PART E - TECHNICAL SPECIFICATION

E1. DESCRIPTION OF THE WORKS

E1.1 Background

The SCA has in place a program to carry out periodic refurbishment of the existing paint protection systems on various valves and pipe work incorporated in the Warragamba pipelines that deliver water from Warragamba Dam to Prospect Reservoir.

E1.2 Purpose

Refurbishment works are to be undertaken at four sites, namely Cross Connection 1, Mamre Road Cross Connection, Wallgrove Road Cross Connection and Cross Connection 3.

E1.3 Scope

Site 1 – Cross Connection 1 involves the refurbishment of the existing protective coatings of valves V03, V05 and V06. These works include, but are not limited to;

- Submission of management plans
- Removal of lead paint from valves and lead paint management
- Confined space management
- Preparation of valves, pipelines and steelwork for painting.
- Corrosion repairs to the valves, associated pipe work and structural steelwork.
- Repair of all wall penetrations after corrosion repairs have been completed.
- Painting of valves, associated pipe work and structural steelwork.

Site 2 – Mamre Road Cross Connection involves the refurbishment of the existing protective coatings of valves V19 and V20. These works include, but are not limited to;

- Submission of management plans
- Complete removal of existing paint from valves, associated pipework.
- Confined space management
- Preparation of valves, pipelines and steelwork for painting.
- Corrosion repairs to the valves, associated pipe work and structural steelwork.
- Repair of all wall penetrations after corrosion repairs have been completed.
- Painting of valves, associated pipe work and structural steelwork.

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Site 3 – Wallgrove Road Cross Connection involves the refurbishment of the existing protective coatings of valves V35, V36, V37 and V38. These works include, but are not limited to;

- Submission of management plans
- Complete removal of existing paint from valves, associated pipework
- Confined space management
- Preparation of valves, pipelines and steelwork for painting.
- Corrosion repairs to the valves, associated pipe work and structural steelwork.
- Repair of all wall penetrations after corrosion repairs have been completed.
- Painting of valves, associated pipe work and structural steelwork.

Site 4 – Cross Connection 3 involves the refurbishment of the existing protective coatings of valves V13, V14, V15 and V16. These works include, but are not limited to;

- Submission of management plans
- Removal of lead paint from valves and lead paint management
- Confined space management
- Preparation of valves, pipelines and steelwork for painting.
- Corrosion repairs to the valves, associated pipe work and structural steelwork.
- Repair of all wall penetrations after corrosion repairs have been completed.
- Painting of valves, associated pipe work and structural steelwork.

Environmental Management Plan

A Review of Environmental Factors (REF) has been carried out and approved for the proposed painting works. The environmental management plan shall address all environmental and safety issues identified in the REF and the schedule 1, condition of approval of the REF. Refer to the Attachments.

Agency Standards Applicable

WS-SPEC, Water Services Specification

This project specification references the current issue of WS-SPEC, including any Addenda, but neither is included herein. WS-SPEC is available from Standards Australia, Customer Services Centre, GPO Box 5420, Sydney NSW 2001,

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telephone: 1300 654 646 and e-mail: sales@standards.com.au". The addenda are available as a free download from the website www.standards.com.au, noting that the keywords "water services specification" must be used, as WS-SPEC is not recognised.

WS-SPEC

Section TR20 Protective Coatings (attached as Appendix C), excluding Sections 1.4 and 6.2, which are superseded by this specification.

AUSTRALIAN STANDARDS

- AS 4361.1: 1995 guide to lead paint management.
- AS1580 Method 108.2: Determination of dry film thickness of iron and steel substrate (Permanent Magnet Method).
- AS1627.4 Abrasive Blast Cleaning of Steel Surfaces
- AS1627.9 Pictorial Surface Preparation Standard for Painting Steel Surfaces (Endorsement of Swedish Standard SIS055900)
- AS2130 Glossary of Paint and Painting Terms
- AS3794.1 Site Testing of Protective Coatings Continuity Testing – High Voltage Spark Testing.
- AS3894.10 Site Testing of Protective Coatings Inspection Report – Daily
- AS3894.11 Site Testing of Protective Coatings – Equipment
- AS3894.12 Site Testing of Protective Coatings – Inspection Report – Coatings
- **AUSTRALIAN PAINT APPROVAL SCHEME**

E1.4 Specifications

E1.4.2 EXISTING PAINT SYSTEMS

The existing paint system at each site appears to be as follows;

Cross Connections 1 & 3 – Read Lead primer / MIO / Oleoresinous

Aluminium.

