reasonably practicable for all people who may approach, work on, or work around the chamber.

3.4.2.1 Chamber height (above-ground)

For fully buried valves, the optimum chamber height above ground shall be 300 mm for the following reasons:

- Provide adequate barrier for surface water.
- Eliminate the need for edge protection for the valve chamber.
- Provide a barrier against which embers and debris accumulates.

For chamber height greater than 300mm above the surrounding ground, action should be taken to either:

- Install AS 1657- compliant perimeter edge protection and access infrastructure (staircase or step-type ladder) to access the top of the chamber.
- Raise the surrounding ground level to reduce the difference in height, in accordance with AS 1657 (see excerpt below in Figure 2).
- Fully or locally lower the height of the chamber wall.

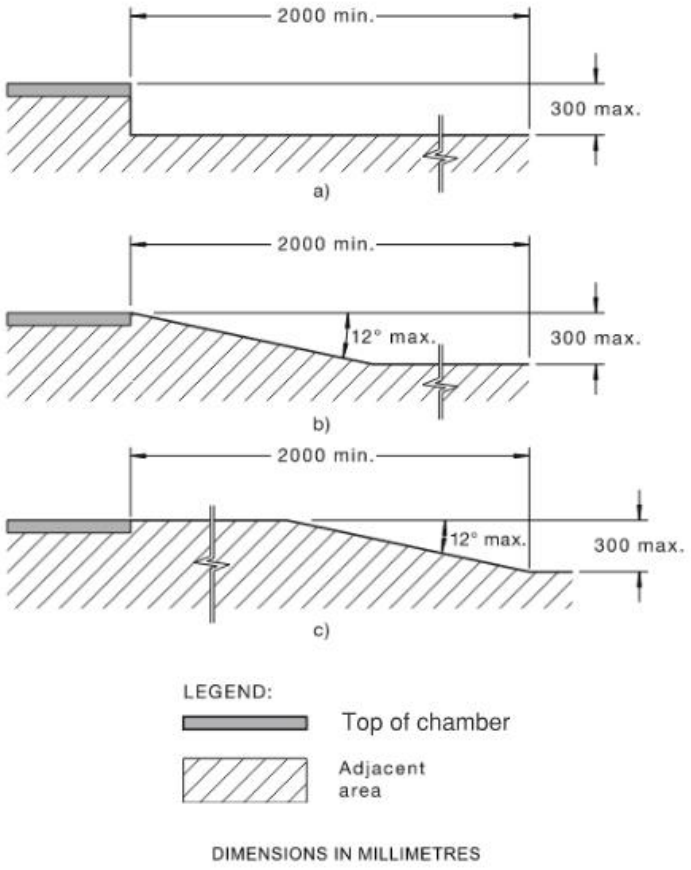


FIGURE 5.2 TYPICAL PROVISIONS OF CLAUSE 5.4.1 WHERE NO GUARDRAIL IS NEEDED

Figure 2: AS 1657 Figure 5.2 Excerpt

3.4.2.2 Valve operation

Access points and/or extended spindles shall be provided to allow operation of valves from outside (above) the chamber cover.

Consideration should be given to preferred SA Water methodologies for operation of valves, including providing stops and/or mounting brackets for any mechanised valve operating tool.

Valve spindles should not sit proud of the cover, so as to avoid creating a potential tripping hazard. Where the spindle hole may need to be greater than 100mm in diameter, a removable cover/grate to the spindle hole should be provided.

3.4.3 Internal access

3.4.3.1 General requirements

Except for multi-level chambers (Refer Section 3.4.6.4), no permanent access infrastructure shall be installed within the valve chamber interior for the following reasons:

- Non-compliant ladder installation to AS 1657 and SA Water working at height standard, in terms of height, installation angle, stiles extension above chamber cover, alignment of top rung with cover and ladder cage.
- Space availability given hatch size and pipework arrangements.
- The unknown condition of the ladder and its fixings to wall given the internal humid environment.
- Safety considerations associated with personnel accessing the interior of a valve chamber (ergonomics, falls, engulfment, etc.)

Interior access shall be a planned activity where all safe means of access (scaffold, temporary ladder, etc.) are organised in advance.

