



**DUBBO  
REGIONAL  
COUNCIL**

**TECHNICAL SCHEDULE**

**DRC-W201**

**INSPECTION AND INTERNAL CLEANING  
OF WATER RESERVOIRS**

**TECHNICAL SCHEDULE DRC-W201 – INSPECTION AND INTERNAL CLEANING OF WATER RESERVOIRS**

<b>CLAUSE</b>	<b>CONTENTS</b>	<b>PAGE</b>
DRC-W201.1	Scope.....	3
DRC-W201.2	Referenced Documents and Standards.....	3
DRC-W201.3	Extent of Work.....	3
DRC-W201.4	Asset Conditions Definitions.....	4
DRC-W201.5	Qualifications.....	4
DRC-W201.6	Labour, Materials, Plant AND Equipment.....	5
DRC-W201.7	Workplace Health AND Safety (WHS).....	5
DRC-W201.8	Reservoir Entry.....	6
DRC-W201.9	Reservoir Cleaning.....	6
DRC-W201.10	Recording and Reporting.....	7
<b>APPENDIX A</b>	<b>INSPECTION FORMS.....</b>	<b>8</b>

## DRC-W201: INSPECTION AND INTERNAL CLEANING OF WATER RESERVOIRS

### DRC-W201.1 SCOPE

This Specification applies to internal and external inspection and the internal cleaning of the Principal's water supply reservoirs, while the reservoirs remain in service.

The purpose of reservoir cleaning is to remove any sediment that has built up on the reservoir floor since the last clean.

The works include submission of a report on the condition of each reservoir, to a standard suitable to update the Principal's ASAM asset management system.

The work required to be performed under this Contract shall comply with the referenced documents in Clause DRC-W201.2, unless specified otherwise herein.

Details of the reservoirs to be inspected and cleaned will be provided by the Principal.

### DRC-W201.2 REFERENCED DOCUMENTS AND STANDARDS

The following documents are referred to in this Specification. The latest version of the document including any published amendments shall apply. Where the drawings or a project specific specification are in conflict or inconsistent with these referenced documents or this Specification, then the details on the drawings or project specific specification shall apply.

#### Australian Standards

AS 2299	Occupational Diving Operations - Standard Operational Practice
AS 2815	Training and Certification of Occupational Divers
AS 2865	Confined Spaces
Safe Work Australia	Confined Spaces Code of Practice (Feb 2014)

Works shall also comply with the current versions all other relevant Australian Standards, where not specifically listed above.

#### Water Services Association of Australia Standards

WSA03	Water Supply Code of Australia
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### DRC-W201.3 EXTENT OF WORK

The works for each reservoir include, but are not limited to the following items:

- a) Internal cleaning of reservoirs by suitably qualified divers, while the reservoirs remain in service
- b) External inspection and reporting on the following:
  - Compound security
  - Vandalism
  - External ladder (safe condition and secure access)

- Walls (leaks and corrosion)
  - Entry hatch (sealing and security)
  - Roof platforms (safe work area, rescue system)
  - Roof (sealing, corrosion, gutters, debris build up, drainage)
  - Ventilation
  - Handrails
  - Rescue frame
  - Bird and vermin proofing
  - Level indicator
- c) Internal inspection and reporting on the following:
- Walls (coating/liner condition)
  - Columns (structural supports)
  - Floor
  - Wall and floor joints
  - Internal ladder
  - Inlet
  - Outlet
  - Scour
  - Overflow
  - Electrical components
  - Roof framing
  - Roof spider
  - Sediment (if any – colour, composition, depth, etc)
  - Any debris or foreign objects

The work are to be undertaken in accordance with the Conditions of Contract, this Specification, the drawings listed and under the supervision of the Superintendent.