Mamre Road & Wallgrove Road Cross Connections – Tar Epoxy

E1.4.2 CROSS CONNECTIONS 1 & 3

Water jet clean at 3,000 PSI the main butterfly valves (V03, 05, 06, 13, 14, 15 & 16), associated pipes, valve supports, by-pass valves, vacuum valves and structural steelwork with potable water until thoroughly clean of all salts, dirt and grime. Remove all sludge from the floor area when cleaning is completed.

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The butterfly valves, counter weights and valve supports are coated with red lead primer and shall be abrasive cleaned in accordance with AS1627.4 to a surface standard of class 3.

Full containment is required for the removal of red lead paint, all work to be in accordance with AS4361.1.

Dehumidification is required if the ambient conditions (temperature, humidity & dew point) are not within painting guidelines.

The existing associated pipe work and structural steel is coated with zinc based prime / MIO and finished coated with aluminium-pigmented oleoresinous spar varnish.

The areas of main pipe, by-pass pipe, manifolds, air valves, stop valves within valve pit / cage showing corrosion are to be spot blasted, pime coated and the finish system will be aluminium-pigmented oleoresinous spar varnish.

All sharp edges and other irregularities shall be ground smooth.

All pitted areas that cannot be effectively coated are to be welded and ground smooth.

The wall penetrations that showing corrosion shall be cut away to remove corrosion and then repaired with EPIREZ 633.

All metal work within the cages and valve pits to be repainted except for the control cabinets, handrails, access platforms, external cage and valve pit covers.

Valve rams and electrical / hydraulic equipment are to be protected during blasting and painting.

Valve cages and pits shall be classified as a confined space.

Valves shall remain in their current position during the course of the works, unless they are operated by the Sydney Catchment Authority. Any region of the steelwork that cannot be prepared and painted as a result of this criterion is to be left unpainted.

The contractor is not permitted to alter the position of valves under any circumstances.

E1.4.3 MAMRE & WALLGROVE ROAD CROSSCONNECTIONS

Pump water from all valve pits prior to the commencement of work.

Water jet clean at 3,000 PSI the main gate valves (V19, 20, 35, 36, 37 & 38), associated pipes, valve supports, by-pass valves, vacuum valves and structural steelwork with potable water until thoroughly clean of all salts, dirt and grime. Remove all sludge from the floor area when cleaning is completed.

The main gate valves and pipe work, by-pass pipe and valve supports are coated with tar epoxy and shall be abrasive cleaned in accordance with AS1627.4 to a surface standard class 3.

All sharp edges and other irregularities shall be ground smooth.

All pitted areas that cannot be effectively coated are to be welded and ground smooth.

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The wall penetrations that showing corrosion shall be cut away to remove corrosion and then repaired with EPIREZ 633.

Dehumidification is required if the ambient conditions (temperature, humidity & dew point) are not within painting guidelines.

All metal work within the valve pits to be repainted except for the control cabinets, handrails, access platforms and valve pit covers.

Valve rams and electrical / hydraulic equipment are to be protected during blasting and painting.

Valve pits shall be classified as a confined space.

Valves shall remain in their current position during the course of the works, unless they are operated by the Sydney Catchment Authority. Any region of the steelwork that cannot be prepared and painted as a result of this criterion is to be left unpainted.

The contractor is not permitted to alter the position of valves under any circumstances.

E1.4.4 ABRASIVE BLAST CLEANING

E1.4.4.1 General

Provide written notice to the Principal of intention to commence surface preparation not less than three working days prior to such commencement.

Carry out all work in accordance with TR20 of the WS-SPEC attached as Appendix C. The abrasive blasting material shall be garnet.

Provide to the Principal a 5kg sample of material to be used before commencement of work.

The process to be employed shall be dry abrasive blast cleaning process.

The standard of surface shall be specified for each particular coating system.