Methods of eliminating or substituting the requirement for personnel to access the chamber interior shall be adopted including, but not limited to, the following:

- Where practicable and with approval of Operation, backfilling and/or burying the chamber with an approved backfill material (generally for pipe DN375 or smaller)
- Relocating equipment and instrumentation (i.e. valves, flow meters, etc.) to ground level, through the reconfiguration of pipework, where they are readily accessible without the need to access the interior of the chamber.
- Installing remote methods of operating equipment housed within the valve chamber (i.e. extended valve spindles), allowing operation from the top of the chamber (refer Section 3.4.2.2)
- Conducting inspections via drone, or other similar Remotely Operated Vehicle (ROV).

Replacement or major refurbishment of equipment and instrumentation are not generally considered to be “regular access”. Any activity which will require a project to be set up, or which may require major dismantling of any infrastructure or equipment, shall be considered a planned activity.

3.4.4 Chamber cover design

Valve chamber covers shall be grid mesh grating (steel, aluminium, FRP or similar) which allows line of sight into the chamber for visual inspection purposes only.

Covers for valve chambers:

- Should comply with the requirements of AS 1657.
- Designed for AS 1657 design loads for floors.
- Should typically be designed to span the width of the chamber from wall to wall in maximum 6.0m length and be of manageable sizes to suit the lifting capabilities of Operations and Maintenance.
- Should typically be fully secured such that cover panels cannot be easily opened or moved. Grating shall be preferably secured using proprietary clips/clamps, fastener discs, permanent bolts, or padlock mechanisms.
- Shall preferably incorporate extension spindle access holes to allow valves to be operated without entering the chamber. Refer also Section 3.4.2.2.
- Where applicable, should have clearly identified safe lifting points.

3.4.4.1 Grid mesh's supporting steel beams

Valve chamber grid mesh cover shall be supported on steel beam spaced to suit the spanning capability of the grid mesh and applied design loadings.

The steel beams shall bear directly on the concrete wall, within a pocket, or U-shaped steel bracket face fixed to the concrete wall. In both cases, no positive connection is required. Refer Figure 3 below.

For end span, the grid mesh shall be supported on steel shelf angle fastened to wall, to allow proprietary clips/clamps installation. Rebating concrete wall for this purpose is not accepted.

All steelworks shall be adequately protected against corrosion to achieve a minimum 25 yrs to first major maintenance.

Figure 3: Steel beam – wall connection

3.4.4.2 Personnel access hatch

A lockable chamber access hatch shall be incorporated within the chamber cover design, for personnel access to clean the chamber and/or undertake repair works.

To reduce manual handling, hatch material should be aluminium with consideration of dissimilar materials contact.

The access hatch should typically be 750mm min. square and hinged along one edge. The hatch shall have a full perimeter physical edge protection in the open position and ability to open ergonomically while behind the edge protection.

An AS 1657-compliant landing area shall be provided adjacent the access hatch with a self-closing gate to access the hatch.

Securing points or rung cradles shall be provided at the top to allow for the fastening of portable ladders which can be lowered into the chamber.

3.4.4.3 Drainage sump's access hatch

Where a chamber has a dedicated sump for pumping out water (refer Section 0), provisions should be made to ensure excess water can be removed from the chamber without needing to remove the cover, or otherwise access the chamber interior.

This may include:

- Provision of a small access point (hinged hatch or similar) directly above a sump in the bottom of the chamber, to allow a submersible pump or hose to reach the sump.
- Provision of hard pipe and couplings to allow connection of a suction pump from ground level.

Access hatch for drainage sump is envisaged to be located in the opposite corner to the personnel access hatch.

3.4.4.4 Davit arm bracket

A cast-in Davit arm sleeve for entry/retrieval and fall arrest applications shall be included and located near the personal access hatch of Section 3.4.4.2.

The bracket shall be cast-in the wall of new chamber or in a standalone concrete footing designed for the davit arm loads. Wall mounted brackets are not preferred due to the annual inspection and testing.

3.4.5 Specific requirements for new chambers

3.4.6 Internal clearances

The layout of pipework within the chamber shall be individually designed such that there is sufficient clearance for operation, maintenance and repair of any particular installation.

