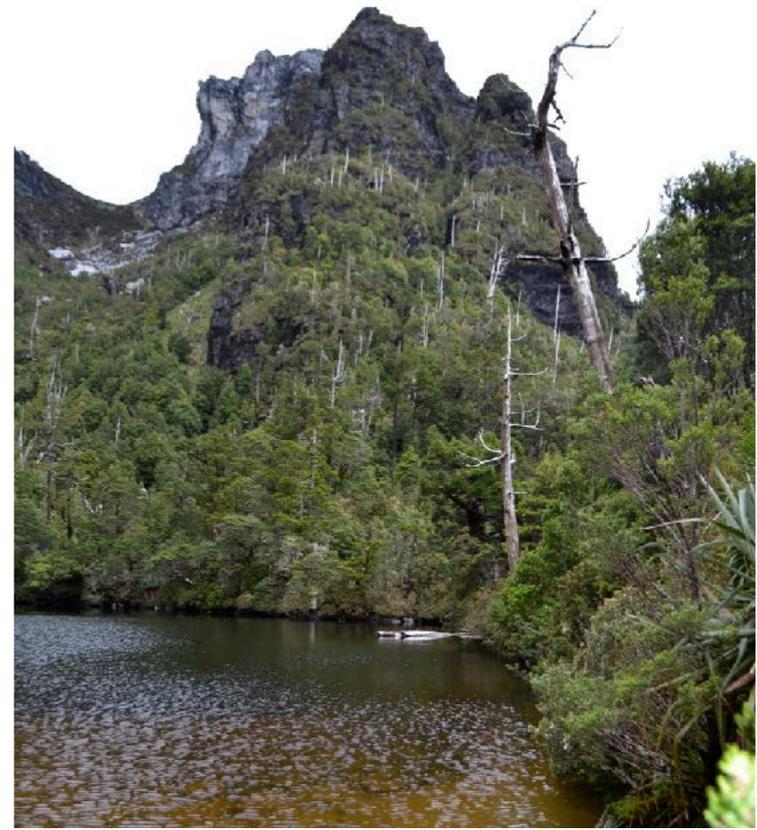


Master Builders' Association Awards – Energy Efficiency

A Walkers Hut For FRENCHMAN'S CAP

Design: Green Design Architects
Building Systems: Warren French Architect
Contractor: Valley Workshop.



The Site



The Ute

How we built what we built at Frenchman's Cap - a location that has been described as Australia's most remote.



Floors and roof are the tricky bits. These are not the Tahune ones, but similar. Panels 2.4m wide and up to 12.0m long. Weight /m² approximately 27kg/m², or a 10.34 m panel @ 2.4m weighs 900kg



We practiced Elsewhere.

East Coast build, 2016. Designed by Warren French
Architect

Practice

cont...prefabricated
in the workshop, flat
packed, design
freedom, hyper
insulated, reduced
time onsite, low
carbon, low impact





An eSIP by Valley Workshop, Not the typical SIP

Interlocking ply and timber grillage, ply skins, Knauf bulk insulation from recycled glass, the grillage not the insulation is structural. The insulation is sandwiched between two skins of ply, thus reducing thermal leakage. Outer skin of the eSIP is Tasmanian Hardwood structural ply. The manufacturing of plywood makes use of smaller diameter logs that are problematic in the forestry and would otherwise be wood chipped. As far as we know these are the only SIPs available in Australia free of polystyrene. Designed by Warren French Architect and Frontier Engineers, engineer certified, built by Valley Workshop. R values floor and roof – R7.34

At Tahune

“Crane Truck’ was different. Site access was a problem. Weather windows were short. Meticulous planning was required.





Building
site

Lake Tahune, Frenchman's Cap

The climate Zone is 8. The project had to be delivered in a weather window of opportunity between the summer months of January and March. It rains and snows for over 300 days a year. Prefabrication and flat packing was essential. Low impact, low maintenance building materials. High thermal properties of the building systems were a project brief. Sustainability and thermal performance and flat packing was our area of expertise.

Emerging New Technology – Home Grown in Tasmania, eSIPs!



Stage 1 – We waited for the weather window. Finally it came on the 19th January 2018. Longlining floor eSIPs and prefabricated wall modules in to site. Time to reach sub-floor 3 hours onsite. Thermal Properties of eSIP floor Panels – **R 7.34**. We are double the R value of a conventional bearer and joist floor system. Zero waste onsite for this stage. Materials for this product are sourced locally in Tasmania. Low carbon miles.