The size of abrasive to be used, the pressure at the discharge nozzle and the distance of the nozzle from the surface which is being blast cleaned shall be such that the angular surface profile is produced, the height of which conforms to the requirements specified for the specified coating systems, unless a different surface profile height is specified by the paint manufacturers.

Abrasives shall be such as not to contaminate the surface, which is being blast cleaned and shall be clean and free from extraneous matter. Do not use abrasives that contain salt. All compressed air used in blast cleaning and blowing down after cleaning shall be free from oil and moisture, and for that reason, suitable oil and moisture traps shall be installed in compressed air system.

No blast cleaning shall be carried out during coating operations or where any previous applied coating has not hardened sufficiently and may be damaged or contaminated as a result of blast cleaning.

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Any surfaces, which should not be blasted or cleaned, but which may be damaged by blast cleaning operations shall be temporarily protected.

Provide any necessary access or make other suitable arrangements to prevent contaminants by abrasives entering into adjacent properties.

E1.4.4.2 REMOVAL OF BLAST GRIT RESIDUE FROM SITE

The removal of blast grit residue shall conform to statutory regulations. Remove the blast grit residue to a disposal site approved for such a purpose.

If required by the Department of Environment and Conservation, prior to removing the blast grit, arrange for a “Leachate Test” to be performed by an approved NATA Laboratory and Test Certificates forwarded to the Department of Environment and Conservation.

E1.4.5 CRITERIA FOR CONTAINMENT SYSTEMS

Design a containment system that is suitable for containing the dust generated by the internal abrasive blast cleaning.

The system shall comprise of a low density polyethylene film sealed to prevent emission of contaminants to the surrounding environment.

The containment of the surface preparation operations shall be sufficient to meet current Department of Environment and Conservation abrasive blast cleaning guidelines which state for outdoor abrasive blast cleaning of large structures, that structures should be “enclosed” such that “NO VISIBLE EMISSIONS ESCAPE TO THE ENVIRONMENT”.

E1.4.5.1 Scope

The purpose is to minimise or prevent the debris generated during surface preparation from entering the environment, and to facilitate the controlled collection of debris for disposal.

(a) External Surfaces

A containment system for external surfaces shall include the cover panels, screens, tarps, scaffolds, supports and shrouds used to enclose an entire working platform.

Containment systems shall also employ the use of ground covers when preparing the external surface of the pipelines..

(b) Construction

The containment system shall be designed and built in accordance with Steel Structures Painting Council SSPC-Guide 61 (CON). The requirements for the internal and external surfaces are given in the following table in the following clause.

For details of requirements see SSPC Guide 61 (CON).

E1.4.5.2 Definition of Containment System for Surface Preparation

(c) External Surfaces

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The external containment system for the mechanical surface preparation of existing surfaces shall conform to the following:

Situation A: Where vacuum shrouded power tools (including vacuum blast cleaning) are used in conjunction with brush or roller application of the coatings. NO CONTAINMENT IS REQUIRED.

Note: Preliminary high pressure water washing DA-03.1.3 will require containment of the equipment or scaffold, sufficient to prevent any water mist from entering the environment.

Situation B: Where open (or shrouded) power tools are used in conjunction with SPRAY application of the coatings, the containment system used shall conform to a Class 5 Containment.

Class 5 – This system provides a minimal level of dust and debris containment. It normally utilises permeable walls with flexible framing, open seams and entryways, and natural air flow.

(d) TABLE OF CRITERIA FOR A CLASS 5 CONTAINMENT SYSTEM IN ACCORDANCE WITH SSPC GUIDE 61 (CON)

ITEM	SSPC CLASS	DESCRIPTION
Containment Material	A1.2	Rigid or flexible clear plastic sheeting/mesh sheeting
Permeability	B2	Material permeable to air
Support System	C2	Flexible support structure
Joints	D3	Partial seal of joints
Entryway	E3	Entryway through open seams
Makeup Air	F2	Open entry points – open entry from sheet edges, etc
Input Air Flow	G2	Natural flow of makeup air at entry point
Air Pressure Inside "Containment"	H3	Negative pressure not required
Air Movement	I2	Air movement not specified
Exhaust Dust Filtration	J2	Not required

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E1.4.5.3 Method of Assessing Quantity of Emissions

Surface preparation and paint removal operations produce dust and debris which can be emitted into the environment. Methods for quantifying the amount of dust and debris escaping the work area are described below.