Minimum clearances between the chamber and the nearest component are shown below in Table 5:

Table 5: Minimum internal clearances[1]

Chamber Element	Clearance to Nearest Component
Floor to pipe	500 mm
Non-working side wall	600mm
Working side wall (clear to bypass pipe)	600 mm
End wall to near flange face[2]	900 mm
End wall to nearest weld (including welded collar)	600 mm
Head room under support beams	2000mm

[1] Where possible, the footprint of the valve chamber is to be less than or equal 15m2, and less than 4m depth to comply with Development Approval exemption Schedule 4. Otherwise Development Approval is to be sought.

[2] The dimension specified allows for pipework or fitting removal by cutting and banding the pipework using welded collar.

3.4.6.1 Location

In road reserves the chamber shall preferably be located in the road verge to allow:

- Safer personnel access, away from the traffic.
- Minimum interruption to traffic.

In other locations, including reservoir or tank sites, the chambers should preferably be located:

- To allow for future expansion of the facilities.
- To allow for vehicle access to all facilities.

3.4.6.2 Chamber drainage

Chambers shall be provided with drainage facilities in the form of a watertight sump integrated with the concrete floor.

The sump should be large enough to hold some debris and the suction of a portable pump. A 450mm square by 300mm deep sump is considered acceptable.

All sumps shall preferably be fitted with a removable grate/lid. Consideration shall be given to allow removal and replacement of grate/lid from the exterior of the chamber at ground level (i.e. a lifting chain or similar).

Refer Section 3.4.4.3.

3.4.6.3 Chamber depth

Wherever possible, the overall depth of the valve chamber shall be minimised. Installation of deep chambers which require multi-level access arrangements should preferably be avoided.

Where the overall chamber depth exceeds 3000mm, additional access provisions may be required (refer Section 3.4.6.4).

3.4.6.4 Multi-level chambers

Where the overall depth of the chamber exceeds 3000mm, and all other alternative solutions/modifications have been considered as per this Technical Bulletin, the incorporation of one or multiple internal intermediate working platforms may be adopted.

Platforms shall be sized to allow for all anticipated works and, where deemed necessary, shall incorporate access provisions to the base of the chamber.

Provisions for multi-level chambers shall be made to ensure all equipment and instrumentation is operable from the uppermost working platform. Access to lower platforms shall be appropriately protected by a lockable self-closing gate.

3.5 Wastewater wet wells and maintenance holes

3.5.1 General

Safe access requirements for submersible sewage pumping stations, and associated infrastructure, shall generally conform with SA Water's Sewer Construction Manual Section M and accompanying Technical Bulletin (WWPS Interim Design Requirements).

All entry into a wet well or maintenance hole shall be considered a planned activity, with accompanying temporary access provisions and safety documentation formulated specifically for the intended task.

For new assets, no permanent access infrastructure shall be provided (i.e. internal ladders, etc.). Permanent access infrastructure for existing assets shall be removed, except whereby the asset interior can be accessed safely through a dedicated staircase at ground level (i.e. an existing staircase leading into a pump station wet well).

The focus of this Technical Bulletin is on the safety cover and physical edge protection to enable maintenance works to be undertaken in a safe manner

3.5.2 SA Water requirements

3.5.2.1 General

The area immediately around all wet well or maintenance hole openings shall be made as safe as reasonably practicable for all people who may approach, or work on or around the opening. Where the access covered and acts as a work area, adequate infrastructure shall be installed to make the area safe for workers.

3.5.2.2 Wet well safety covers

Safety covers to wet wells shall be designed, constructed, and/or modified in accordance with the following requirements, as applicable:

- All safety covers shall be designed to ensure that openings are fully sealed (gas and watertight), weatherproof, and vermin proof.
- Safety cover materials shall be suitable for the corrosion category of the application environment and the project design life requirements (aluminium or stainless steel for sewer applications).
- Associated elements pertaining to site security shall conform to the requirements of TS 0121. Where required, a site-specific security assessment shall be undertaken in accordance with the SA Water Security team to determine any necessary additional design requirements
- Infrastructure geometry, spacing, and clearances shall conform to the requirements of AS 1657.
- All panels for access covers shall be fitted with hinges with tamper-proof bolts, and lifting handles
- The cover shall have a solid lid with an internal safety grate (to facilitate visual inspection), and integrated fall protection when in the open arrangement. Integrated fall protection shall be appropriate to provide protection around all edges of the access opening.
- Mechanical protection (bollards or similar) shall be provided to prevent unauthorised vehicular loading on the access cover.
- Reference shall be made to TS 0504 for approved products.

