

Challenges and Lessons Learnt in Going Large with Passive House

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Much more than just a room, 150 new residences and support facilities at Peninsula campus will provide Monash students with a home away from home. Aligned with organisational objectives, the project will provide a range of modern, high quality residential spaces that are unique to Monash Peninsula; enabling students from around the world to connect, belong, and collaborate in a welcoming and supported environment. The building will be sustainable, enduring and connected.

In May 2017, Monash University embarked on what eventuated to be a landmark project in Australia. A new 6-storey, 150 unit student accommodation building with a GFA of approximately 6,600 sqm at its Peninsula campus was conceived with the intention of providing high quality and sustainable living spaces for its cohort of students living on campus. The project team was tasked with taking on the delivery of what, when completed in January 2019, is expected to be the first commercial scale Passive House building in Australia, if not the South Pacific region.

With an ambitious programme, town planning to contend with, and not to mention a challenging budget, why pursue the agendas of Passive House?

To begin with, some of the University's key drivers include:

- Commitment to Sustainability,
- Comfort, and
- Maintenance

As the project has developed, a lot of focus has been brought on to the fact that the building will be Net Zero ready. Net Zero being the University commitment and strategy to achieve net zero carbon emissions by 2030.

However, prior to the launch of the Net Zero strategy late last year, the University in its guidelines for new buildings called for them to be delivered to an internationally recognised green building certification.

Until recently, the certification implemented at Monash was green star. Turner Hall, student housing at the Clayton campus, designed by the same architects, was a great outcome for the University, and achieved a five star green star certification.

However from a performance point of view, the four new residential halls, all delivered concurrently, have in instances failed to deliver to expectations. Particularly at the peak of summer heat.

Accordingly, the University has recently adopted Passive House as the design standard to which new buildings are to aspire to.

Large-scale low-cost construction in Australia is geared towards a very specific model – exposed precast concrete construction, low cost BCA compliant glazing solutions, a 'just enough' approach to solar control and insulation, and minimal mechanical intervention. Indeed, to deliver Turner Hall within budget and a 16-month program this was the approach followed by the design team and builder. Even though the team was working with the same brief, client, and similar program, a fundamentally different design approach was required for Peninsula. From site master planning and massing to facade detailing,



Turner Hall, Monash Clayton Campus



Peninsula Student Accommodation, Monash Peninsula Campus

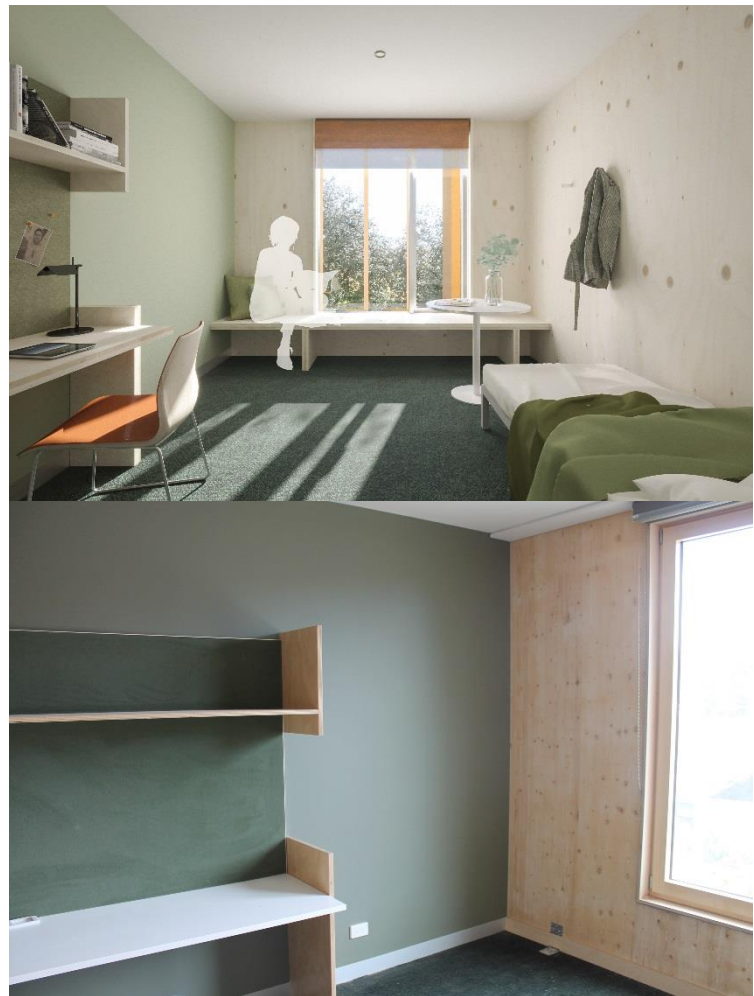
passive house design principles presented robust architectural opportunities not normally afforded in a business as usual model.

Using Turner as a benchmark against which to measure Peninsula, key lessons were learnt including:

- The emphasis on building envelope design and performance required far greater collaboration from the design team than typical construction demands
- That early contractor involvement on large projects ensures buildability and detailing issues are resolved and owned by all the team
- That typical detailing a European model of building in the Australian BCA environment is not without substantial challenges
- That design criteria for Passive House in warm climates needs to be explored further and adapted

From the delivery perspective, Passive House has relied on a greater degree of vigilance and a wider understanding on the details than is typically seen on a construction site. All trades involved in the thermal envelope and the building services have had to have both a holistic understanding of the ideas, physics and tenets of Passive House, but also the interpretation of those at a detail level. The construction management team, the sub-contractors and the consultants have carried out a greater degree of spatial analysis and thoroughly assessed the interactions of each plane, connection and barrier. Using CLT assisted in creating a clear air tight line for the typical floor and allowed for greater concentration on potential areas of air leakage – such as the punched windows. A greater degree of quality assurance and review of the air tight membrane at the ground level and an in-depth understanding of the strategy by the façade sub-contractor, allowed the ground level to be completed to an acceptable degree.

It was recognised that attention needed to be spent in educating the team and ensuring that there was an in-depth understanding of the integrity of the Passivhaus line. This was assisted by regular on site toolboxes and workshops. Creating a full set of details for all penetration types, which the Consultant team reviewed prior to works on site. And constant monitoring of the works on site from the management team, and the Consultants. The sub-contractor engaged to undertake the air leakage tests was engaged early. And provided regular advice and inspections to ensure the integrity of the air seal.



Single Occupancy Unit

Pursuing a performance based sustainable design solution, Passive House, in itself is a lesson learnt for the University. Nonetheless looking closer at Passive House and the lessons learnt in delivering the building from the point of view of the University, the key take away would be occupant education. Being an institution, at times organisational objectives and user expectation can be at odds with one another. With the student accommodation model for Single Occupancy Units being well established, there was no avenue to adapt the product being delivered around the Passive House objectives. Instead, the principles of Passive House needed to be adopted around a well-established product offering. Similarly user education with regard to understanding the heating and cooling requirements, or lack thereof among others have been vital to the success of the project.