ARKit Intro

A. Design & Construction Company –

ARKit is a hybrid prefabrication company combining architectural services, project management and manufacturing. Our prefab buildings can be delivered in a couple of different ways; they can either be flat packed or they can be fully assembled in our factory and transported to site.

I am interested in offering smarter assembly methods using offsite construction methods including, panelised construction, partially assembled buildings or fully assembled buildings.

i. Value adding to material
ii. Partially complete buildings
iii. Complete buildings

Our buildings are highly sustainable, they reduce construction time, construction waste, onsite noise pollution and increasing our build quality by working in a factory environment maintains precision construction and high quality finishes. Big claims I know, however this text is directly from my marketing material☺

We are very much interested in the design response and uniqueness of each site, rather than repetitive manufacturing - offering an inhouse design and construction solution.

B. Prefab Local History

Building prefabrication has been an important contributor to Melbourne's built environment, most probably commencing on an industrious level in the 1850's gold rush period, with the Singapore Cottages which were exported from Singapore globally.

Other more contemporary examples representative of a car manufacturer's assembly line were the steel panelised - Beaufort Homes - developed for the Department of Aircraft Production during the 1940's.

Prefabrication of buildings, whether in components partially assembled or a full volumetric build are an accepted alternative to traditional construction in Japan and across Europe. Within Australia there has been a rapid expansion in the past 10 years. This has been recognised by the recent assembly of PrefabAUS. PrefabAUS is Australia's hub for quality offsite construction. It is a new non-profit organisation dedicated to showcasing and advancing Australian building prefabrication through representation, collaboration, innovation, education and advocacy.

C. 5 x 4 - Design Response

The Team

ARKit
The Barley Store
GHD
UoM
Peter Felicetti

Design Overview / Conversations

The architectural response to this very compact inner city site was to deal with it in a pragmatic way – introducing verticality reflecting the visible skyline of Melbourne. It is hoped that this project could also engage with broader discussions including;

1. How best to reduce emissions of greenhouse gases associated with the operation and construction of homes.

2. To provide a viable solution to Melbourne's [and similar cities] increasing population growth, by providing low impact, low cost residential buildings to assist in densification of urban areas and manage urban sprawl.

3. Demonstrate to consumer and property developer markets that sustainable solutions are attractive, affordable and can contribute to reducing greenhouse gas emissions from buildings.

4. Demonstrate through good design that you can build and operate residential accommodation which is self-sufficient in energy requirements, water requirements and waste manage.

Stair circulation slide

Given the constraints of the site and size of the building, movement around and within the spaces is an important function of the design and various design options were explored to ensure compact efficient circulation.

The engineering for the project will be very much an integral part of the design and will be on show highlighting the performance of the building and will not be concealed by internal linings. This will be the case for the structural engineering as well as the environmental engineering.

Review floor plan and architectural slides

This will also be the first project of its size in to follow the One Planet Living 10 guiding principles for sustainability

D. OPL

OPL Slide

OPL Principles and Objectives

The main objectives of OPL are to provide an easy framework for sustainability in order to reduce our ecological footprint to one planet rather than the current footprint of 4 planets for the average Australian.
It considers 10 principles for our built environment and how new projects can respond to;

Zero Carbon
making buildings more energy efficient and delivering all energy from renewable technology

Zero Waste
reducing waste, reusing where possible, and ultimately sending zero waste to landfill

Sustainable Transport
reducing the need to travel and encouraging low carbon modes of transport to reduce emissions

Sustainable Materials
use low impact construction materials and encourage the sale and purchase of sustainable products, with low embodied energy

Local and Sustainable Food
choosing low impact, local, seasonal and organic diets and reducing food waste

Sustainable Water

reducing water usage in buildings and in the products we buy; preventing flooding and pollution

Land use and wildlife
protecting and expanding existing natural habitats and creating new space for wildlife

Culture and Heritage
reviving local identity and wisdom; supporting and participating in the art and cultural activities

Equity and local economy
creating local economies that support fair employment

Health and Happiness
creating communities that promote health and wellbeing

5 x 4 OPL Response

A workshop was carried out early in the design stage with GHD, the client and Bio Regional, to identify how his project could respond to the OPL 10 principles. This outcome would then form the basis of an Action Plan to implement into the project.

Zero Carbon

I've borrowed a few slides from Tai Hollingsbee of GHD to better describe the Zero Carbon application strategies for the 5x4 Project.

Tai slides

a. Neutralise the Building Envelope Gains
b. Multimodel operation – sealing of the envelope

Sustainable Materials

As part of the design stage ARKit considered a variety of possible materials for the building including its structure, internal and external materials and insulation. All materials that were selected as part of the material matrix were currently commercially available locally.

Dr Robert Crawford took our matrix of possible materials analysing 11 different floor assemblies and 52 different wall assemblies, calculating the total life cycle embodied energy of each system. The conclusion of this study enables me, as architects to confirm the selection of materials based on a ridged analytical approach.

E. Conclusion

With the idea of a foot print of 5m x 4m in mind, I would like to end on the question of - how small of a residence is liveable?