



SUMMARY OF FINAL REPORT

Perth Children's Hospital audit

April 2017



The Building Commission has released a final audit report on some compliance and conformance issues that arose during the construction of the new Perth Children's Hospital (PCH) at the QEII Medical Centre site.

The audit was announced in July 2016 following the discovery of asbestos in unitised roof panels (URPs) supplied and installed by Yuanda Australia Pty Ltd for principal contractor John Holland Pty Ltd. The Building Commission published an [interim audit report](#) in September 2016 on the discovery of asbestos in the URPs.

The final report provides further detail on the asbestos and assesses the remedial work undertaken to ensure the roof panels are asbestos-free. It also examines other issues including those relating to the plumbing system and fire safety. The report explains the probable causes of the problems identified in the audit scope, how they were addressed and whether there is any ongoing concern for the operation of the PCH or the safety of its users. A separate audit is assessing all Yuanda-supplied products and materials installed in other WA buildings.

What was the purpose of the audit?

The audit checked that the items examined in the PCH have been completed in accordance with the plans and specifications; whether the building and plumbing laws have been complied with; and how the building and plumbing standards were applied.

What has been audited?

The audit examined the actions of the registered and licensed contractors John Holland Pty Ltd (builder); Christopher Contracting (plumber); and Philip Chun (building surveyor); and the following issues of public concern:

Asbestos: URPs; the partial collapse of the atrium ceiling; and curtain wall components.

Plumbing: Lead contamination in the water; stainless steel pipe corrosion; and a burst rubber expansion joint.

Fire safety: Aluminium composite panels; and fire doorsets.

Other issues: Vitreous enamel panels; and curtain wall glazing.

What are the final report's key findings?

Asbestos:

Unitised roof panels

- The URPs containing asbestos were successfully rectified and there is now no risk of asbestos contamination of the PCH from the URPs.

The audit reports are available at:

www.commerce.wa.gov.au/building-commission/audit-yuanda-building-products

Partial collapse of atrium ceiling

- John Holland and its subcontractors have repaired or replaced all damaged ceiling panels.
- Plasterboard ceiling panels became waterlogged because John Holland did not ensure the temporary URP remediation works were sufficiently sealed.

Curtain wall system components

- Occsafe assessed all other components that Yuanda (Australia) supplied for the PCH and found no further asbestos contamination.

Plumbing:**Lead contamination in water**

- Water supplied from end-use fittings has not yet been approved by the Chief Health Officer as meeting the Australian Drinking Water Guidelines (ADWG).
- Water supplied to the QEII campus by the Water Corporation contains negligible lead and does not contribute to lead contamination.
- There are four potential sources of the lead contamination:
 1. Lead leaching from fittings in the QEII ring main (fire hydrants etc).
 2. Lead contained in residues in the QEII ring main.
 3. Lead leaching from fittings in the PCH plumbing (brass fittings and taps etc).
 4. Lead contained in residues in the PCH water supply network (residues containing lead from PCH brass fittings and residues drawn in from the QEII ring main).
- Brass plumbing fixtures and fittings in the PCH meet the required standards for lead content.
- Flushing and filtering of water within the PCH has reduced but not eliminated the lead contamination.
- Water and metallurgical testing for lead undertaken by various parties to date allows potential sources to be identified but not the contribution, if any, of each source to the lead detected in the tests.
- Until the source, or sources, of excessive lead is determined it is premature to find whether a registered or licensed contractor has acted appropriately.
- Options to manage the lead contamination are outlined in section 6.4.3 of the report.

Stainless steel pipe corrosion

- Manufacturing defects are primarily responsible for the corrosion in the stainless steel pipes. Water quality may have increased the rate of corrosion.
- John Holland did not contribute to the manufacturing defects that contributed to the stainless steel pipe corrosion.
- Christopher Contracting did not contribute to the manufacturing defects that contributed to the stainless steel pipe corrosion.
- Christopher Contracting should have taken more care to reduce the burrs and the resulting swarf from pipe cutting that a CCTV inspection discovered inside the stainless steel pipework.

