



Engineering

Technical Standard

TS 0521 – Installing, replacing and adjusting access covers

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**Government of
South Australia**

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Documents superseded by this standard

The following documents are superseded by TS 0521:

- a. TS 0521 version 1.1

Significant/major changes incorporated in this edition

- a. Document updated onto the version 8.3 SA Water template
- b. Cross referencing links updated.


Document controls

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1 Introduction

SA Water is responsible for an extensive amount of engineering infrastructure such that it is safe and functional.

This standard has been developed to assist in the planning, design, maintenance, construction, and management of this infrastructure.

1.1 Purpose

The purpose of this standard is to detail SA Water's minimum requirements for adjustment of access covers in roadways, and ~~similar location~~ public areas and easements, to achieve consistent standards and attain the required asset life.

Reliability of these assets is essential to meet ~~Customer's~~ community service expectations and for operator and public safety. ~~In addition, this assists traffic flow along roads and will ensure they can be operated and maintained efficiently.~~

1.2 Glossary

Terms and Abbreviations utilised in this Standard are included in the following sections. The definitions presented below are to be used when interpreting this Standard and actions undertaken in relation to this Standard. Where a conflict exists, clarification is to be sought from SA Water.

1.2.1 Terms and Definitions

The following is a list of Terms applicable to this document:

Term	Description
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Designer	The organisation responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or a Constructor, or an in-house entity. A Designer is a person who effects design, produces designs or undertakes design activities as defined in the <i>Work Health and Safety Act 2012 (SA)</i> .
Must	Indicates a requirement that is to be adopted in order to comply with the Standard.
Responsible Discipline Lead	The engineering discipline expert identified in the 'Approvers' table (via SA Water's Representative).
SA Water Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): <ul style="list-style-type: none"> • Superintendent's Representative (for example AS 4300 and AS 2124 etcetera) • SA Water Project Manager • SA Water nominated contact person
Should	Indicates practices which are advised or recommended, but is not required.
Supplier	A person, group or company that provides goods for use in SA Water infrastructure.
Technical Dispensation Request Form	This form is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure

Term	Description
	compliance, with SA Water's technical requirements may seek dispensation from those requirements.
Work	Elements of a project which require design and/or construction.

1.2.2 Abbreviations

The following is a list of Abbreviations, Acronyms and Initialisms used in this document:

Abbreviation	Description
APA	Australian Pipeline Trust APA Group
CFS	Country Fire Service
DPTDIT	Department for of Planning, Transport and Infrastructure and Transport
FSL	Finished Surface Level
IO	Sewer Inspection Opening
IP	Sewer Inspection Point
MFS	Metropolitan Fire Service
MH	Sewer Maintenance Hole
MS	Sewer Maintenance Shaft
SA Water	South Australian Water Corporation
SA Water	South Australian Water Corporation
SAPN	SA Power Networks
TDRF	Technical Dispensation Request Form
TG	SA Water Technical Guideline
TS	SA Water Technical Standard
WHS	Work Health and Safety
WSAA	Water Services Association of Australia

1.2.3 Terminology

The following is a list of specific interpretations for Terminology used in this standard.

- Where an obligation is given and it is not stated who is to undertake these obligations, they are to be undertaken by the Constructor.
- Directions, instructions and the like, whether or not they include the expression "the Constructor shall" or equivalent, shall be directions to the Constructor, unless otherwise specifically stated.
- Where a submission, request, proposal is required and it is not stated who the recipient should be, it is to be provided to SA Water's Representative for review.
- Each word imparting the plural shall be construed as if the said word were preceded by the word "all".
- "Authorised", "approval", "approved", "selected", "directed" and similar words shall be construed as referring to the authorisation, approval, selection or direction of SA Water's Representative in writing.
- "Submit" mean "submit to the SA Water Representative or their nominated delegate".

- Unless noted otherwise, submissions, requests, proposals are to be provided at least 10 business days prior to work commencing or material ordering (unless noted otherwise).

1.3 References

1.3.1 Australian and international

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

Reference	Title
AS 3996	Access covers and grates
	The Water Industry Act 2012
	South Australia Work Health and Safety Act 2012
	Water Industry Regulations 2012
	South Australia Work Health and Safety Regulations 2012

1.3.2 SA Water documents

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

Reference	Title
TS 0101	Safety in Design
TS 0500	Authorised Products Water and Sewer Maintenance
TS 0502	Authorised Products Gravity Sewer and Pressure Pumping Main Systems
TS 0503	Authorised Products Water Systems
SCM	Sewer Construction Manual
WSCM	Water Supply Construction Manual

2 Scope

2.1 Scope and application of this Technical Standard

This standard specifies SA Water minimum requirements when modifications are made to access covers. It includes adjusting and replacing covers installed in roadways, footpaths, easements and reserves and applies to all water supply and sewer covers.