<https://youtu.be/2h-U8oXAUIg>

Innovation – prefabricated, bespoke design, flat packed wall modules, design freedom.



Stage 2 - Standing walls. Walls are built in the Westbury workshop and windows, permeable membrane, cladding and trims and all done in the horizontal plane in the workshop. Onsite the walls are erected into position. Windows are triple glazed and very heavy. No mechanical lifting was available on this site. Wall jacks had to be 'invented', after watching YouTube videos from USA. Condensation control within the structure of the wall module.



Taking shape.
Time onsite to get to this stage from footings – 1 day

A harsh site is Lake Tahune



Sunday January 21st 2018 temperature is 37 degrees by Wednesday 24th January we worked in snow.



Stage 3 – 4th February 2018 Placing roof panels Starting to look like a real building. Time to manufacture roof panels in Westbury workshop 2 weeks. Time to place roof panels – 3 hours. Helicopter pilot placed the 900kg panels within 100mm of each other from 70m in the air.

R Value of roof panels 7.64

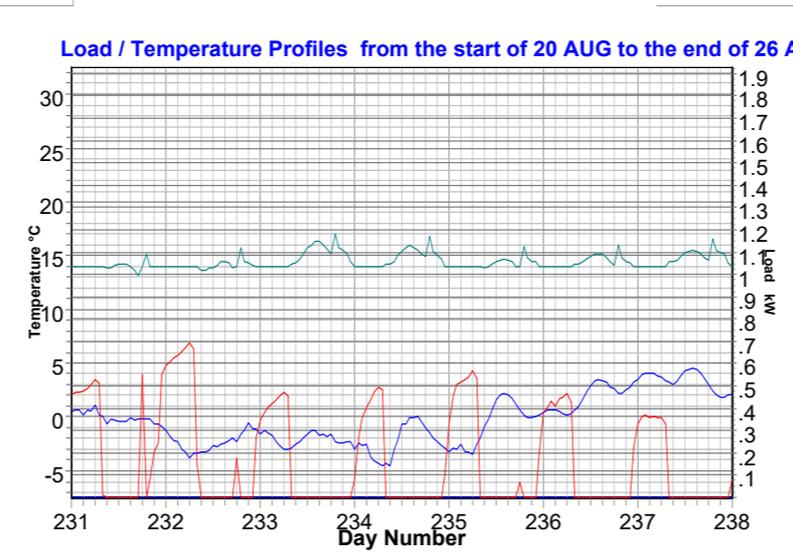
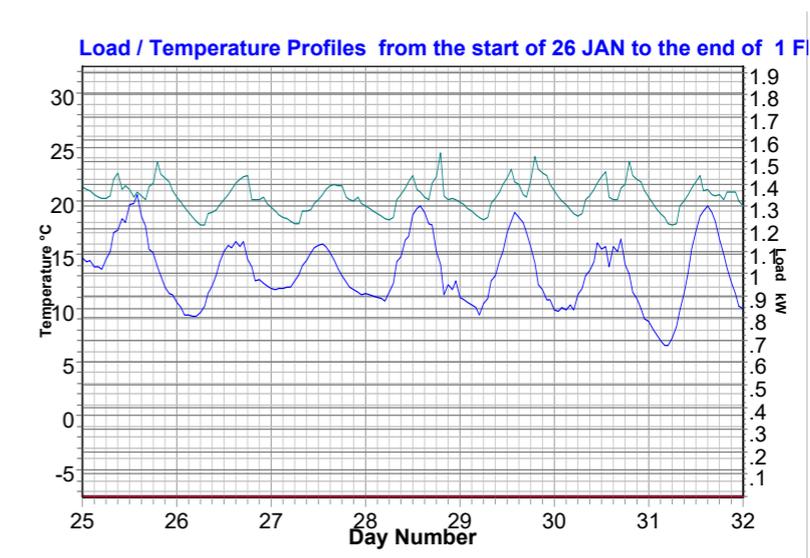
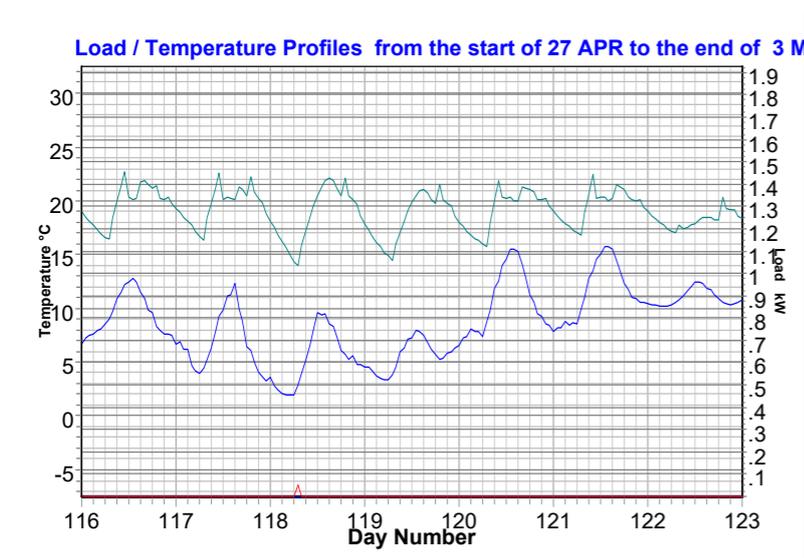
Insulation (as roof system).