Burst rubber expansion joint

- The rubber expansion joint burst due to a failure in the building management system that allowed the water temperature to rise above the manufacturer's specifications. The building management system has now been rectified and the expansion joint replaced.

Fire safety:**Aluminium composite panels**

- The Building Commission is not satisfied that there is sufficient evidence to demonstrate the Haidabond aluminum composite panels used in the PCH meet the deemed-to-satisfy provisions of the National Construction Code (NCC).
- An independent fire expert engaged by the Building Commission considered that the Haidabond panels installed at the PCH meet the performance requirements to avoid the spread of fire for a sprinklered building.
- Philip Chun should have obtained appropriate evidence to demonstrate the Haidabond panels meet the deemed-to-satisfy provisions of the NCC.
- John Holland should have obtained appropriate evidence to be satisfied that the Haidabond panels complied with the project specification.

Fire doorsets

- The fire doorsets initially supplied by Leaderflush-Shapland Ltd did not comply with the relevant Australian Standards to meet the deemed-to-satisfy provisions of the NCC.

- John Holland took appropriate actions to rectify the doorsets to meet the relevant standards. The PCH fire doorsets now meet the performance requirements of the NCC.

Other issues:

Vitreous enamel panels

- A proportion of the vitreous enamel (VE) panels supplied to the PCH were damaged during transportation from the factory in China.
- John Holland took appropriate action to use experienced subcontractors to manufacture and transport the original and replacement panels.

Curtain wall glazing

- No compliance issues were identified with the curtain wall glazing that required remediation.

What caused the lead contamination?

On discovering lead in the PCH water supply, John Holland, Christopher Contracting and the Department of Treasury (Strategic Projects) carried out more than a thousand individual tests from May 2016. The Building Commission has reviewed these test results, to try to identify the potential sources and causes of the lead contamination. Tests were also done for other water chemistry and quality measures.

The audit found the most likely causes of the lead contamination were:

- Disturbed residues in the QEII Medical Centre ring main.
- Lead leaching from the brass fittings and fixtures in the PCH plumbing network.

Test results from January to March 2017 show lead levels in the PCH drinking water steadily decreasing (see section 6.4.2.1 of the report), although there are still intermittent readings above the ADWG for lead. More recent test results show higher incidences of lead than the lowest results reported in March 2017.

What are the report’s recommendations?

Recommendation 1 – Non-conforming products and materials

- The Building Commission recommends the Building Minister’s Forum concludes its current work on the issue of non-compliant and non-conforming building materials and

products, and the establishment of a national regulators forum to coordinate education and compliance activities.

- The Building Commission recommends building contractors implement more thorough quality assurance and quality checking procedures when sourcing materials and components.

Recommendation 2 – Lead in PCH plumbing network

- Perth Children’s Hospital: The Building Commission recommends that the State appoints an independent organisation to review the existing test results and carry out whatever additional tests are needed to determine the proportions of lead that came from the identified sources of lead at the PCH.
- Other new buildings: The Building Commission recommends the Building Ministers Forum requests the Australian Building Codes Board to collate existing test results and commission whatever new testing is required to determine whether lead leaching from brass plumbing fittings is contributing to lead levels above the ADWG in Australian buildings.

What disciplinary action will be taken?

In examining the specific terms in this audit, the Building Commission has not identified conduct by the registered building contractor John Holland; registered building surveying contractor Philip Chun; or licensed plumbing contractor Christopher Contracting; that requires immediate disciplinary action.

Delayed completion, complaints, material failures and contractual disputes suggest that the registered building contractor may have failed to properly manage and supervise the project.

The Building Commission will continue to review evidence from this audit, other inquiries and the resolution of disputes to determine whether any disciplinary action is required.

Contact us

www.commerce.wa.gov.au/
building-commission ☎ 1300 489 099