**DRC-W201.4 ASSET CONDITIONS DEFINITIONS**

The Principal has the following approved condition definitions for its Asset Management System. This should be referred to and adopted in the reporting of the condition of the reservoirs:

Level	Condition	Description
5	Very Poor	Urgent renewal/upgrading required
4	Poor	Renewal required
3	Average	Maintenance work required
2	Good	Only minor maintenance work required
1	Excellent	No work required

**DRC-W201.5 QUALIFICATIONS**

The minimum qualifications of staff employed on the works by the Contractor including any sub-contractors, shall be as follows:

- Divers shall be fully trained and certified in accordance with the requirements of AS 2299 and NSW WorkCover which includes diving procedures, no decompression times with attention to depth, temperature, altitude and oxygen resuscitation combined with first aid;
- All Contract staff entering the reservoir or other confined space shall be certified for confined space entry and rescue; and
- All Contract staff onsite will have a full understanding of potable water operations, particularly hygiene and reservoir functions.

#### **DRC-W201.6 LABOUR, MATERIALS, PLANT AND EQUIPMENT**

The Contractor shall provide at his own cost and expense all labour, materials, plant, tools and equipment necessary for the proper and complete performance of the works under the Contract.

Equipment used shall comply with the following:

- All equipment is to be used exclusively for potable water and shall be suitably disinfected prior to use;
- Divers shall operate in an hygienic dry suit and full face mask with filtered compressed air fed by an umbilical hose attached to diver's harness and connection bloc, which controls suit inflation and operation of emergency air supply;
- All equipment shall be stored in a waterproof, dust-free and secure purpose built vehicle;
- Care is to be taken with transferring equipment from vehicle to the work site to avoid contamination;
- The compressor intake is to be positioned to avoid fumes from motors and other equipment in the vicinity; and
- Lighting equipment shall be suitable for safe use in a wet environment.

#### **DRC-W201.7 WORKPLACE HEALTH AND SAFETY (WHS)**

All costs associated with ensuring a safe work environment for the implementation of the works shall be deemed to be included in the tender price.

The Contractor shall ensure that in the performance of the works, the Contractor's employees, sub-contractors and employees of such sub-contractors shall observe the statutory Safety Regulations and Site Conditions for Contractors.

Within 28 days of the Date of Acceptance and prior to the commencement of work, the Contractor shall submit to the Superintendent details of the Contractor's WHS Management System including a Hazard and Risk Assessment and a Safety Plan specific to the Contract covering all of the Contractor's activities for the duration of the Contract.

For works in confined spaces the Contractor is to conform to the requirements of the Work Health and Safety Act 2011 and AS 2865.

The Contractor shall provide medical treatment facilities and first-aid personnel to at least the minimum standards required by Workplace Health and Safety legislation.

As soon as possible, following their occurrence, the Contractor shall report to the Superintendent any injuries likely to require medical treatment or involving lost time. In addition, the Contractor shall report to the Superintendent all injuries and near misses.

The Contractor shall manage and report all safety and security matters relating to his sub-contractors as if they were his own personnel.

Copies of the Safety Plan and records of all safety and security reporting over the duration of the Contract shall be held onsite and readily accessible for inspection by the Superintendent. The Superintendent shall carry out, from time to time, ad-hoc audits of the Contractor's safety systems onsite. The Contractor shall attend all safety audits. The cost for participation in safety audits shall be included in the tender price.

### **DRC-W201.8 RESERVOIR ENTRY**

Prior to entering a reservoir the following steps are to be completed:

- Notify the Principal's security company, emergency services and the Principal's system operation staff and make them familiar with the work to be carried out;
- Conduct an external visual inspection of the reservoir infrastructure;
- Review the technical information on the reservoir supplied by the Superintendent (ie layout of internal fittings, sizes of pipe work and potential hazards);
- Review the operating features of the reservoir as detailed in information provided by the Superintendent (ie filling times and periods of maximum water flow leaving reservoir);
- Determine the presence of screens or guards on inlets/outlets;
- Determine the method for manually closing off the outlet flow in case of emergencies;
- Ensure that the valve key is onsite;
- Isolate electrical equipment (mixers, cathodic protection, etc) and pumps, inlet/outlet valves as necessary;
- Determine procedures for protection of existing reservoir infrastructure, working at heights;
- Prepare a Communications Plan between the diver, supervisors and emergency services;
- Prepare the Dive Plan;
- Fill out the diver worksheet and confined space entry permit. This includes standard Hazard Identification and Safe Work Procedures and Job Safety and Environmental Analysis (JSEA); and
- Disinfect all equipment and transfer to the reservoir working area near the entry point. Lay out the equipment on a clean surface area ready for use.