This standard applies to works undertaken by both SA Water and Constructors on water and sewer network infrastructure.

Any Constructor undertaking this work shall be responsible for:

1. Compliance with the standard,
2. The adjustment and final level of all castings,
3. The final restoration of all roadways and the site area,
4. All work undertaken by a sub-contractor commissioned to undertake work on their behalf.

2.2 Technical dispensation

Departure from any requirement of this Technical Standard shall require the submission of Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of SA Water Responsible Discipline Lead listed in Page 4, on a case-by-case basis.

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

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

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

2.3 Hazards

SA Water has provided known hazards associated with activities for raising and lowering access cover in this Technical Standard below for reference by users of this document.

Specific hazards/risks and their proposed control relating to raising or lowering access covers are to be identified and addressed by Constructors based on site specific factors.

Hazards/risk may include, but are not limited to, the following:

1. Asbestos may be present in old water street box chambers and asbestos cement pipes
2. The potential for toxic or flammable gases, for example, H₂S. (it should be noted that smoking is prohibited within 6 metres of any maintenance structure, IO or IP)
3. Local traffic near the work site
4. Manual handling risks associated with **lifting and** moving equipment into position for propping, testing or repairs
5. **Failure of temporary propping or support systems**
- ~~5-6.~~ **Escape of energy should water pipes in particular be damaged.**

Personnel undertaking the task may be unaware of emergency processes.

3 Hold points and witness points

Hold points applicable to this Technical Standard can be found in Appendix A. Please refer to TS 0105 for further detail on hold points.

3.1 Witness points

Witness Points applicable to this Technical Standard can be found in Appendix A. Please refer to TS 0105 for further detail on witness points.

3.2 Non-conformance

Please refer to TS 0105 for the requirements relating to non-conformance.

4 Guidelines and requirements

4.1 General

Adjustment of SA Water cover and frame assemblies may be ~~performed~~ **required**:

1. Due to road resurfacing, **road upgrades** or realignment managed by a road Authority
2. At the request of a road Authority due to the cover subsidence or damage
3. Due to other third-party work affecting existing SA Water access covers
4. As part of SA Water's maintenance or replacement programs.

Irrespective of who has commissioned the Constructor to undertake the adjustment or replacement of the SA Water assemblies, the methods and work practices used in performing the work shall be in accordance with this standard.

Replacement, raising or lowering of assemblies may be performed either before or after the pavement placement, both of which are acceptable techniques.

4.2 Legislative Requirements

Under Section 52 of the Water Industry Act 2012, for which there is any water/sewerage infrastructure (including casting adjustments), before beginning to:

1. First lay the pavement or hard surface in any road
2. Relay the pavement or hard surface in any road
3. Widen or extend the pavement or hard surface in any road
4. Alter the level of any road
5. Construct or alter any footpaths, gutters, kerbing or water tables in any road
6. Construct or alter any drainage work in any road.

Section 23 of the Water Industry Regulations 2012 states that fittings etcetera are to be flush with the road surface and:

- **requires the Council, other authority or person who made the alterations to the surface height of a road, footpath or easement to give notice to SA Water if the surface height of a road footpath or easement is altered and**
- **SA Water must at the cost of the Council, other authority or person alter the height.**

The person authorising or intending to do the work must give SA Water 14 days' notice of the proposed work. Notification to SA Water should be made through sawateralterations@sawater.com.au.

Advice to SA Water shall include:

- a. Contact Name (including organisation, phone number and email)
- b.** Scope of works including clear identification of each clash with SA Water Infrastructure and alterations required
- ~~b.c.~~ **Methodology if works are non-standard**
- ~~e.d.~~ Confirmation of which Constructor is required to undertake the casting adjustment,
- ~~e.e.~~ Drawings if required
- f.** Proposed delivery dates
- ~~e.g.~~ **Date works completed.**

Through the application of this standard, SA Water gives permission ~~to person~~ **for accredited contractors** carrying out the ~~road alteration~~ **alterations to the surface height of a road, footpath or easement**, to make the adjustment to castings and fittings ~~at road surface~~ on behalf of SA Water. Under this circumstance, the alteration to the fittings is at the cost of the council, ~~road~~ **other** authority or person who made the alteration to the road as per Section 23 of the Water Industry Regulations 2012.

The alterations are subject to a 12-month defects period and are subject to the inspection of the SA Water representative at any time during the defects period.