Air film external	R .04
Cladding	R .00
Sarking foil	R .05 (
Air film cavity	R .24
Panel skin top	R .05
Panel insulation	R 5.4
Panel skin bottom	R .05
Foil barrier	R 1.4
Air film cavity	R .24
Ply lining	R .05
Air film internal	R .12

TOTAL R 7.64

Energy Efficiency due to Internal Gains from Hyper Insulated Structure

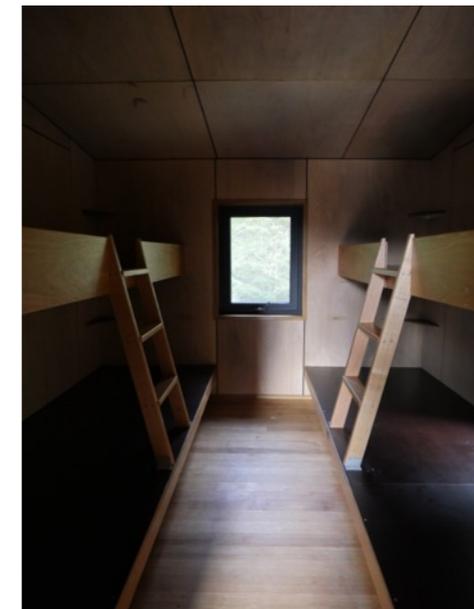
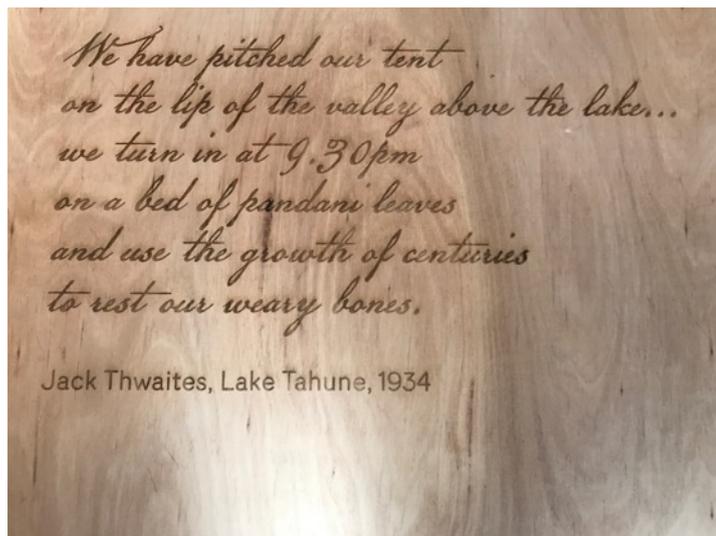
Graphs show: Internal temp (green) external temp (blue) and heating load (red). The temperature scale is on the left and the heating load is on the right. There is a cold winter week, an autumn week and a warm summer week. You can see for this cold week in winter that the heater is able to keep the room above 14deg as required, without going over the 0.7kW (700W) capacity. The heater is barely required through autumns/spring and not at all in summer to keep it above 14 deg. Also note that this is based on 6 people being in the building. With more people there would be less heating required. Less people, more heating required. (Ref: Steve Watson B.Env.Des. B.Arch., PhD @ RED Sustainability)



