

Appendix H Coating Condition Assessment Report



Memo

To: Anand Thakur
From: Gideon Chapman (prepared by George Symonds)
Subject: Angas Street Bridge Paint Study Outcomes
Our ref: PS213457-WSP-SYD-STR-MEM-00001 Rev1
Date: 1 April 2025

Remedy AP has completed the paint testing scope and provided the attached paint testing factual report.

The conclusions from this study are that:

1. The paint contains a % of lead and chromium that classifies it as hazardous per AS 4361.1.

If refurbishment works were to be undertaken on site, then hazardous paint management requirements would need to be met as previously mentioned in the Structures Options Assessment. We have expanded upon these requirements below.

The requirements for Lead Paint Management are described in the attached summary and WorkSafe references.

These requirements for the Contractor operator OHS&W include blood testing to provide a benchmark before work commences. This is then repeated following the project completion to compare any variations for operator health from exposure to lead dust.

An onsite decontamination trailer will provide the basic necessary “clean in, dirty exit “management of operator hygiene, this includes change room, shower facilities. Provided by the PCCP Certified Contractor.

The encapsulated work area is required to comply with a “negative air flow“ (the Dust Collector) within Australian Standards; This is rated by the PCCP Certified Contractor, based upon area sizing. An onsite Lead Dust Monitoring system is set up to measure airborne contaminants; This is a safety requirement to ensure all the encapsulated area is sealed and not leaking lead dust particles during works.

Waste management is a serious matter, and the PCCP Certified Contractor must test the waste abrasive/encapsulation to detect lead dust levels prior to disposal in the appropriate manner. A Waste Certificate is provided by the Contractor as evidence of the process.



2. The paint was found to be in poorer condition than previous reports indicated. Across large areas of the bridge, poor paint adhesion and delamination was identified.

Refurbishment work would necessitate full removal of the existing coating, preparation of the substrate, and full re-coat. Spot repair is not suitable.

3. Steel corrosion was identified at interface regions between bridge elements. For example, where transverse members sit on longitudinal members and vice versa (see example photograph below).

Effectively cleaning out the corrosion product and repainting in these regions is likely to be too difficult in situ.



Based on the conclusions from the paint study (and prior lift study) WSP's recommendations for the Angas Street Bridge and the associated reasoning are as follows:

- If the existing structures is to be re-used, the existing bridge requires lifting out and refurbishment in a workshop
 - o Too costly and time consuming to provide encapsulation and lead management on site.
 - o Full repaint is required which is time consuming, and there are too many associated traffic impacts due to road closures if refurbishing in situ.
 - o High quality refurbishment is required to eliminate ongoing corrosion of interface regions. This may only be achieved effectively in workshop conditions.
 - o Bridge can feasibly be lifted out and back in again.
- A new concrete bridge structure is recommended per the option presented as part of the Structures Options Assessment.
 - o The extent (full repaint) and complexity (lead and corroding interface regions) of refurbishment required is at the extreme end of what was anticipated.
 - o Finding a workshop willing to take on the refurb is anticipated to be difficult. Incorporation of the refurbishment item into the overall Contractor scope could discourage some Contractors from bidding and reduce the competitiveness of the bidding process.
 - o The new structure proposed has a design life of 100 years and minimal maintenance requirements over this period. The refurbishment works to the existing structure would suffice for another approx. 15 years until another re-coat would be required. The costs per year of service life are markedly lower for a new bridge.
 - o The ongoing safety risk for a new structure is lower. Any defects to the proposed concrete bridge are easier to identify and rectify compared to the existing structure.
 - o The new bridge can feasibly be lifted into place.
 - o A new bridge would enable the additional widening of the southern footpath on Constitution Road.

Per recent discussions with CoR, and given the short timeframes for Contractor procurement, WSP proposes production of Reference Design General Arrangement drawings for the new bridge structure. The Contractor can then use these drawings to conduct 100% detailed design as part of a Design and Construct (D&C) process. The Reference Design drawings would show all proposed dimensional requirements, articulation requirements (i.e. bearing types), and handrail/screen requirements but would omit details such as reinforcement arrangements and hold down bolt configurations, etc. Reinforcement rates can be provided.

The intent is that the Contractor uses these drawings for pricing the D&C.

An alternative option again, would be to 'do nothing' as part of this phase of work. Bollards could simply be installed either side of the existing bridge to prevent vehicular traffic in the interim.

Environmental Containment,

You are responsible

Today's duty-of-care requirements for environmental protection and occupational health and safety mean that open air blasting, without any responsibility for the consequences, is a thing of the past.

To help you achieve environmental legislation compliance and provide a safe workplace, **BlastOne has an extensive range of containment and ventilation solutions.**

1 Blasting and Painting Enclosure

The 'heart' of any containment system is the enclosure itself, which consists of two major elements—the sheeting and the support structure.

Containment Sheeting

BlastOne has an extensive range of containment sheeting available. This extensive range ensures that whatever your operating requirements are, they can be met. Sheeting options include:

- a selection of different sheet widths and lengths
- economical, light duty sheeting or heavy duty, long-term sheeting
- flame-retardant sheeting
- custom made sheeting and tarps
- company logos printed on sheets.

See pages 276 - 280 for more information

Support Structure

The most commonly used support structure for containment sheeting is stationary steel scaffolding. BlastOne does not supply scaffolding, however we can provide referrals for contractors who are experienced in setting up scaffolding structures for containment enclosures.

2 Ventilation and Dust Collection

An abrasive blasting enclosure without ventilation quickly becomes a dusty, hazardous haze, hindering productivity and safety.

To counter this problem, BlastOne has an extensive range of dust collection solutions to complete any containment system.

