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Amar, Johari; Rusch, Rosemarie; Armitage, Lynne

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Dr Johari H. N. Amar, Dr Rosemarie Rusch and Associate Professor Lynne Armitage, Built Environment, Faculty of Society and Design, Bond University

Building a case for developing HBIM for heritage-listed houses

Built heritage is at risk from planning and development pressures which place society's economic demands before the values of its communal memory. There are opportunities for this to be ameliorated by using new techniques such the building information management (BIM) approach, whilst still benefiting from some level of statutory protection.

The unsustainability of built heritage management

In December 2021, the Victorian Civil and Administrative Tribunal fined developers \$400,000 and ordered a month's jail, for the overnight demolition of the 159-year-old heritage-listed Corkman Pub located in Carlton, Melbourne on 16 October 2016.¹ Other Councils, including Brisbane City, Northern Beaches and Moreland, have refused applications to demolish heritage-listed houses related to dereliction due to neglect.

These examples show that, despite strong conservation efforts, some developers' desire to achieve the highest and best economic use is compromising heritage conservation through deliberate neglect, vandalism and demolition. For example, while the City of Melbourne won the Corkman Pub case, their proposed reconstruction was deemed not legally sound and instead it was proposed that the Victorian Government should acquire the site for housing development. Due to the derelict nature of their historic fabric, similar decisions were approved for Warriewood and Coburg properties, while Kangaroo Point² is in the process of sympathetic renovation by the purchasers.

A cautionary tale: towards a basis for action

Lobbying and campaigning by heritage stakeholders in the private, public and community sectors have pressured governments to find new solutions to address problems associated with built heritage destruction. For example, following the Corkman Pub debacle, the Victorian Government introduced the *Planning and Environment Amendment 2021*³ to block any new developments on heritage sites for over a

decade where a historic building was illegally demolished in whole or in part, or left to fall into disrepair.

While this reform seeks to end the practice of demolition by neglect, there may be perverse effects on built heritage conservation. Private owners may choose to allow the property to fall into disrepair over this decade period and then undertake redevelopment so meeting their statutory requirements at the loss the heritage asset to the community. Considerations relating to disrepair are also entrenched in NSW planning system under the planning principle in *Helou v Strathfield Municipal Council* [2006] NSWLEC 66 at [43-46].

Frequently, planners and other heritage stakeholders have found that the option of 'left to fall into disrepair' results in historic buildings being rendered derelict partly due to the costs and complexity of retrofitting such building envelopes to meet current planning and buildings codes (e.g., heritage overlays, energy retrofit and fireproofing) and partly due to a lack of techniques for fabrication of authentic construction materials for restoration.

For these reasons, it is now a well-accepted consensus as part of planning and heritage discourse that *historic building information modelling* (HBIM)⁴ should shape the approaches to addressing the issues of demolition by neglect practice discussed above. It has been suggested that by integrating HBIM with planning and conservation processes, historic buildings in the dire condition classed as uninhabitable and derelict could be restored to their original

states. Moreover, where reconstruction is deemed legally unsound, HBIM provides the mechanism to recreate them as a virtual reality museum experience.

Although the Australian Building Information Management (BIM) focus is not on built heritage, there have been some notable success stories for large and significant historical landmarks (e.g. the Royal Exhibition Building World Heritage) and heritage-listed asset and infrastructure sites (e.g. the Sydney Pyrmont Bridge). Consequently, as the demolition by neglect of historic buildings is reaching crisis point, the Australian heritage sector should, without delay, use scientific and technical research to establish a HBIM repository, particularly for heritage-listed houses that are facing unprecedented planning and development pressures and legal challenges. This is why we have embarked on a journey to construct a HBIM framework for heritage-listed houses in Queensland.

Among the many remarkable heritage-listed houses in Queensland, we chose the Japanese House built in 1887⁵ at 92 Cartwright Street, Ingham as our case study. This state heritage building has had a very interesting past.⁶ It was built in Japan, moved to New Farm then Ingham. These moves involved repeated prefabrication, assembly, dismantling and reassembly. The house has survived private, public trustee and communal ownership, resulting in changes to the building façade, materials and services, all compliant with the contemporary heritage and planning frameworks at every stage. Most importantly, however, for this research, was the retention of its authentic Japanese architecture and much of the material fabric, furniture and interior decorative elements.

Embarking on an HBIM journey for heritage-listed houses

The aim of this pilot project was to use Lidar scanning technology to record the existing fabric of this house with the intention of creating a comprehensive framework for heritage-listed and historically significant houses, informed by this first feasibility run. The initial familiarisation scan



Figure 1: Raw images of small sections from the trial scan with insufficient overlap (Source: Authors, 2022)

of the Japanese house used a FARO Freestyle 2 handheld scanner as its portability was useful for the 1,500km trip to Ingham from our Gold Coast base.

Being a small room, the scan took just ten minutes and immediately several methodological problems were evident:

- The lighting was poor because of the design in relation to electricity supply and the lack of overhead lighting was available resulting to insufficient overlap during processing as shown on Figure 1.
- The house was undergoing partial and incomplete reconstructing – highlighting urgency to record the existing fabric.

These concerns suggested the need for a more complete follow up scan for which the owners' cooperation would be needed. Whilst a handheld scanner is adequate for small objects and decorative details, for an entire house, the pilot study confirmed the need for the combination of a large, free-standing scanner and a plan scanner as well as the hand scanner influencing the budget, technical and user capabilities needed.

Whilst the HBIM technology is at an early stage of application and shows great promise as technique for protecting old built heritage, its adoption shares the well-established limitation of needing a commitment of resources to be operationalised effectively. The key points are to introduce the innovative use of lidar scanners and a BIM

approach as a tool to contribute to an archival record for built heritage houses which are often at risk of loss, whether benefiting from some level of statutory protection or not. The additional purpose could also be the improvement of methods for surveying, recording and perceptual monitoring of preservation and restoration of any valuable built heritage. This is in line with Queensland's Government SSP 2017 (Part E), which seeks to enhance 'our community identity and provides valuable insights and connection to the past',⁷ and other planning frameworks such as 2015 *Australian Heritage Strategy*⁸ and 2013 *Guideline: Archival Recording of Heritage Places* prepared under Section 173 of the *Queensland Heritage Act 1992*⁹.

Johari Amar is a lecturer in property at Bond University and has worked in academia and the property industry. She holds a PhD in Sustainable Development, MSc. in Real Estate Management and BSc (Hons) in Land Management and Valuation. Her research interests include built heritage, land economy and sustainable development.

Rosemarie Rusch lectures in Construction Management and leads the BIM/IPD Program at Bond University. She holds a PhD in Sustainable Development and Architecture and has extensive experience as a Building Designer. Rosemarie's research interests are primarily concerned with the sustainable built environment, working in collaborative transdisciplinary research in built environment.

Lynne Armitage is the Associate Professor of Urban Development in the Built Environment group at Bond University. She is a Chartered Valuation Surveyor and holds a Master of Environmental Planning and PhD in Property Market Analysis. Her research interests are centred on people, property and place with particular emphasis on built heritage.

Endnotes

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