~~The SA Water Alterations Team may undertake a random audit of the Constructor's work that is completed on behalf of the council or road authority. Defects will be reported back to the council and road authority to attend to.~~

Alternatively, the council or other authority or person may request SA Water to carry out this work as per Section 23 of the Water Industry Regulations 2012. Under this circumstance, SA Water shall carry out the casting adjustment and will recover its debt from the council, other authority or person.

4.24.3 Constructor Considerations

The Constructor undertaking the adjustment of SA Water assemblies shall ensure that the following requirements are addressed (as a minimum):

1. WHS Regulations 2012
2. Environmental considerations
3. Work Zone Traffic Management Plan (including pedestrians), (also refer clause 4.10)
4. The specific requirements are satisfied of:
 - a. Asset owners (SA Water, ~~DPT~~ **IDIT**, Councils, other **Service Authorities** ~~Essential Service Providers~~ for example SAPN, APA, **Communications** inclusive of access permits)
 - b. Asset users (MFS, CFS, etcetera)
 - c. Other ~~ea~~ affected customers or stakeholders.
5. Minimum possible disruption for road users and to the road surface during the process
6. Ground conditions
7. Noise, dust and odour
8. Potential hazards:
9. Asbestos may be present in old water street box chambers (refer clause 4.7) and asbestos cement pipes
10. The potential for toxic or flammable gases, for example H₂S. (It should be noted that smoking is prohibited within 6 metres of any maintenance structure, IO or IP).
11. Sewer maintenance structures shall not be entered without the approval of the SA Water Representative. The Constructor shall contact the SA Water Representative should entry be considered. Entry permits shall be required
12. For water infrastructure, no vehicular loading at the surface/road level shall be transferred to the valve or pipe.

4.34.4 AS 3996 classifications

Water industry cover assemblies are compliant with AS 3996. Two AS 3996 load classifications are applicable:

- Class B Typically used in, footpaths, **easements** and reserves ~~accessible to use by light vehicles~~ **with infrequent light surface loading**

- Class D For Road Carriageways, ~~subject to use by commercial vehicles~~
- Class E For Freeways and Motorways.

All cover assemblies shall have a rating suitable for the application in which they are installed.

4.44.5 Materials and Ratings

Only SA Water Authorised Products and materials shall be used for the adjustment or replacement of covers and frame/chamber assemblies as follows:

1. Authorised Products shall be sourced from one of the approved manufacturers listed in the relevant SA Water Technical Standard (TS 0500, TS 0502 or TS 0503 as appropriate).
2. All products (both covers and support blocks) shall be installed in accordance with SA Water's WSCM or SCM.
3. All mortar used during the installation and adjustment of access covers (as per this standard) shall be fast setting mortar (for example, Sika 2500, EMACO T545 or a similar authorised product).
4. Construction sealant is to be used around the perimeter of the underside of all sewer access cover frames, to prevent tree root intrusion. The sealant shall be construction quality (for example, Sika Flex 118 extreme grab, ChemLink M1, or similar construction sealant).
5. Materials used for the road base/ sub-base and reinstatement of the road surface shall be in accordance with the road Authority specification.
6. Any works or materials not otherwise specified shall comply with the requirements of the relevant WSAA publications.

4.54.6 Final Levels

4.5.14.6.1 Roadways Installations

Regardless of the method used, the final level of all covers and frames/chamber assemblies installed in roads shall ensure that:

1. The final level of cover and frame assembly shall be determined with respect to the required road finished surface level (FSL).
2. The tolerances for the final level of top of the cover and frame shall be in accordance with this standard. Due to this being remedial work, the tolerances shown in this standard shall override those in the SCM and WSCM.
3. Where a tolerance is stated in this standard the measurement is mm (millimetres).
4. The following procedure shall be used to confirm cover acceptability:
 - a. A straight edge which extends 1 metre past the outer edge of each side of the frame/chamber shall be used for the measurements,
 - b. Two measurements shall be taken, the second at 90 degrees to the first,
 - c. Both measurements shall be within the specified tolerance for the adjustment to be considered acceptable.

4.5.24.6.2 Non-Roadway Installations

The FSL of all covers and frames/chamber assemblies installed in footpaths, easements, reserves, etcetera shall ensure that the final level of cover and frame/chamber assemblies is above the FSL of the surrounding surface to ensure that water will not pool over the casting or cover.

The tolerance for the FSL of top of the cover and frame shall be in accordance with this standard.