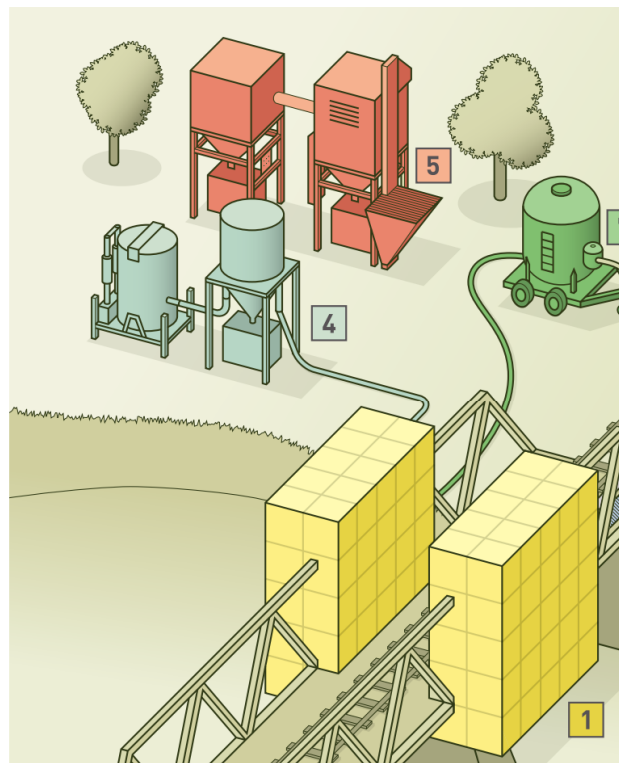
See page 78 for more information

In some instances the coating requiring removal may contain hazardous substances; in the majority of cases this will be lead-based pigments.

As these substances are considered toxic, specialized systems will be required. BlastOne can help you with waste disposal, testing and monitoring systems, and specialized PPE Systems.

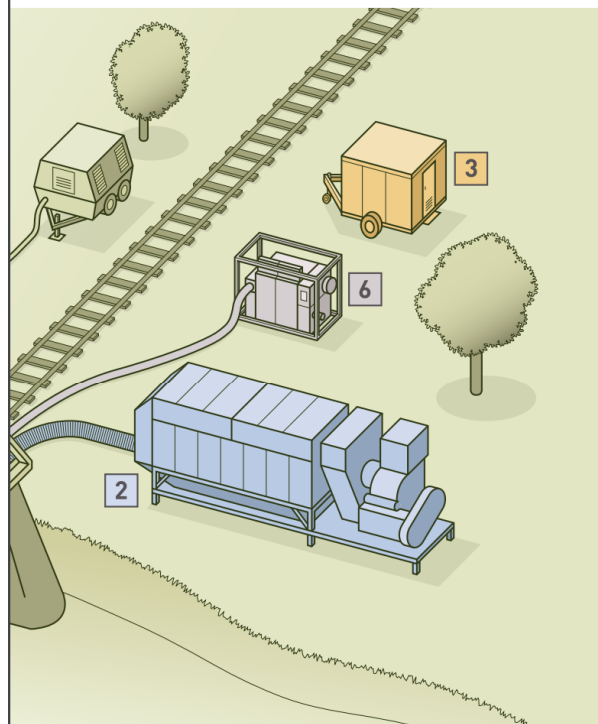
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The Key Components of a Safe



Control and Ventilation

Corrosion Controlled Worksite



4 Vacuum Recovery

Sweeping and shovelling spent abrasive inside a containment enclosure can be a very time-consuming process. To help speed up spent abrasive recovery, BlastOne has available for purchase or hire, industrial vacuum systems that are built specifically for recovering abrasive. A range of different options are available including electric and pneumatic systems.

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See page 64 for more information

5 Abrasive Recycling

Where an abrasive is being used that has good recycling characteristics, such as Australian GMA Garnet or Steel Grit, BlastOne can supply recycling systems to clean spent abrasive. These systems can clean up to 7 tons of abrasive per hour, removing both coarse trash and dust creating abrasive fines. Easy to use and low cost to run, BlastOne abrasive recycling systems are suitable for both fixed and site installations. Reduce your disposal costs!

See page 70 for more information

6 Dehumidification

Every contractor realizes that a supply of clean, dry air is essential to the efficient operation of a blast machine, however, drying the air inside a blast enclosure also helps to improve productivity. Traditionally used in cold, wet conditions, dehumidifiers have proved their worth time and time again by minimizing flash rusting and extending the length of time required between blasting and prime coating.

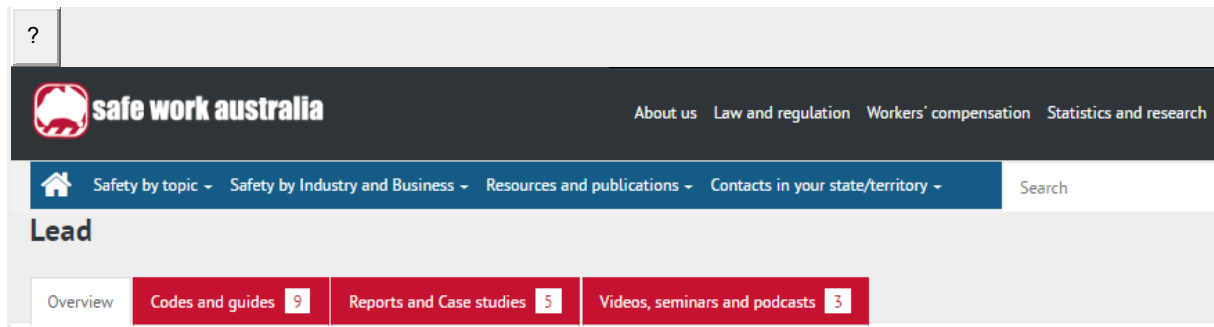
Talk to BlastOne for a range of rental or purchase solutions.

See page 108 for more information

7 Abrasive Blasting Machinery

From lightweight hand-held units to trailer-mounted bulk blasters for up to four operators, BlastOne has a blast machine to suit your needs. In addition to the blast unit itself, BlastOne has an extensive range of specialized safety equipment for the corrosion control industry.

BlastOne's entire range of corrosion control equipment is available for both sale and rental – **call BlastOne today.**



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Lead

Overview Codes and guides 9 Reports and Case studies 5 Videos, seminars and podcasts 3

- [Managing risks associated with lead](#)
- [Change to allowable blood lead levels](#)
- [Lead processes and lead risk work](#)
- [Health monitoring](#)
- [Biological monitoring](#)
- [Monitoring for airborne contaminants](#)
- [Recent changes](#)
-

Inorganic lead (lead) is used in Australian workplaces in a variety of products, including solders, batteries, radiation shielding and ammunition. It was used extensively in lead paints and lead fuels before these products were banned, and may still be present in some workplaces.

Exposure to lead can cause adverse health effects. Evidence links lead exposure to:

- cancer
- cardiovascular disease
- kidney damage
- effects on the nervous system, including difficulty concentrating, hearing loss, loss of balance, tremors
- behavioural changes like aggression, anxiety and depression
- anaemia
- reduced fertility, and
- birth defects and developmental delays in children.

Lead can accumulate in the body over time, depositing in the bones and teeth. This 'body burden' can become a risk later in life as the body ages and bones demineralise, releasing stored lead into the blood stream.