Stage 4 - Hut to completion

The final phase of the 24 bed, 60m² hut included 45m² decks, tank stand, cladding for bush fire attack level around footings and internal linings. Whilst all the structure and joinery was prefabricated offsite and flown in via helicopter flat packed, the footings, decking, tank stands etc still required onsite work to be conducted. **The time to deliver the structure was 4 days onsite.** The project required meticulous planning from our team, the PWS team and helicopter pilot. We estimate **we saved 8 weeks of time onsite** and approximately **6 helicopter mobilisations** due to our flat packed building systems.

Date for completion 26th March 2018.



Summary

The project at Lake Tahune realized the benefits of our flat packed timber building systems, their efficiency onsite, sustainability and their high thermal performance. The building has a 9 star rating. Condensation is managed through our building systems and via a heat exchange system. R values are Double that of a conventional building due to the eSIP panels.

The main people

Warren French –
Architect/Builder



Penelope Haley - Director



Andrew -
Foreman/Carpenter



Alistair - Carpenter



Kayden 1st year
carpenter apprentice,
Charles – workshop
fabricator

Jesse – 4th year carpenter
apprentice



Justin - Carpenter



PWS helicopter riggers



Shift 4 – March 2018



Opening of the Hut

- On Wednesday 11th April the hut was officially opened by Hon. Will Hodgman and Dick Smith in Hobart.
- We pulled it off, on budget and on time and we had a happy and relieved client.



Executive Summary

- Valley Workshop submitted an alternative tender for the 67m², 45m² of decking and 24 bed bushwalkers hut using our building systems. The architect and engineered systems that were being proposed in the tender documents were a prototype. We won the tender for our alternative system. We had experience. Our system had been tried and tested and was not a prototype.
- The 67m² hut was Prefabricated off site in our Westbury Workshop. It was flat packed and helicoptered to site in packs around 800kg. Saving time onsite in a remote and sensitive environment.
- Warren French Architect kept the building the same but re-designed the structure using our eSIP panels and our prefabricated wall module system
- Time onsite to get to lock-up including delivery by helicopter - 4 days.
- By lock-up stage we had just two bulker bags of rubbish to remove from the World Heritage Area. Minimal environmental impact in a sensitive site.
- High R values of the floor and roof panels. Insulation is sandwiched between plywood skins thus reducing thermal leakage. Floors R 7.34, Roof R 7.34. This is double that of conventional bearer/joist, batten/rafter system.
- Footings were a pad footing. Aggregate and cement was helicoptered in to site. Reduced embodied energy in the foot print of the building.
- Structural skin of the eSIP floor and roof panels is bought locally in Smithton. Through the supply chain we are supporting local Tasmanian businesses and sustainably managed forestry practices.
- Linings of the hut are also Tasmanian Hardwood structural ply. Oiled using Livos White Oil.
- Water is retained by a 5000l tank. A water treatment system located away from the lake, includes a grease trap, bio filter, dosing tank, and sand filtration. This treats the water used by occupants with minimal environmental impact and is low maintenance.
- Triple glazed PVC windows. Large windows are north facing to enhance comfort for the occupants.
- Condensation is managed through recessed drip lines in the wall structure, permeable membranes and a heat exchange system to maintain ambient temperature.
- The hut has a 9 Star rating.
- Expected life span of the hut is over 100 years
- The hut has large north facing windows (true north) and cross ventilation
- Renewable energy - The hut relies on the internal gains (heat given off by occupants, cooking and sunshine) of the hyper insulated structure for warmth. Electricity is generated by renewable energy, an off grid mini-hydro system. A 700 watt heater provides extra heating in winter and is rarely required. Electricity is also used to run the heat exchange system to control condensation. The dump load electricity goes to a heated towel to dry bushwalkers dirty socks.
- Project was delivered on time and on budget. A satisfied client. A building for the general public to enjoy
- Benefits of our systems – we've practiced, reduced thermal leakage, high R values, made in Tasmania using local timbers, supporting sustainably managed forestry practices, condensation control in timber structure, reduced time onsite, reduced waste, light weight, low embodied energy.