4.64.7 Removed Materials

1. Excavated material shall **only be reused if compliant with SA Water standards.** ~~not be reused for reinstatement of any trench~~
2. All removed material shall be taken from the site by the Constructor and appropriately disposed of in accordance with the requirements of relevant authorities (for example, the Environmental Protection Authority, etcetera)
3. Any old concrete fibre cement street box chamber (if encountered) shall be removed. As these may contain asbestos an assessment is required by an appropriately qualified person. If asbestos is confirmed, only Constructors licensed to undertake asbestos work may perform the removal of the chamber and any associated site clean-up
4. No **foreign** materials shall be placed or left in a chamber.

4.74.8 Replacement of damaged frames and covers

It is possible that in undertaking the required work the Constructor may encounter damaged frames and covers. Dangerously worn or damaged items shall be replaced.

The assessment criteria for replacement shall be:

1. Cracked or seriously chipped covers and/or frame assemblies present WHS issues and shall be replaced under the following circumstances:
 - a. Where the frame is cracked to such an extent it is likely to split
 - b. Where the cover is cracked into parts or cracked to such an extent it is likely to split.
2. Worn covers and frame assemblies should be replaced under the following conditions:
 - a. Where the cover sits more than 15mm below the outer rim of the frame
 - b. Where the cover tread pattern has been ground down ~~for~~ **by** more than an average of:
 - **70**50% of the cover's total surface area **in trafficable pavements**
 - **70% in all other areas**
 - **Or if the lid inscription is not legible.**
 - ~~b.c.~~ **Where lifting lugs are damaged or not accessible**
 - ~~c.d.~~ Where any of the casting support structure is damaged (i.e. badly cracked or crumbling), all damaged items shall be replaced.

4.84.9 Roadworks requiring lowering of the water main

Where the road is to be lowered to an extent that the new FSL results in a valve or hydrant spindle of an existing water main protruding into a topstone chamber, or where there is insufficient clearance from a street box cover, the existing water main may need to be lowered. **Minimum and maximum clearances are shown in the WSCM.**

Lowering of the water main shall only be undertaken by a Constructor authorised to work on live SA Water infrastructure.

The SA Water Representative shall be notified of the need to lower the water main **and works progressed via third party alterations sawateralterations@sawater.com.au**. Refer clause 4.2.

4.94.10 When Work Not ~~In~~in Progress

The Constructor shall ensure that their Work Zone Traffic Management Plan covers the site being in a safe condition for all road users, pedestrians, and the general public at all times (including when work is not being performed).

4.104.11 Emergency Contact Details

Should the Constructor encounter an emergency situation, for example, a burst water main, a sewer overflow or an accident due to the SA Water infrastructure, SA Water shall be advised of the incident:

- 1300 ~~650-950729 283 (1300 SA WATER)~~1300 SA WATER.

5 Adjustment Methods

5.1 General

This clause specifies the methods of adjusting castings that are acceptable to SA Water and the requirements for each method.

5.2 Acceptable Methods of Adjusting Castings

5.2.1 Raising of castings

Three methods of raising castings are acceptable:

1. Jacking (while spacer ring/s are inserted under the frame)
2. Insertion of (mating spacer) Ring
3. Excavation and adjustment.

5.2.2 Lowering of castings

Only one method is approved for lowering castings this is: excavation and adjustment.

5.3 Selection of Adjustment Method

Refer to Table 1 in Appendix A: Approved adjustment summary list, for confirmation of which method is appropriate for the type of cover and the work being undertaken, i.e., raising or lowering.

6 Methodologies and Minimum Requirements

6.1 General

This clause describes the minimum requirements for each acceptable adjustment method specified in clause 4.

Each cover type may have specific requirements, (in addition to those specified in this clause). For details of any specific requirements refer the relevant clause.

Any proposed adjustment where minimum clearance requirements cannot be fulfilled shall be reported to SA Water prior to adjustment commencing.

6.2 Jacking Method

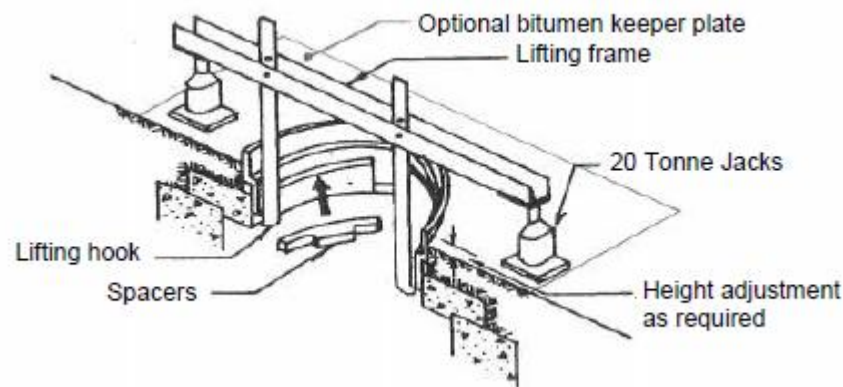


Figure 1. Typical Jacking Method Setup

6.2.1 General

Where recommended the jacking method shall be used unless:

1. The casting support structure is damaged. Where found, new supports are required and shall be installed using the Excavation and Adjustment method
2. Raising of castings is required prior to road re-surfacing and road cannot be made safe
3. Frames installed have external protrusions or flanges which prevent lifting
4. The spacer ring cover and frame is to be raised >70mm
5. Street Box – Type B requires adjustment. Refer clause 7.3.