Managing risks associated with lead

If you are a PCBU, you have duties under the model WHS Regulations to manage the risks to health and safety associated with using, handling, generating or storing lead at a workplace. Failure to manage these risks is a breach of the model WHS laws.

The best way to control a risk is to eliminate it completely—that is, by removing the risk from the workplace. If that is not possible you must minimise risks, so far as is reasonably practicable.

The [model Code of Practice: Managing risks of hazardous chemicals in the workplace](#) provides a four-step risk management approach to managing the risks of hazardous chemicals, including lead. More information on [Identifying, assessing and controlling hazards](#) is also available.

When choosing control measures, PCBU's must consider the hierarchy of control and choose the control that most effectively eliminates the hazard or minimises the risk. This can be a single control or a combination of different controls that provide the highest level of protection that is reasonably practicable.

Change to allowable blood lead levels

Lead risk work is any work that will likely cause blood lead levels of a worker to exceed 20 µg/dL (0.97 µmol/L), or 5 µg/dL (0.24 µmol/L) for females of reproductive capacity.

This is a reduction from previous blood lead levels of 30 µg/dL (1.45 µmol/L) and 10 µg/dL (0.48 µmol/L) for females of reproductive capacity.

A transitional period of two years applies for these new levels and your local WHS regulator will have more information on how this will work in your state or territory.

Lead processes and lead risk work

Due to the severity of health effects caused by exposure to lead, and the abundance of lead in workplaces and the environment, Part 7.2 of the model WHS Regulations specifies that PCBU's are required to identify lead processes or lead risk work.

While extensively defined in Regulation 392 of the model WHS Regulations, a *lead* process in general is any work that exposes a worker to:

- lead particulates, lead dust or lead fumes, for example grinding, sanding or welding
- molten alloys containing lead
- lead included in batteries or parts of batteries, and
- lead based spray paint, including any abrasive blasting or water jet treatment of surfaces coated in lead based paint.

A PCBU must ensure, so far as is reasonably practicable, that:

- contamination by lead is confined to a lead process area at the workplace
- these lead process areas are kept clean and steps are taken to prevent any persons from eating or drinking in the process area, and
- an eating and drinking area is provided that is free from lead contamination.

Other important duties required when lead is used or present at a workplace include:

- a PCBU's provision and maintenance of changing rooms, and washing, showering and toilet facilities to minimise lead contamination and exposure

- information about the health risks and toxic effects associated with exposure to lead is provided to workers before they start the lead process, and
- steps taken to minimise workers' exposure to lead when handling contaminated PPE and ensure that contaminated PPE is disposed of appropriately.

PCBU's have a duty to assess each lead process carried out by the business and determine if it is lead risk work. Any worker carrying out lead risk work must be given information about the process before they start. They must also be provided information about health monitoring.

Health monitoring

A PCBU must ensure that health monitoring is provided to workers undertaking lead risk work before the worker first starts the work and one month after.

Health monitoring must be carried out by or under the supervision of a registered medical practitioner with experience in health monitoring.

Health monitoring must include:

- demographic, medical and occupational history
- physical examination, and
- biological monitoring.

Health monitoring can be used to help identify whether existing control measures are working effectively or whether more effective control measures should be implemented. Health monitoring must never be used as an alternative to putting in place effective control measures.

The [*Health Monitoring for Exposure to Hazardous Chemicals – Guide for persons conducting a business or undertaking*](#) provides further information on health monitoring, and guidance on meeting your requirements as a PCBU.

Biological monitoring

Biological monitoring for lead is conducted by taking a blood sample and measuring the blood lead level.

Biological monitoring starts before the worker commences the work, one month after starting and must continue at regular intervals depending on previous results, gender and reproductive capacity.

For females not of reproductive capacity and males, biological monitoring must be conducted:

- 6 months after the last test if the last result showed a blood lead level of less than 10 µg/dL (0.48 µmol/L)
- 3 months after the last test if the last results showed a blood lead level of 10 µg/dL (0.48 µmol/L) or more but less than 20 µg/dL (0.97 µmol/L), or

- 6 weeks after the last test if the last results showed a blood lead level of 20 µg/dL (0.97 µmol/L) or more.

For females of reproductive capacity, biological monitoring must be conducted:

- 3 months after the last test if the last result showed a blood lead level of less than 5 µg/dL (0.24 µmol/L)
- 6 weeks after the last test if the last results showed a blood lead level of 5 µg/dL (0.24 µmol/L) or more but less than 10 µg/dL (0.48 µmol/L).

The testing frequencies and blood lead levels were implemented in 2018. A transitional period of two years applies and your local WHS regulator will have more information on how this will work in your state or territory.

Amendments have been made to the model WHS Regulations that lower the threshold at which a worker is removed from lead risk work. A worker must now be removed from lead risk work if their blood lead levels exceed:

- 30 µg/dL (1.45 µmol/L) for females not of reproductive capacity and males (down from 50 µg/dL (2.42 µmol/L)), and
- 10 µg/dL (0.48 µmol/L) for females of reproductive capacity, or those who are pregnant or breastfeeding (down from 20 µg/dL (0.97 µmol/L) and 15 µg/dL (0.72 µmol/L) respectively).

These removal levels were implemented in 2018. A transitional period of two years applies and your local WHS regulator will have more information on how this will work in your state or territory.

If the medical practitioner supervising the health monitoring recommends it, a worker must also be removed from lead risk work regardless of the blood lead level. The PCBU must notify their WHS regulator if a worker is removed from lead risk work due to the outcomes of health monitoring.

If a worker is removed from carrying out lead risk work because of excessive blood lead levels, the PCBU must arrange for the worker to be medically examined within seven days of removal. The worker may only return to lead risk work if the medical practitioner is satisfied that the worker is fit to return and the worker's blood lead level is less than:

- 20 µg/dL (0.97 µmol/L) for females not of reproductive capacity and males (down from 40 µg/dL (1.93 µmol/L)), and
- 5 µg/dL (0.24 µmol/L) for females of reproductive capacity (down from 10 µg/dL (0.48 µmol/L)).

These return to work levels were implemented in 2018. A transitional period of two years applies and your local WHS regulator will have more information on how this will work in your state or territory.

A confidential record of the worker's health monitoring reports must be kept by the PCBU for at least 30 years. The PCBU must take all reasonable steps to obtain the health monitoring report and provide a copy to the worker as soon as practicable.