(e) Visible Emission of Dust

The requirement for internal abrasive blast cleaning shall be a maximum of Level 2 emission from outside the containment area.

External power tool cleaning shall have a maximum of a Level 3 emission.

General Surveillance - Visible emissions are permitted at given frequencies or durations provided they do not extend beyond an established boundary line (eg. property line). Possible frequencies include:

1. Level 0 Emissions	No visible emission. **Note:** This level may not be achievable during abrasive blasting.
2. Level 1 Emissions	Random emissions of a cumulative duration of no more than 1% of the work day (eg. five minutes in an eight hour work day).
3. Level 2 Emissions	Random emissions of a cumulative duration of no more than 5% of the work day (eg. 24 minutes in an eight hour work day).
4. Level 3 Emissions	Random emissions of a cumulative duration of no more than 10% of the work day (eg. 48 minutes in an eight hour work day).
5. Level 4 Emissions	Emissions are unrestricted and may occur at any time.
NOTE: The work day activities for timing emissions encompass surface preparation and clean-up only.	

The contractor will also conform to AS 4361.1 Appendix E Containment Design.

E1.4.6 AIR QUALITY

The contractor shall carry out the requirements as per AS 4361.1 Appendix F.

E1.4.7 GROUND (SOIL) SAMPLING AND ANALYSIS

The contractor shall carry out the requirements as per AS4361.1 Appendix G.

E1.4.8 WATER AND SEDIMENT SAMPLING ANALYSIS

The contractor shall carry out the requirements as per AS 4361.1 Appendix H

E1.4.9 WORKERS PROTECTION

The contractor shall carry out the requirements as per AS 4361.1 Appendix I

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E1.4.10 INSPECTION AND TESTING BY THE CONTRACTOR

E1.4.10.1 General

Carry out the inspections and tests specified together with any other inspections and tests considered to be necessary to ensure that the preparation of the surfaces which are to be coated, the coating materials and the application of these, conform to the requirements of the Specification.

Complete the inspection and equipment reports to AS 3894.10, AS 3894.11 and AS 3894.12. A copy of the reports shall be supplied to the Principal after each day's work.

Personnel responsible for completion of inspection and equipment records and certification of coating application shall possess an Australian Corrosion association Coating Inspection Certificate.

Where applicable, all testing instruments shall be checked for accuracy or shall be calibrated immediately before being used and at intervals such that their accuracy is maintained while carrying out tests.

E1.4.11 COATING SYSTEMS

E1.4.11.1 General

All coating materials in any one coating system shall be manufactured by the same manufacturer and shall be compatible with each other.

Furnish to the Principal one sample per batch of each paint to be used for the works in accordance with the following requirements:

(a) Each sample shall be a minimum 500 ml container filled with paint. In the case of Multi Pack paints, the sample shall consist of the requisite number of containers, each of such a capacity that when components are mixed in the required proportions, not less than 500ml of paint is contained.

(b) Each container shall have the following information indelibly marked on it.

1. The name of the area where the paint is to be used.
2. Description of the paint or component inside the container.
3. The batch numbers.
4. The date when the container was filled with the paint or component.

Paint samples may be required before the coating operations are commenced and/or while in progress.

E1.4.11.2 COATING APPLICATIONS

REQUIREMENT: Prepare the surfaces and apply protective coatings in compliance with Section TR20 of the WS-SPEC attached as Appendix C and the following.

Cross Connections 1 & 3

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Prime coat all blasted areas with Orica Zincanode 202 (GPC-C- 14/2) or equivalent to a dry film thickness of 75 microns.

Stripe coating required all nuts, bolts and edges.

The intermediate coat will be Orica Durabuild STE (GPC-C-29/7 type 6) or equivalent to a minimum dry film thickness of 200 microns per coat. Colour Light Grey N35 on all steelwork.

The finish coat will be Oleoresinous Aluminium to a dry film thickness of 75 microns. All other associated pipe work and structural steel to be coated with the above system.

Mamre Road & Wallgrove Road Cross Connections

Prime coat all areas with Orica Zincanode 202 (GPC-C- 14/2) or equivalent to a minimum dry film thickness of 75 microns.