In utilising the jacking method, the Constructor shall ensure that:

- a. The height of total adjustment required using frames and packers is ≤ 70 mm
- b. The equipment listed in clause 6.2.2 is used
- c. The procedure listed clause 6.2.3 is followed.

6.2.2 Equipment

1. Adjustable Lifting frame (complete with lifting legs)
2. 2 off. 20-tonne hydraulic jacks
3. Spacer rings to accommodate height adjustment to FSL
4. Packing mortar (refer clause 4.5)
5. Optional flat 6mm steel bitumen keeper plate to prevent damage to the existing bitumen as the frame is being raised.

6.2.3 Procedure

The procedure for the jacking method shall be:

1. Measure the distance from top of frame to new FSL for selection of appropriate size spacers
2. Lift cover and install lifting frame (use of bitumen keeper plate is recommended)
3. Raise frame to the required height by jacking evenly both sides
4. Place the spacers beneath the cover frame to match the road level including road crossfall and longitudinal fall
5. Remove lifting frame
6. The frame and any spacers shall be mortared into position
7. Make minor adjustments by tamping as required to achieve FSL
8. Seal any surface gap between the frame and road surface with liquid bitumen as appropriate
9. Replace cover. Ensure that when in its final location, the cover frame does not rock or move.

6.3 Insertion of (Mating Spacer) Ring Method



Figure 2 Typical Insertion Ring

The insertion method is only relevant to the TAC type MH Cover where adjustment is ≤ 105 mm. Refer clause 7.4.

Where adjustment is > 105 mm the Excavation and Adjustment method shall be used.

Where recommended the insertion method shall be used unless:

1. The casting support structure is damaged,
2. Raising of castings is required prior to road re-surfacing,
3. The cover is a CLASS B assembly. This method shall not be used for this class.
4. The existing frame is not designed for use with a mating spacer ring.

The insertion of the (mating spacer) ring shall ensure that:

- a. The height of adjustment required using the spacer ring is ≤ 105 mm,
- b. The appropriate thickness ring is installed,
- c. Frame Ring height, 60mm,
- d. Spacer ring height variable. Options are 50, 75, 90, and 105mm.
- e. To prevent root intrusion, the underside circumference of all sewer cover frames shall be sealed using a construction adhesive (refer Clause 4.5).
- f. Only new fixing bolts are installed (i.e., no bolts shall be re-used),
- g. All rings installed are bolted into place prior to insertion of the cover.

6.4 Excavation and Adjustment Method



Figure 3. Typical Excavation (for casting adjustment)

The excavation and adjustment method is recommended for the majority of cover alterations. Refer to Table 1 in Appendix A: Approved adjustment summary list.

This method is recommended:

1. For lowering of all frames and covers.
2. When raising castings is required prior to road re-surfacing,
3. Where the casting support structure is damaged,

The Excavation and Adjustment method shall ensure that:

- a. All rings and packing segments installed shall be mortared into position with a layer of mortar between each ring, between the bottom ring and base and between the top ring and top slab (as applicable)
- b. The maximum allowable mortar thickness shall be 50mm
- c. Any support slabs or frames to be installed (as a base) shall be mortared into position (only applicable to meter chambers)
- d. **Rocking or** Any movement of the frame ~~shall be avoided~~ **is not acceptable**
- e. Final levels meet the specified requirements (unless stated otherwise)
- f. Only authorised fill shall be used to backfill around the frame
- g. All fill shall be compacted to match the existing road base
- h. No vehicular loading at the surface/road level is transferred to the valve or pipe
- i. Any concrete reinforcing steel exposed during concrete cutting activities shall be protected using Megapoxy (or an approved equivalent) prior to covering with mortar.

7 Water Network Covers

7.1 General

Specific requirements are applicable to each type of cover. Water street box requirements are specified in this clause.

Water street boxes not compliant with current standards should be replaced with compliant street boxes as per TS 0500, and TS 0503.

Proposed works that are reducing cover over a watermain and require lowering of street boxes should be assessed for cover compliance to the watermain prior to undertaking works.