Read further information in our [Lead \(inorganic\) health monitoring guidance material](#).

Monitoring for airborne contaminants

A PCBU must ensure that a worker is not exposed to concentrations of airborne chemicals above the workplace exposure standard. The workplace exposure standard for inorganic lead (eight hour time-weighted average) is 0.05 mg/m³.

The workplace exposure standard for lead was implemented in 2018. A transitional period of two years applies and your local WHS regulator will have more information on how this will work in your state or territory.

More information can be found in:

- [Workplace exposure standards for airborne contaminants](#), which contains key information about how workplace exposure standards are applied under the model WHS Regulations, and
- [Guidance on the interpretation of workplace exposure standards for airborne contaminants](#), which contains further information for businesses.

To comply with the model WHS Regulations, PCBU's must monitor workers' exposure to airborne lead if:

- there is uncertainty whether or not the exposure standard has been or may be exceeded, or
- it is necessary to work out whether there is a risk to health.

Records of air monitoring must be kept for a minimum of 30 years and must be made available to workers who are exposed.

Recent changes

In April 2018 the [model WHS Regulations](#) and the workplace exposure standard for lead were amended.

The changes include:

- reducing the workplace exposure standard for lead from 0.15 mg/m³ to 0.05 mg/m³
- reducing the blood lead level used to define lead risk work
- reducing the mandated blood lead removal levels
- adjusting the testing frequency of workers, and
- reducing the blood lead levels permitted to return to lead risk work.

Contact options



- [SafeWork NSW](#)
[View more NSW contacts](#)



- [Workplace Health and Safety Queensland](#)
[View more QLD contacts](#)



- [WorkSafe Victoria](#)
[View more Vic contacts](#)



- [WorkSafe ACT](#)
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- [WorkSafe Tasmania](#)
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Angas Street Bridge Coating Condition Assessment Report



Document Coating Condition Assessment Report

Prepared for City of Ryde

Ref 1776-1

Date 20th March 2025

Hobart - Adelaide - Melbourne - Sydney - Brisbane - Cairns - Broome
info@RemedyAP.com.au | 1300 956 054 | www.RemedyAP.com.au
Accelerator (Australia) Pty Ltd T/A Remedy Asset Protection | ABN 85 136 055 831

Quality information

Revision history

Rev	Revision date	Details	Author/Qualification	Authorised name/Position	Signature
0	19 th March 2025	Draft for client review	Arash Mansouri AMPP (NACE) Coatings Inspector- Level 3 – Cert No 62315	Alex Shepherd AMPP (NACE) Coatings Inspector- Level 3 – Cert No 20345	
1	20 th March 2025	Final	Arash Mansouri AMPP (NACE) Coatings Inspector- Level 3 – Cert No 62315	Alex Shepherd AMPP (NACE) Coatings Inspector- Level 3 – Cert No 20345	

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Summary

Remedy Asset Protection (RemedyAP) performed a condition assessment of coatings applied to Angas Street bridge steel structure, in Meadowbank.

The assessment was conducted over two-night shift visits from 3rd to 4th March and included visual assessment, HazChem sampling, dry film thickness (DFT) measurement, and coating adhesion testing.

The visual condition of the coating was poor in most of the inspected areas, with flaked coating, signs of corrosion, and coating delamination evident in different areas of the bridge soffit and above the deck.

The average of DFT readings was 297 μm on the bridge soffit, and 296 μm on the above deck area.

Coating adhesion testing was performed on limited areas with sound coating. All adhesion pull-off test results were above 5 MPa, showing a reasonable adhesion of primer coat in these areas. Areas with visual evidence of poor adhesion could not be nominated for the pull-off test, as the coating was already delaminated in those areas.

Laboratory testing performed on retrieved coating flakes confirm that concentrations of chromium and lead were detected which exceed the threshold in accordance with Clause 8 of AS 4361.1. Concentrations of cadmium do not exceed the threshold.

Based on the inspection findings, the coating system appears to be at the end of its service life. RemedyAP are not of the opinion that a spot repair and overcoat approach to reinstate the coating system will be either economical or provide long term durability when compared to full coating removal (to bare metal) and reinstatement of a new coating system.

Contents

1	Project representatives	5
2	Acronyms, terms and definitions	5
3	References.....	5
4	Condition assessment methodology	6
4.1	Visual assessment	6
4.2	Dry film thickness (DFT)	6
4.3	Assessment of adhesion	6
4.4	Sampling	6
5	Visual inspection findings.....	7
5.1	Bridge soffit	7
5.2	Above deck.....	10
6	Dry film thickness (DFT).....	11
7	Adhesion test (Pull-off test)	12
8	Laboratory testing.....	13
9	Expected service life of current system.....	14
9.1	Corrosivity zone.....	14
9.2	Durability of existing coating system	14
	Appendix A DFT gauge reports	15
	Appendix B Adhesion test gauge reports.....	16
	Appendix C Laboratory test report.....	17

1 Project representatives

Project representatives who attended the inspections, are listed in Table 1.

Table 1 Project representatives

Name	Position	Company
Arash Mansouri	Quality field auditor	RemedyAP
George Symons	Bridge engineer	WSP

2 Acronyms, terms and definitions

Lists of acronyms and terms used in this report are presented in Table 2 and Table 3 respectively.

Table 2 Acronyms

Acronym	Definition
DFT	Dry film thickness
ITP	Inspection and test plan
SDS	Safety data sheet
TDS	Technical data sheet

Table 3 Terms and definitions

Term	Definition
Applicator	The Contractor or protective coating application sub-contractor or the employee of the Contractor or protective coating sub-contractor who prepares the surface and applies the specified coatings
Design life	The period which the asset or its components is to remain fit for its intended purpose with periodic routine maintenance and without major repairs
Durability	The time elapsed before the first major maintenance (recoating or patch repairs) of a coating system becomes necessary, to arrest corrosion
Inspector	An appropriately qualified and experienced person to provide independent inspection, testing and reporting of the works
Supplier	The supplier whose name appears on the product container, data sheets and the safety data sheets (SDS)
Owner's representative	The person or company who is appointed by the owner of the asset to act as the owner's advocate and represent their best interests.

3 References

The documents referenced in this report are listed in Table 4.