### **DRC-W201.9 RESERVOIR CLEANING**

Prior to commencement of internal cleaning of the reservoir, the Contractor shall undertake the following:

- Undertake a visual check and record details of the sediment before any cleaning commences. The type of sediment and the patterns it forms can give an indication of water movement, leaks and/or unusual contamination in the tank;
- Determine the vacuum head required to complete the job based on the type of sediment encountered;

- Determine the vacuum pattern by the reservoir internal layout, such as roof support posts, pipe work and construction of the floor;
- The Superintendent shall advise of the particular aspects and internal features to be inspected and aspects likely to be of interest;
- The Contractor shall plan and carry out the works to avoid erosion, contamination and sedimentation of the site and its surroundings. This may include, but not be limited to, the use of sediment socks, strainers or other items; and
- If there is no suitable area for irrigation at the tank site, the water shall be tankered away for disposal in a suitable location identified by the Principal.

When cleaning the reservoir the following steps must be observed:

- Use the vacuum head to clear a working area for the diver to move without disturbing sediment;
- Maintain a visual check at all times for items that may be of interest to the Superintendent (eg leaks, paint condition, poor positioning of fixtures and fittings);
- Use caution always in approaching the inlet/outlet areas. Common inlet/outlets can change flow directions without warning so the diver should always be aware of water movements when adjacent to a penetration;
- The diver to remain low and at least 2 m away from a live outlet to avoid the suction area;
- Divers changing over shall brief their replacement diver on any details relating to safety likely to be encountered;
- Upon completion of cleaning, move all equipment to the entry point area and lift to the surface;
- Following cleaning, all equipment shall be checked off to confirm that nothing has been left in the reservoir;
- Record details of the cleaning operation and any recommended improvements from the diver debriefing, for future use; and
- The discharge hose shall be fitted with a strainer and a soaker hose. The water shall be used for site irrigation and under no circumstance be discharged to stormwater or the sewerage system.

Upon completion of the work the Contractor shall:

- Notify the Principal's operation staff and the Superintendent that the job is complete and the reservoir can be returned to normal functions (ie mixer and cathodic protection systems turned back on, isolated valves reopened, etc); and
- Ensure that the reservoir and surrounding security arrangements are locked and the site left tidy.

#### **DRC-W201.10 RECORDING AND REPORTING**

The Contractor shall record details of the reservoir inspection on the report pro-formas included in Appendix A, unless an alternative format is agreed with the Superintendent. In addition to the written report, the Contractor shall also prepare and provide still photographs showing the internal condition of the reservoir and all key components covered by the inspection and CCTV footage of the interior of the reservoir in MPEG format.

Upon completion of the inspections a detailed report on the site is to be presented to the Superintendent including still photographs, videos and completed pro-formas.

**APPENDIX A – INSPECTION FORMS**

ASAM R/T External and Internal Inspection  
ASAM Coating Details Template  
ASAM Cathodic Protection Template  
ASAM Mixer Template