Stripe coating required on all nuts, bolts and edges.

The intermediate and topcoat will be Orica Durabuild STE (GPC-C- 29/7 type 6) or equivalent to a minimum dry film thickness of 200 microns per coat. Colour to be black.

E1.4.11.3 INSPECTION OF COATING APPLICATIONS

All necessary inspections and tests shall be carried out by the contractor to ensure that all requirements are complied with.

Measure the ambient and steel temperature and the relative humidity immediately prior to commencing the coating operations and at intervals as required thereafter to ensure compliance with the requirements of Paragraph 4.1 of section TR20 of the WS-SPEC attached as Appendix C.

Each surface, which is to be coated, shall be visibly examined for compliance with the requirements of Paragraph 4.2 of TR20.

The wet film thickness of each coat of paint shall be measured to enable modification of the rate of application of the paint if necessary, before a coating has hardened. Wet film thickness may be measured by a wheel gauge conforming to AS 1580, Method 107.3, such as Elcometer 120, or by a wet film comb, such as Elcometer 115.

The dry film thickness of the prime coat or coats, that of the partly completed and/or that of the completed coating system, shall be measured as often as deemed to be necessary to determine whether or not such thickness conforms to the requirements for the particular coating system. The dry film thickness of a coat or of a coating system may be measured by pull-off or direct reading instruments based on magnetic attraction and conforming to AS 1580, Method 108.1, such as PositTector 2000, Elecometer 157 and Microtest, or by instruments utilising electromagnetic induction and eddy current, such as Elecometer 256.

The dry film thickness gauges shall be calibrated using standard plastic shims of known thickness on a smooth flat steel surface.

Each coat of a coating system shall be visually examined for general appearance, colour and defects.

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E1.4.11.4 INSPECTION AND TESTING BY THE PRINCIPAL'S REPRESENTATIVE

Independent of the inspections and tests carried out by the Contractor, the Principal may carry out, or may arrange to be carried out by others, any of the inspections and tests specified, using test equipment supplied by the Principal. The cost of such inspections and tests shall be borne by the Principal, except for provision of scaffolding and adequate lighting, which is the Contractor's responsibility.

Inspection for acceptance of prepared surfaces and coatings will take place at stages after the surfaces and coatings have been presented to the Principal as having been inspected and passed by the Contractor as being in accordance with this Specification. The physical limits of work to be inspected for acceptance shall be clearly described by the Contractor at the time of presentation for inspection.

Provided forty eight hours notice has been given, surfaces prepared for painting will be inspected by the Principal within two hours of presentation by the Contractor for approval.

E1.4.11.5 RECTIFICATION OF DEFECTS

Any surface damaged by rain or any other cause, or showing imperfections such as blisters, runs or sags, shall be repaired by the Contractor by rubbing down the defects, feathering back any paint edges and application of an additional coat of paint.

Paint to be used for repair work is to be mixed in containers of one litre capacity to the ratio required by the paint manufacturer.

Where the extent of damage or defects is such that surfaces repairs would not result in a coating conforming to the Specification, the affected area shall be re-blasted to bare metal and re-coated as specified for the original coating.

Where the average dry film thickness (i.e. the average of not less that ten determinations uniformly over a test area of 1m²) of a single coat or of the complete coating system is less than the specified minimum dry film thickness, or where any single reading is less than 80% of the specified minimum dry film thickness, an additional coat of paint shall be applied over the area represented by the test area.

E1.4.12 CONTROL OF WASTE

The contractor is responsible for the control of all waste. This may include assuring that all testing, handling storage and disposal requirements are properly implemented, including the satisfactory training of job site personnel and cleaning of all reusable items and equipment prior to removal from the work site. The Contractor will carry out the requirements of AS 4361.1 Appendix J Solid Waste Management.

Temporary waste storage sites are to be adequately protected from vandalism and access by unauthorised personnel. .

E1.4.13 COMPLETION OF WORKS

On the completion of all works, the site of the works shall be cleaned of all surplus material, spoils, plant, site sheds and notice boards.

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Any area, which has been used by the Contractor for execution of the Contract, shall be restored to existing contours prior to construction. Grassed areas disturbed during the work to be grass seeded and maintained during the 52 weeks maintenance period.

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