Table 4 Reference documents

Document	Version/Year	Author/Publisher
AS 2312.1- Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings- Part 1: Paint coatings	2014	Standards Australia
AS 4312- Atmospheric corrosivity zones in Australia	2019	Standards Australia
ISO 4628- Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance	2014	ISO
AS 1580.481- Methods of test of coatings exposed to weathering	1998	Standards Australia

Document	Version/Year	Author/Publisher
AS 3894.3 Site testing of protective coatings Method 3: Determination of dry film thickness	2002 (R2013)	Standards Australia
AS 3894.7 Site testing of protective coatings Method 7: Determination of surface temperature	2002 (R2013)	Standards Australia
AS 3894.9 Site testing of protective coatings Method 9: Determination of adhesion	2003	Standards Australia
AS 4312 Atmospheric corrosivity zones in Australia	2019	Standards Australia
AS/NZS 4361.1 Lead and other hazardous metallic pigments in industrial applications	2017	Standards Australia

4 Condition assessment methodology

4.1 Visual assessment

RemedyAP Evaluated the degree of deterioration of coatings in accordance with AS/NZS 1580.481. Accessible areas of substructural steel were visually inspected.

4.2 Dry film thickness (DFT)

DFT measurements were conducted in accordance with AS 3894.3 and the results recorded for each batch.

4.3 Assessment of adhesion

Adhesion testing was conducted in accordance with AS 3894.9- Method C; pull-off test.

Using an automatic adhesion tester, this quantitative test directly measures the tensile adhesion of the coating system to the substrate under operational condition. The adhesion tester is connected to a “dolly” which has previously been glued to the surface and measures the tensile bond strength in megapascal. Possible outcomes of adhesion test are:

- The coating dis-bonds from the surface
- Cohesive failure occurs within any layer of coating
- Adhesion failure occurs between coating layers
- A specified force has been reached.

4.4 Sampling

RemedyAP collected three coating samples from the bridge soffit and two samples from above deck, in accordance with AS 4361 for third-party laboratory testing, to determine the presence of:

- (Pb) Lead in Paint
- (Cr) Chromium in Paint
- (Cd) Cadmium in Paint

5 Visual inspection findings

5.1 Bridge soffit

5.1.1 Bottom chords

Evidence of heavy corrosion was visible in ~ 5% of areas on the two truss bottom chords on eastern and southern elevations.

Coating delamination was observed on ~30% of these bottom chords. Surface rust was visible on ~ 20% of the surface.



Figure 1- Heavy spot corrosion on bottom chord



Figure 2- Coating delamination and surface rust on bottom chord

5.1.2 Transoms

Coating flaking and delamination was observed in ~ 20% of areas. The topcoat could be easily removed from the primer by using a putty knife. Surface rust was visible on ~10 % of the surface.

Evidence of previous poor-quality coating touch-ups was visible in some areas.



Figure 3- Flaking defect on transom



Figure 4- Flaked coating on transom



Figure 5 Coating flaking and surface rust



Figure 6 Evidence of poor coating touch-ups

5.1.3 I section stringers

Heavy accumulation of dirt and contaminations were visible above the road spans.

Coating was delaminated from the substrate in ~20% of the substrate in the southern elevation.

Corrosion was advanced on ~ 5% of edges, mostly on the southern elevation.

The coating delamination was observed in ~ 10% of the northern elevation.



Figure 7 Accumulation of contamination



Figure 8 Coating delamination and corrosion on edges

5.1.4 Hollow section stringers

The galvanised hollow structural sections were over-coated with paint. The paint was delaminated from the galvanised, in ~ 30% of areas. Poor adhesion of paint was visible on the majority of galvanised hollow sections on both southern and northern elevations.



Figure 9 Delaminated paint from galvanised substrate



Figure 10 Poor adhesion between paint and galvanised coating

5.1.5 Connection points and faying surfaces

Corrosion was visible on ~10% of connection points and faying surfaces. This was observed in connection points between different stringers, and between decking sheets and stringers.



Figure 11 Corrosion between girders and trough decking sheets



Figure 12 Corrosion on welds

5.1.6 Trough decking sheets

The galvanised trough decking sheets (Bondek) were over-coated with paint. The paint was delaminated from the galvanised in ~ 20% of the surface. Evidence of poor adhesion between paint and galvanised was visible in different areas.



Figure 13 Delamination between paint and galvanised substrate

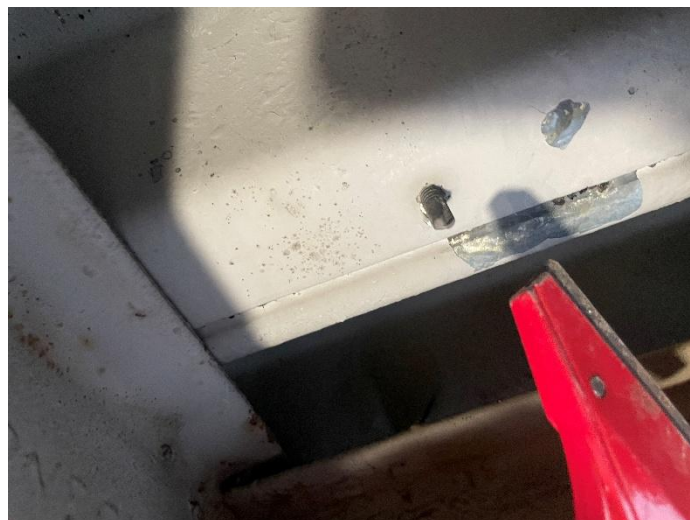


Figure 14 Poor adhesion between paint and galvanised

5.2 Above deck

The above deck area was not fully accessible for the inspection due to the presence of debris on the edge of the deck.

5.2.1 Top chords

The coating was delaminated from the substrate in ~ 40% of top chord surfaces on both eastern and western elevations.

Surface rust was visible on ~30% of the surface.



Figure 15 Coating delamination and surface rust



Figure 16 Coating delamination and surface rust

5.2.2 Posts and diagonal bracings

Coating delamination between primer and topcoat was visible in ~ 30% of posts and connection plates.



Figure 17 Coating delamination on posts and diagonal bracings



Figure 18 Coating delamination on connection plate

6 Dry film thickness (DFT)

DFT measurement was performed on 10 areas on a variety of

The gauge batch readings are appended in Appendix A.

The summary of DFT measurements is in Table 4.