## ASAM R/T External and Internal Inspection

Date \_\_\_\_\_ Job No. \_\_\_\_\_ Project No. \_\_\_\_\_

Client \_\_\_\_\_ Name \_\_\_\_\_ WS No. \_\_\_\_\_

Inground	Semi-Inground	Onground	Standpipe	Elevated
Construction:	Walls -Steel / Concrete / Other:		Floor Steel / Concrete / Other:	
Roof Material:				
Diameter: _____ m    Depth: _____ m    Area: _____ m <sup>2</sup> Capacity: _____ ML				
GPS Datum:		Latitude: S	Longitude: E	
Environment Type:				
EMF Hazard		Notification Period :		
Vehicle Access		Tanker Access	Site Access	
Lifting Access		Entry Hatch	Entry Hatch Size	
Work Platform		Rescue Hatch	Rescue System Type	
External Ladder:		Type	Length:	
Internal Ladder:		Type	Length:	
Material		Cage	Confined Space Compliant	
C.P.: Y / N		Mixer: Y / N	DIN Y / N	
Type Of Pipe work	Inlet: Top / Wall / Floor	Outlet	Wall / Floor	Scour Wall / Floor
Other:				
Position Of Pipework	Inlet	Outlet	Scour	
Position Of Valves	Inlet	Outlet	Scour	
Size Of Pipework	Inlet	Outlet	Scour	
Screen	Inlet Y / N	Outlet Y / N	Scour Y / N	
Screen Material	Inlet	Outlet	Scour	
Benchmark	Rank	Comment		
Security				
Contamination				
COF Water Quality				
Safety				
Confined Space				
COF OH&S				
External Structural				
External Coatings				
Internal Structural				
Internal Coatings				

AREA	PRIORITY	STATUS	COMMENTS
Compound			
Vandalism			
Walls			
Ladder			
Entry Hatch			
Platforms			
Walkways			
Roof			
Roof Hatches			
Handrails			
Davit			
Ventilation			
Bird Proofing			
Electrical			
Level Indicator			

Walls			
Columns			
Roof Spider			
Roof Framing			
Floor			
Inlet			
Outlet			
Scour			
Overflow			
Flow Meter			
Mixer Motor			
Motor Type			
Mixer Supports			
Supports Type			
Electrical			
CP			
Ladder Platform			
Floor Seals	Bitumen	Mastic	Welded N/A
Leakage	External- Internal - Leak detected	Nil Slight Yes / No	Trickle Position: Flowing
Sediment Depth	Type		
Comments: _____			
_____			

ASAM Coating Details Template

Client Name:		Report Date:	
Reservoir Name:		WS No	
Location:		Report prepared by:	

External	Anti Graffiti	Wall	Roof	Roof Walkways
Type **				
System **				
Supplier				
Applicator				
Date Applied				
% of area coated				
Expected service life				
Previous Coatings				

Anti Graffiti Comments	
Wall Comments	
Roof Comments	
Roof Walkway Comments	
Handrail Comments	

Internal	Floor	Wall	Columns	Roof Framing
Type **				
System **				
Supplier				
Applicator				
Date Applied				
% of area coated				
Expected service life				
Previous Coatings				

Floor Comments	
Wall Comments	
Column Comments	
Roof Framing Comments	

\*\* Examples

Type	Alkyd or Epoxy	
System	External	Internal
	Interprime 198/Interlac 192	Jotamastic 87
	Interseal 670/Intergard 475	Jotaprime 505/Tankguard 412

**ASAM Cathodic Protection Template**



Client Name:		Report Date:	
Reservoir Name:		WS No	
Location:		Report prepared by:	

<b>Details</b>	
Type eg Impressed/Sacrificial	
Supplier	
<b>Inspection</b>	
Date	
Inspection Interval	
Type of Inspection eg. Visual/Electrical	
Inspected by : Name	
: Company details	
<b>Service</b>	
Date	
Service details	
Serviced by : Name	
: Company details	
Comments	

ASAM Mixer Template



Client Name:		Report Date:	
Reservoir Name:		WS No	
Location:		Report prepared by:	

<b>Details</b>	
Motor Type	
Motor Condition	
Supports Type	
Supports Condition	
<b>Inspection</b>	
Date	
Inspection Interval	
Type of Inspection eg. Visual/Mechanical	
Inspected by : Name	
: Company details	
<b>Service</b>	
Date	
Service Type eg. Oil Change	
Serviced by : Name	
: Company details	
Comments	