7.2 Street Box – Type A

(Refer TS 0503, 11.1.1 for details of chamber and support options).



Figure 4. Street Box - Type A

Adjustment to water street box (Type A) shall comply with the following:

1. The method for raising and lowering shall be in accordance with Table 1 in Appendix A: Approved adjustment summary list.
2. Be in accordance with the WSCM.
3. Ensure that when the lid is removed:
 - a. A standard valve key can be used on the valve spindle,
 - b. For a fire plug or hydrant a hose can be connected through the opening without fouling.
4. Ensure that with the valve fully open, the distance between the top of valve/hydrant spindle and the underside of the cover is **as per the WSCM namely:**
 - a. A minimum of 150mm ~~Should the FSL not facilitate this clearance refer to the SA Water Representative for authorisation to proceed~~
 - b. A maximum of 300mm.

Should the FSL not facilitate this clearance refer to the SA Water Representative for instructions
5. When lowering **is approved by the SA Water representative:**
 - a. Where it is not possible to obtain the required level using existing full-size box, it shall be replaced with a half-height street box.
 - b. Where the half-height street box cannot be installed the existing water main shall be lowered.
6. For both raising and lowering The permissible tolerance to FSL shall be:
 - a. Within road, +5/-0,
 - b. Within an easement, +15/-0.

7. All old concrete fibre cement chambers (if encountered) shall be replaced by a new steel street box in accordance with this clause.
8. All asbestos removal shall be in accordance with clause 4.7.

7.3 Street Box – Type B

(Refer TS 0503, 11.1.2 for details of chamber and support).



Figure 5. Street Box - Type B

In the Metropolitan area, if adjustment of the Type B lid is required, the existing chamber and support shall be removed and replaced by the Street Box – Type A.

Installation of the Street Box – Type A shall be in accordance with clause 7.2.

Elsewhere, adjustment to water street box (Type B) shall comply with the following:

1. The method for raising and lowering shall be in accordance with Table 1 in Appendix A: Approved adjustment summary list
2. Be in accordance with the WSCM
3. Ensure that when the lid is removed a standard valve key can be used on the valve spindle
4. Ensure that with the valve fully open, the distance between the top of valve/hydrant spindle and the underside of the cover is:
 - a. A minimum of 150mm ~~Should the FSL not facilitate this gap refer to the SA Water Representative for authorisation to proceed~~
 - b. A maximum of 300mm.

~~Should the FSL not facilitate this gap refer to the SA Water Representative for authorisation to proceed~~
5. For both raising and lowering the permissible tolerance to FSL shall be:
 - a. Within road, +5/-0
 - b. Within an easement, +15/-0.

7.4 Concrete Topstone

(Refer TS 0503, 11.1.3 for details of topstone and support options).



Figure 6. Topstone and lid

In the Adelaide metropolitan area, within a bitumen road, should adjustment be required, the Topstone shall be removed and replaced with the Street Box – Type A.

Installation of the new Street Box shall be in accordance with clause 7.2.

Elsewhere within unpaved road (which may be subject to grading) or easement, adjustment of topstones shall be undertaken based upon the following guidelines:

1. The method for raising and lowering shall be in accordance with Table 1 in Appendix A: Approved adjustment summary list.
2. Ensure that when in its final position, the valve/hydrant spindle cap does not extend/protrude into the topstone chamber (due to potential damage when road grading undertaken)
3. Ensure that when the lid is removed:
 - a. A standard valve key can be used on the valve spindle
 - b. For a fire plug, a hydrant can be connected through the opening without fouling.
4. Ensure that with the valve fully open, the distance between the top of valve/hydrant spindle and the underside of the cover is:
 - a. A minimum of 150mm. Should the FSL result in a smaller gap, the requirements of point 1 of this list shall be adhered to
 - b. A maximum of 300mm.
5. When raising:
 - a. Only concrete spacer rings shall be used (i.e. packers shall not be permitted).
6. When lowering:
 - a. It may be necessary to lower the water main to comply with the requirement of point 2 of this list.
 - b. Lowering of the main shall only be undertaken by a Constructor authorised to work on live SA Water infrastructure. SA Water shall be notified of the requirement to lower the water main and permission obtained prior to undertaking lowering of the main.
7. The permissible tolerance to FSL shall be +5/-0
8. All damaged water topstones shall be replaced.