Table 5 DFT measurements

Area	Area Location	Coating layer	Batch No.	Number of readings	Gauge readings		
					Minimum DFT (µm)	Average DFT (µm)	Maximum DFT (µm)
Soffit	Bottom chord	Topcoat	B443	18	154	357	620
Soffit	Transom	Topcoat	B446	16	192	473	803
Soffit	Transom	Topcoat	B448	16	164	283	493
Soffit	I section stringer	Primer	B450	16	99	166	211
Soffit	I section stringer	Topcoat	B453	16	91	204	521
Soffit	Hollow section stringer (galvanised)	Galvanised	B445	12	43	55	64
		Paint			60	174	335
Soffit	Trough decking sheet (galvanised)	Galvanised	B470	14	17	27	58
		Paint			34	123	380

Area	Area Location	Coating layer	Batch No.	Number of readings	Gauge readings		
					Minimum DFT (µm)	Average DFT (µm)	Maximum DFT (µm)
Above deck	Top chord (east)	Topcoat	B455	14	82	386	627
Above deck	Top chord (west)	Topcoat	B457	18	29	221	612
Above deck	Diagonal bracing	Topcoat	B456	12	186	283	392

No record of the existing coating specification was provided for assessment.

The average DFT was 297 µm on the soffit, and 296 µm on the above deck area.

7 Adhesion test (Pull-off test)

RemedyAP conducted pull-off adhesion tests in accordance with AS 3894.9- Method C, to quantify the tensile force required to disbond the coating from the surface. This test was performed on 6 areas on the soffit, and 3 areas above the deck. Nominated areas were selected from areas with the sound quality of coating.

The coating surface was cleaned with a clean rag and solvent (Xylene), and then smoothly abraded with sandpaper to remove gloss. 20mm dollies were abraded and glued to the surface and left for a minimum of 22 hours before the test.



Figure 19- Dollies attached and labelled



Figure 20- Adhesion pull-off test

Referring to Table 4, the average DFT of the coating was below 500µm in all tested areas, so no scoring was performed around the dollies in accordance with the test standard.

The adhesion test batch readings are appended in Appendix B.

The summary of the adhesion test is in Table 4.

Table 6 Adhesion test results

TEST DETAILS						
SPECIFICATION & TEST PIECE DETAILS		EQUIPMENT & TEST DETAILS				
Specification Name/No.	N/A	Equipment used	Defelsko Positest AT-A		DFT Average	288 μm
Structure Name	Angas Rd bridge	Equipment Serial	AT18631		DFT gauge batch	B443, B446, B448, B450, B453, B455, B456, B457
System No.	N/A	Calibration Due	31/01/2026		Adh. gauge batch	B88, B89, B90
Structure Material	Steel Structure	Dolly Size	20mm		Testing Authority	
Test Section	Soffit and above deck	Adhesive	Selleys Araldite		Testing Entity	Remedy Asset Protection
		Adhesive Cure	>22 Hours		Tested by	Arash Mansouri
Test Locations	Girders, chords	Dollies glued	03/03/25 @ 20:00 to 21:50		Certification	AMPP- level 3: 62315
		Dollies Pulled	04/03/25 @ 18:40 to 20:50			
AS3894.9 - Determination of Adhesion - Method C Pull-off test						
Dolly Number	Description	Date applied	Date Pulled	MPa value	Adhesion/Cohesion	Percentage Adh/Coh
A1	Soffit- Transom- Web	03/03/2025 @ 20:01	04/03/2025 @ 18:57	8.57	A/B	30% Adh
A2	Soffit- Transom- Web	03/03/2025 @ 20:03	04/03/2025 @ 19:00	9.10	C/Y	70% Adh
						100% Adh
A3	Soffit- Transom- Bottom flange	03/03/2025 @ 20:05	04/03/2025 @ 19:03	12.30	C/Y	100% Adh
A4	Soffit- Transom- Web	03/03/2025 @ 20:57	04/03/2025 @ 19:42	8.14	C	50% Coh
					C/Y	50% Coh
A5	Soffit- Stringer- Web	03/03/2025 @ 20:58	04/03/2025 @ 19:47	8.62	B/C	30% Adh
					C/Y	70% Adh
A6	Soffit- Stringer- Web	03/03/2025 @ 21:10	04/03/2025 @ 19:57	7.31	C/Y	100% Adh
A7	Above deck- Top chord- Top flange	03/03/2025 @ 21:45	04/03/2025 @ 20:59	6.04	B/C	100% Adh
A8	Above deck- Top chord- Top flange	03/03/2025 @ 21:47	04/03/2025 @ 21:01	12.13	B/C	60% Adh
					C	40% coh
A9	Above deck- Top chord- Web	03/03/2025 @ 21:49	04/03/2025 @ 21:03	12.20	B/C	80% Adh
					C/Y	10% Adh
					B	10% Coh
Notes						
N/A				L	Y	GLUE
				E	C	TOPCOAT
				G	B	PRIMER
				E	B	PRIMER
				N	A	Substrate
				D		

8 Laboratory testing

Laboratory testing was undertaken in a NATA accredited laboratory. Five samples were taken – three from the soffit and two above deck.

The samples were evaluated against the threshold in Table 1, Clause 8 of AS 4361.1. The most conservative case is considered. It is assumed that the total mass of paint exceeds 250 kg. The thresholds are shown in Table 7.

Table 7 Threshold concentration criteria for hazardous paints with total mass of 250 kg (Clause 8, AS 4361.1)

Hazard	Total mass of paint > 250 kg
Cadmium (% w/w)	0.05
Zinc chromate (as Chromium) (% w/w)	0.05
Lead (% w/w)	0.1

The % by weight (% w/w) concentrations are shown in Table 8. A note has been added if the sample exceeds the threshold shown in Table 7. Concentrations of chromium and lead were detected which exceed the threshold.

Table 8 Summary of laboratory testing

Element	Sample 1 - Soffit	Sample 2 - Soffit	Sample 3 - Soffit	Sample 4 - Above Deck	Sample 5 - Above Deck
Cadmium (% w/w)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium (% w/w)	0.06 ^{Note 1}	0.02	0.05 ^{Note 2}	0.08 ^{Note 1}	0.05 ^{Note 2}
Lead (% w/w)	6.2 ^{Note 1}	1.8 ^{Note 1}	5.6 ^{Note 1}	0.84 ^{Note 1}	0.45 ^{Note 1}

Note 1: concentration exceeds the threshold in Table 7.

Note 2: concentration is equal to the threshold Table 7.

9 Expected service life of current system

9.1 Corrosivity zone

AS 4312:2019 *Atmospheric corrosivity zones in Australia* provides excellent advice where the objective of this Standard is to provide guidelines for the classification of atmospheric environments in terms of their effects on corrosion to assist with the selection of metal finishes for ferrous products.