3.5.2.3 Wet wells – Physical edge protection

Where possible, a permanent full perimeter edge protection shall be installed with an access gate to the safety cover.

3.5.2.4 Wet wells - Davit arm bracket

A cast-in Davit arm sleeve for entry/retrieval and fall arrest applications shall be included and located near the safety cover.

The bracket shall be cast-in in a standalone concrete footing located outside the edge protection guardrail and designed for the davit arm loads. Wall mounted brackets are not preferred due to the annual inspection and testing.

3.5.2.5 Maintenance hole access covers

Covers to maintenance holes shall be designed, constructed, and/or modified in accordance with the following requirements, as applicable:

- Where applicable, proprietary maintenance hole access covers shall be in accordance with SA Water's Authorised Products Technical Standards (TS 0502).
- Proprietary access covers shall be rated to the following load rating classes in accordance with AS 3996:
  - Class B, where covers are subject to pedestrian traffic only.
  - Class D, where covers are subject to major road traffic (i.e. typical road vehicles, vans and light trucks).
  - Class E, where covers may be subjected to loading from heavy vehicles, carriageways, or cranes.
- Covers shall allow for decorative surface finishes such, as paving or asphalt, as appropriate
- Covers shall be fitted with a suitable lifting keyhole to facilitate manual removal/opening.

3.5.2.6 Access openings

Wherever practicable, access openings shall be designed, constructed, and/or modified in accordance with the Standard Drawings and the following, as applicable:

Access opening sizes shall be as per that outlined within Table 6.

Table 6: Wet well and maintenance hole access opening size requirements

Element Description	Preferred Access Cover Size
Wet Wells and Packaged Pump Station Access Covers	1200mm x 900mm rectangular solid cover with safety grate and integrated fall protection (Austral cover or equivalent)
Maintenance Hole Access Covers (1200mm diameter or smaller)	600mm diameter solid cover in accordance with SA Water's Authorised Products Technical Standards
Maintenance Hole Access Covers (greater than 1200mm diameter)	No. 5 (900mm x 600mm) rectangular or 900mm diameter solid cover in accordance with SA Water's Authorised Products Technical Standards

3.6 Pipeline trestle bridges

3.6.1 General

Trestles/bridges are designed to provide safe access for pipelines above ground crossing waterways such as creeks, rivers, etc.

3.6.2 SA Water requirements

3.6.2.1 Design considerations

- The water main shall span the waterway above ground with an appropriate safe access and support system (piers and trestle bridges).
- Crossing shall be near perpendicular to the waterways where practicable.
- The design shall address all anticipated loadings, including forces from water flow to AS 5100.2 that will impact on the main and support structure.
- Crossing shall minimise interference with the natural channel form and capacity.
- The pipe support structure shall be founded a minimum of 1.0 m below creek bed with additional erosion measures.
- The safe access system shall comply with AS 1657 generally and the minimum clearances stipulated in below.
- Non-slip walkway both sides of pipe with physical edge protection to AS 1657.

3.6.2.2 Minimum clearances

Minimum clearances between the pipework and the nearest component are shown below in Table 7.

Table 7: Minimum clearances for trestle bridges

Element	Clearance to Nearest Component
Floor to pipe	500 mm
Guardrail to pipe	600mm
Head room under support beams	2000mm

3.7 Safe access- related civil works

3.7.1 SA Water requirements

- Unauthorised access shall be prevented by local fencing or site perimeter fencing with additional security measures designed and installed in accordance with the recommendations of the Security Risk Assessment for the site.
- Access track around the tank/tower perimeter shall be designed to accommodate Elevated Working Platform (EWP) equipment which usually used by Operations and Maintenance teams for inspection and regular maintenance activities.
- The siting of crane pad shall consider the relative position of the access stairway and service platform such that no liftings occur over them.
- Access to the top of an embankment shall be via a dedicated reinforced concrete staircase, compliant with AS 1657.

Version History

Version	Date	Author	Comments
1.0	24/08/2023	Matthew Davis	Final.
2.0	12/04/2024	Hany Habib	Updated following a workshop with Operations and Maintenance.
3.0	25/10/2024	Hany Habib	Updated as part of the fall prevention program.