7.5 Meter Boxes (Water)



Figure 7. No 2.5 box and support



Figure 8. No 3 box and support

Adjustment to meter boxes shall comply with the following:

1. The method for raising and lowering shall be in accordance with Table 1 in Appendix A: Approved adjustment summary list,.
2. Be in accordance with the SA Water WSCM.
3. Supports listed in TS 0503, 11.1.4 and 11.2.1.1 shall be installed under the meter box as a firm base, upon which the meter box shall sit,
4. Ensure that with the boundary valve fully open, the distance between the top of the handle or boundary valve and the underside of the cover is:
 - a. A minimum of 150mm. ~~Should the FSL not facilitate this separation refer to the SA Water Representative for authorisation to proceed~~
 - b.** A maximum of 300mm.

~~Should the FSL not facilitate this separation refer to the SA Water Representative for authorisation to proceed~~
5. When raising:
 - a. Within a lane, driveway or footpath the permissible tolerance to FSL is +5/-0
 - b. Within an easement or garden area the permissible tolerance to FSL is +15/-0.
6. When lowering:
 - a. Within a lane, driveway or footpath the permissible tolerance to FSL is +5/-0
 - b. Within an easement or garden area the permissible tolerance to FSL is +15/-0.

8 Sewer Covers

8.1 General

Specific requirements are applicable to each type of cover.

The method for raising and lowering the different types of covers shall be in accordance Refer to Table 1 in Appendix A: Approved adjustment summary list.

SCM, shall also be referred to for details of the maintenance structure, its components and construction requirements.

To prevent root intrusion, the underside circumference of all sewer cover frames shall be sealed using a construction adhesive (refer Clause 4.5).

Prior to opening any sewer manhole, a safety assessment should be undertaken considering the hazards identified in section 2.3.

Prior to undertaking any works, the manhole condition should be visually assessed as suitable for any adjustment to the levels. The SA Water representative shall be notified of any concerns.

8.2 Bell Type Maintenance Hole Cover & Frame



Figure 9. Bell Type

It should be noted that:

- this type of cover has not been installed since 1960's
- the access opening diameter is 430mm.

Adjustment of the maintenance hole cover shall comply with the following:

1. When raising:
 - a. Standard concrete rings shall be used for level adjustments >25mm
 - b. Permissible tolerance to FSL is +5/-0.
2. When lowering:
 - a. Ensure that a minimum of one 75mm concrete ring is installed between the support slab and frame (to allow for future adjustment)
 - b. Permissible tolerance to FSL is +/-0.

8.3 Lohmeyer Type Maintenance Hole Cover & Frame



Figure 10. Lohmeyer Type

It should be noted that:

- this type of cover has not been installed since 2000
- the access opening diameter is 540mm.

Adjustment of the maintenance hole cover shall comply with the following:

1. When raising:
 - a. The jacking method may be used where the level change required is $\leq 75\text{mm}$
 - b. The excavation and adjustment method shall be used where the level change is $> 75\text{mm}$
 - c. Standard concrete rings shall be used for level adjustments $> 75\text{mm}$
 - d. Permissible tolerance to FSL is $+5/-0$.
2. When lowering:
 - a. Ensure that a minimum of one 75mm concrete ring is installed between the support slab and frame (to allow for future adjustment)
 - ~~a~~.b. **No cutting of the manhole structure is permitted**
 - ~~b~~.c. Permissible tolerance to FSL is $+/-0$.

8.4 TAC type maintenance hole cover & frame



Figure 11. TAC Type Cover

It should be noted that the access opening diameter is 600mm.

Adjustment of the TAC cover and frame shall comply with the following:

1. When raising:
 - a. The requirements of clause 6.3 are adhered to
 - b. The permissible tolerance to FSL is +5/-0.
2. When lowering:
 - a. Ensure that a minimum of one 75mm concrete ring is installed between the support slab and frame (to allow for future adjustment)
 - b. Permissible tolerance to FSL is +/-0.

8.5 1500 ID maintenance hole cover & frame



Figure 12. No. 5 Cover (1500 MH)

It should be noted that:

- the rectangular cover dimensions are 1180 x 680,
- should the current cover be a multi part/section cover (generally 4 pieces), it shall be replaced with a new single piece cover.

Adjustment of the maintenance hole cover shall comply with the following:

1. Construction shall be in accordance with the SA Water ~~Sewer Construction Manual~~ **SCM**.
2. When raising:
 - a. The cover and frame shall be removed
 - b. Suitably sized spacers (bricks or pavers) shall be seated on a bed of mortar to raise the frame to the required height
 - c. Permissible tolerance to FSL is +5/-0.
3. When lowering:
 - a. As the support slab sits on the MH shaft increments, the support slab, frame and top increment shall be exposed prior to removal of the slab and frame,
 - b. The top increment is required to be cut to facilitate the reduced height
 - c. Prior to removal of the support slab the extent of the cut shall be determined as follows:
 - Calculate the required 'Cut Depth' using the following formula:
 - 'Cut Depth' = Depth to be lowered + 50mm (allowance for mortar),
 - Mark a line around the MH increment for the calculated cut,
 - Using a saw with a diamond blade remove the segment above the line.
 - d. Prior to placement of the support slab any exposed reinforcing shall be protected using Megapoxy (or an approved equivalent),
 - e. Re-install the support slab, followed by the cover and frame. The slab and frame shall be placed on a bed of mortar and tamped to the required height and grade.
 - f. Permissible tolerance to FSL is +/-0.