Referring to AS 4312:2019-figure A4; *ISO Corrosivity Categories for Sydney*, the location of Angas Road bridge is classified as **corrosivity zone of C3 (Medium)**. According to the standard, *much of the metropolitan areas of Sydney, are in this category.*

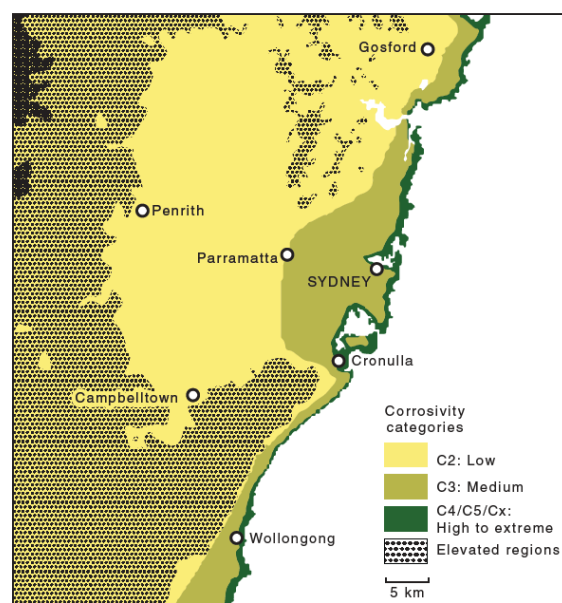


Figure 22- ISO corrosivity categories for Sydney- AS 4312:

9.2 Durability of existing coating system

Referring to AS 2312:2014 *Guide to protection of structural steel against atmospheric corrosion by the use of protective coatings*, for a coating system, the “life to first maintenance” is the time which can elapse before major or general maintenance is required. This life mostly depends on environment and the coating system specification.

9.2.1 Remaining Life of Coating System

There is no record of the specification for the existing coating system, to evaluate the durability of the current coating system. Based on the visual inspection and the extent of the coating delamination and surface corrosion, the coating system appears to be at the end of its service life.

RemedyAP are not of the opinion that a spot repair and overcoat approach to reinstate the coating system will be either economical or provide long term durability when compared to full coating removal (to bare metal) and reinstatement of a new coating system.

Appendix A DFT gauge reports

The following pages show the DFT gauge reports.

B470

Coating Thickness Inspection Report



Condition Assessment
Repair recommendations
Tendering management
Dispute resolution
Historical condition assessment
Specification writing
Construction verification
Failure analysis

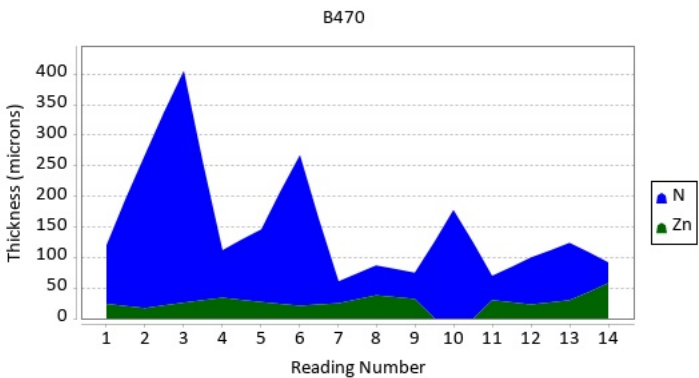
Created: 2025-03-04 17:25:38
PosiTector Body S/N: 872321
Probe Type: PosiTector 6000 FNDS
Probe S/N: 376925

Calibration

Cal Name: Cal 1

Summary

	#	$\bar{x}$	σ	↓	↑
N (microns)	14	123.1	104.2	34	380
Zn (microns)	14	27.3	13.1	-3	58



Readings

#	N (microns)	Zn (microns)	Time
2025-03-04			
1	96	24	17:25:42
2	252	17	17:25:44
3	380	26	17:25:45
4	78	34	17:25:47
5	119	27	17:25:49
6	247	21	17:25:51
7	36	25	17:25:53
8	49	38	17:25:55
9	43	32	17:25:57
10	178	-3	17:25:59
11	40	30	17:26:02
12	77	23	17:26:06
13	94	30	17:26:08
14	34	58	17:26:10

Appendix B Adhesion test gauge reports

The following pages show the adhesion test gauge reports

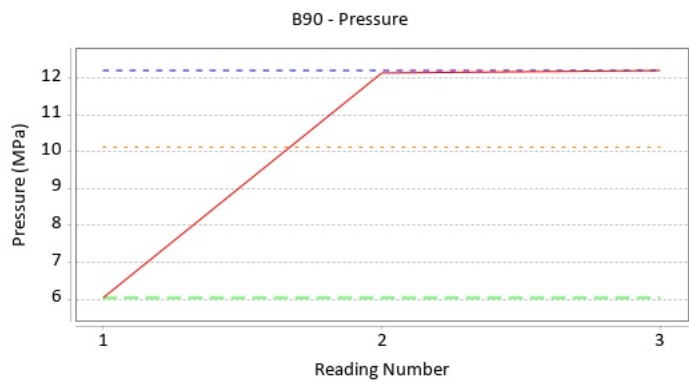
1776- Angas Rd Bridge-Adhesion - B90

Adhesion Testing Inspection Report



Condition Assessment
Repair recommendation
Tendering management
Dispute resolution
Historical condition assessment
Specification writing
Construction supervision
Failure analysis

Created: 2025-03-04 20:58:02
PosiTest AT-A S/N: 15945



1776- Angas Rd Bridge-Adhesion - B90

Adhesion Testing Inspection Report



Readings

#	Pressure Limit (MPa)	Duration Hold Time (s)	Dolly (mm)	Rate (MPa/s)	Result Time
1	6.04 24.00	9.2 0.0/10.0	20	1.00	Pulled 20:59:01
2	12.13 24.00	15.7 0.0/10.0	20	1.00	Pulled 21:01:01
3	12.20 24.00	15.3 0.0/10.0	20	1.00	Pulled 21:03:00

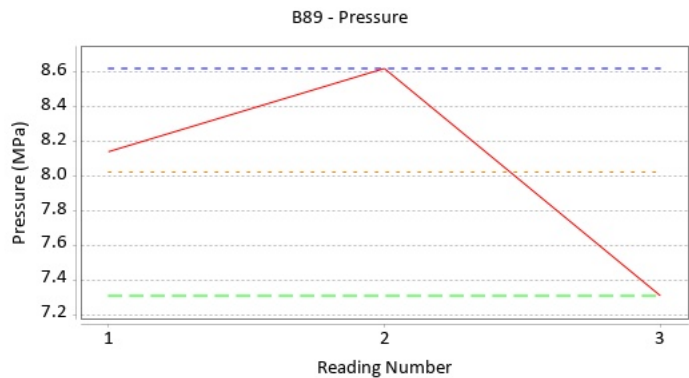
1776- Angas Rd Bridge-Adhesion - B89

Adhesion Testing Inspection Report



Condition Assessment
Repair recommendations
Testing management
Dispute resolution
Historical condition assessment
Specification writing
Construction verification
Failure analysis

Created: 2025-03-04 19:41:30
PosiTest AT-A S/N: 15945



1776- Angas Rd Bridge-Adhesion - B89

Adhesion Testing Inspection Report



Readings

#	Pressure Limit (MPa)	Duration Hold Time (s)	Dolly (mm)	Rate (MPa/s)	Result Time
1	8.14 24.00	11.2 0.0/10.0	20	1.00	Pulled 19:42:20
2	8.62 24.00	11.5 0.0/10.0	20	1.00	Pulled 19:47:00
3	7.31 24.00	10.2 0.0/10.0	20	1.00	Pulled 19:57:33

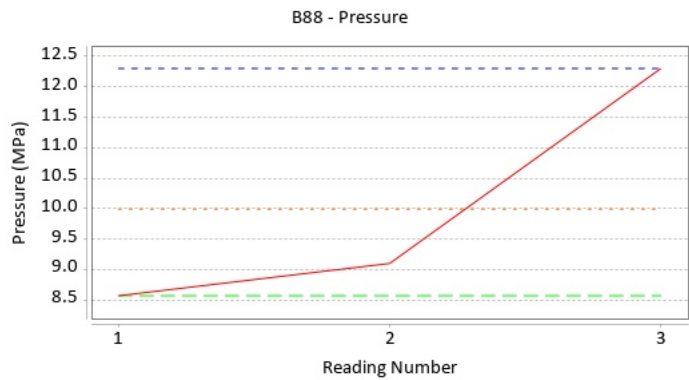
1776- Angas Rd Bridge-Adhesion - B88

Adhesion Testing Inspection Report



Condition Assessment
Repair recommendations
Tendering management
Dispute resolution
Historical condition assessment
Specification writing
Construction supervision
Failure analysis

Created: 2025-03-04 18:55:53
PosiTest AT-A S/N: 15945



1776- Angas Rd Bridge-Adhesion - B88

Adhesion Testing Inspection Report



Readings

#	Pressure Limit (MPa)	Duration Hold Time (s)	Dolly (mm)	Rate (MPa/s)	Result Time
1	8.57 24.00	11.8 0.0/10.0	20	1.00	Pulled 18:57:07
2	9.10 24.00	12.1 0.0/10.0	20	1.00	Pulled 19:00:18
3	12.30 24.00	15.5 0.0/10.0	20	1.00	Pulled 19:03:55

Appendix C Laboratory test report

The following pages show the laboratory test reports.

Accelerator Australia t/a Remedy Asset Protection
27 Beckett Road
Donvale
VIC 3111



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Arash Mansouri**

Report **1196035-S-V2**
 Project name **ANGAS ROAD BRIDGE**
 Project ID **1776**
 Received Date **Mar 10, 2025**

Client Sample ID			S1-SOFFIT	S2-SOFFIT	S3-SOFFIT	S4-ABOVE DECK
Sample Matrix			Paint	Paint	Paint	Paint
Eurofins Sample No.			S25-Ma0019921	S25-Ma0019922	S25-Ma0019923	S25-Ma0019924
Date Sampled			Mar 03, 2025	Mar 03, 2025	Mar 03, 2025	Mar 03, 2025
Test/Reference	LOR	Unit				
Cadmium (% w/w)	0.01	%	< 0.01	< 0.01	< 0.01	< 0.01
Chromium (% w/w)	0.01	%	0.06	0.02	0.05	0.08
Lead (% w/w)	0.01	%	6.2	1.8	5.6	0.84

Client Sample ID			S5-ABOVE DECK
Sample Matrix			Paint
Eurofins Sample No.			S25-Ma0019925
Date Sampled			Mar 03, 2025
Test/Reference	LOR	Unit	
Cadmium (% w/w)	0.01	%	< 0.01
Chromium (% w/w)	0.01	%	0.05
Lead (% w/w)	0.01	%	0.45

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Cadmium (% w/w) - Method: LTM-MET-3040 Metals by ICP-MS	Sydney	Mar 18, 2025	6 Months
Chromium (% w/w) - Method: LTM-MET-3040 Metals by ICP-MS	Sydney	Mar 18, 2025	6 Month
Lead (% w/w) - Method: LTM-MET-3040 Metals in Waters Soils & Sediments by ICP-MS	Sydney	Mar 10, 2025	6 Months



Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079
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Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554
--

Auckland 35 O'Rorke Road Penrose Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise Mount Wellington Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road Gate Pa Tauranga 3112 +64 9 525 0568 IANZ# 1402
--	--	---	--

Company Name: Accelerator Australia t/a Remedy Asset Protection
Address: 27 Beckett Road
Donvale
VIC 3111
Project Name: ANGAS ROAD BRIDGE
Project ID: 1776

Order No.:
Report #: 1196035
Phone: 0457 555 035
Fax:

Received: Mar 10, 2025 12:40 PM
Due: Mar 17, 2025
Priority: 5 Day
Contact Name: Arash Mansouri

Eurofins Analytical Services Manager : Christina Lowrie

Sample Detail						Cadmium (% w/w)	Chromium (% w/w)	Lead (% w/w)
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	S1-SOFFIT	Mar 03, 2025		Paint	S25-Ma0019921	X	X	X
2	S2-SOFFIT	Mar 03, 2025		Paint	S25-Ma0019922	X	X	X
3	S3-SOFFIT	Mar 03, 2025		Paint	S25-Ma0019923	X	X	X
4	S4-ABOVE DECK	Mar 03, 2025		Paint	S25-Ma0019924	X	X	X
5	S5-ABOVE DECK	Mar 03, 2025		Paint	S25-Ma0019925	X	X	X
Test Counts						5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Lead (% w/w)	%	< 0.01			0.01	Pass	

Comments

Report 1196035-S-V2 (amendment to report 1196035-S) has been issued with results for Chromium and Cadmium in Paint added.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Christina Lowrie
Mickael Ros

Analytical Services Manager
Senior Analyst-Metal



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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