8.6 Maintenance shaft cover and frame



Figure 13. MS Cover and Frame

It should be noted that the access opening diameter is 450mm.

Adjustment of the maintenance shaft covers shall comply with the following:

1. The chamber shall be positioned to ensure that it is centrally located over the riser shaft
2. The riser shaft sealing cap (located under the cover) shall be a minimum distance from the FSL, in accordance with the SA Water [Sewer Construction Manual](#) (SCM). The PVC riser pipe shall be cut or extended as necessary to achieve the required height
3. When raising:
 - a. The jacking method shall be used
 - b. Permissible tolerance to FSL is +5/-0.
4. When lowering:
 - a. Sufficient backfill or road base material shall be removed for the new depth requirement
 - b. Compaction below the slab shall be in accordance with the SCM or the road Authority's specification
 - c. Permissible tolerance to FSL is +/-0.
5. Any replacement chamber shall be wrapped in PE sleeving to facilitate any future adjustment.

8.7 Inspection point (IP) cover & frame



Figure 14. IP Cover and Frame

It should be noted that this clause is relevant to both 100mm and 150mm IPs.

Adjustment of the Inspection Point cover & frame shall comply with the following:

1. Construction shall be in accordance with the SA Water [Sewer Construction Manual SCM](#), inclusive of:
 - a. The position of the block and frame
 - b. The frame and cover shall be central over the riser shaft
 - c. The riser sealing cap height from the FSL. The PVC riser pipe shall be cut or extended as necessary to satisfy this requirement
 - d. The support items beneath the concrete block shall form a firm base upon which the block shall sit
 - e. Where rebuilding of the IP is required.
2. When raising:
 - a. An additional new concrete base shall be mortared to the top of the existing block where the level is to be raised by $\geq 100\text{mm}$
 - b. Where the level is to be raised by $\geq 150\text{mm}$, the entire structure shall be removed and re-built.
3. When lowering:
 - a. The entire structure shall be removed and re-built
 - b. The permissible tolerance to FSL shall be $+5/-0\text{mm}$.

A Approved adjustment summary list

Table 1: Raising/ Lowering Methodologies

Cover Type	Jacking		Insertion Ring		Excavation & Adjustment	
	Raising	Lowering	Raising	Lowering	Raising	Lowering
Water						
Street Box – Type A	✓					✓
Street Box – Type B					✓	✓
Topstone					✓	✓
No. 2 Meter Box					✓	✓
No. 2.5 Meter Box					✓	✓
No. 3 Meter Box					✓	✓
Sewer						
Bell					✓	✓
Lohmeyer	✓ 1				✓ 1	✓
TAC			✓ 2		✓ 2	✓
No. 5 Cover					✓	✓
Maintenance Shaft	✓					✓
I.P.					✓	✓

Based upon the site, should the Constructor consider an alternative method preferable (to the method shown in Table 1), the Constructor shall refer the matter to the SA Water Representative.

¹ Refer clause 6.2. Jacking used for adjustments ≤75mm. Adjustments >75mm shall use the Excavation & Adjustment Method.

² Refer clause 6.3. Insertion Ring used for adjustments ≤100mm. Adjustments >100mm shall use the Excavation & Adjustment Method.

B Constructor report

This Report shall be completed and signed by the Constructor providing details of adjustments performed.

The completed form shall be forwarded to: sawateralterations@sawater.com.au.

Table 2: Constructor Detail

Company Name	ABC Road Constructor	Project Title	South Road Realignment
Supervisor	John Smith	Contact Details	0409 222 666
Signature		Date	01/11/17

Table 3: Record of items modified

Road/ Street		Main South Road			Suburb	Bedford Park		
Adjacent House No.	Water/ sewer (W/S)	Cover type	Raise / Lower (R/ L)	Extent (mm)	Adjustment method	Cover ID No.	GPS Coordinates	Remarks
1437	W	Street box A	R	36	Jacking	3589524	277927.8, 6121969.2	
1445	W	Street box A	R	15	Jacking	3599522	277876.7, 6121904.7	
1429	S	MH – Bell type	R	28	E & A	4566787	277969.6, 6122019.8	New Lid & Cover. (Existing cracked).