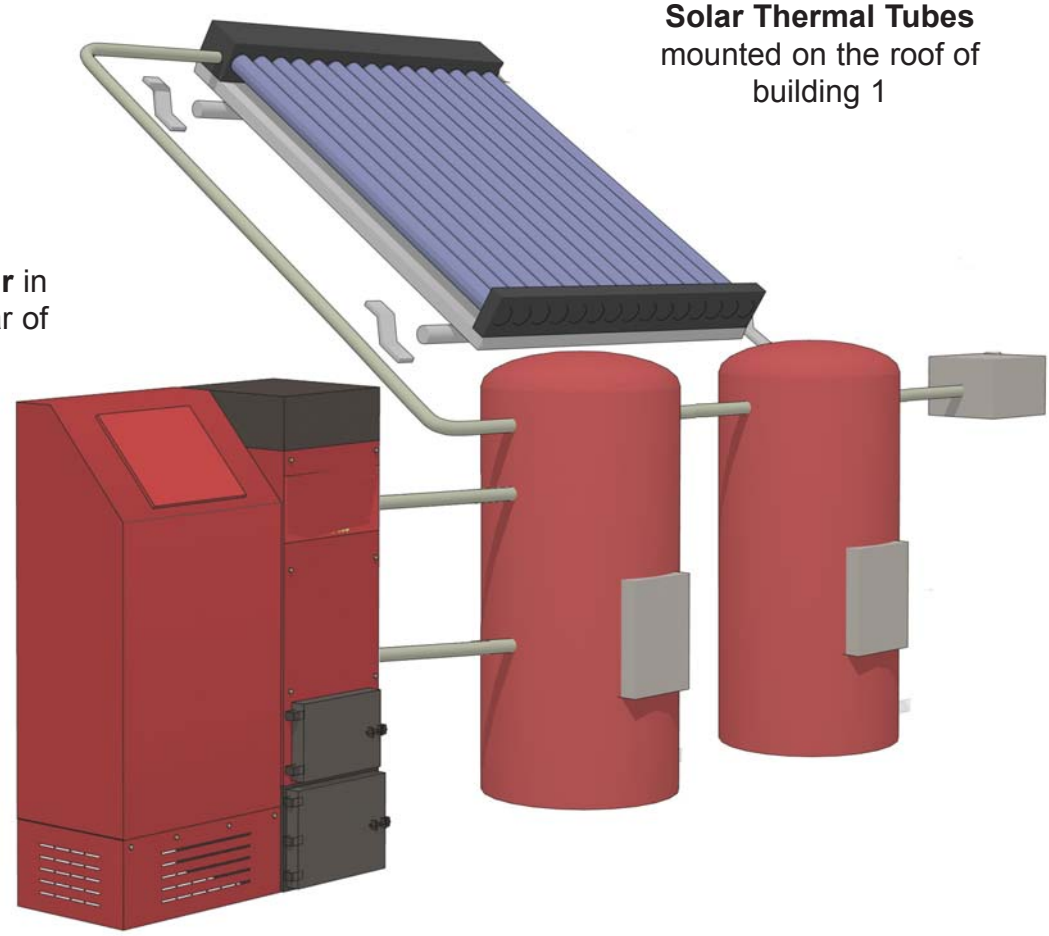
Solar Hot Water

Solar Thermal Tubes
mounted on the roof of
building 1

Wood pellet boiler in
boiler house at rear of
building 1

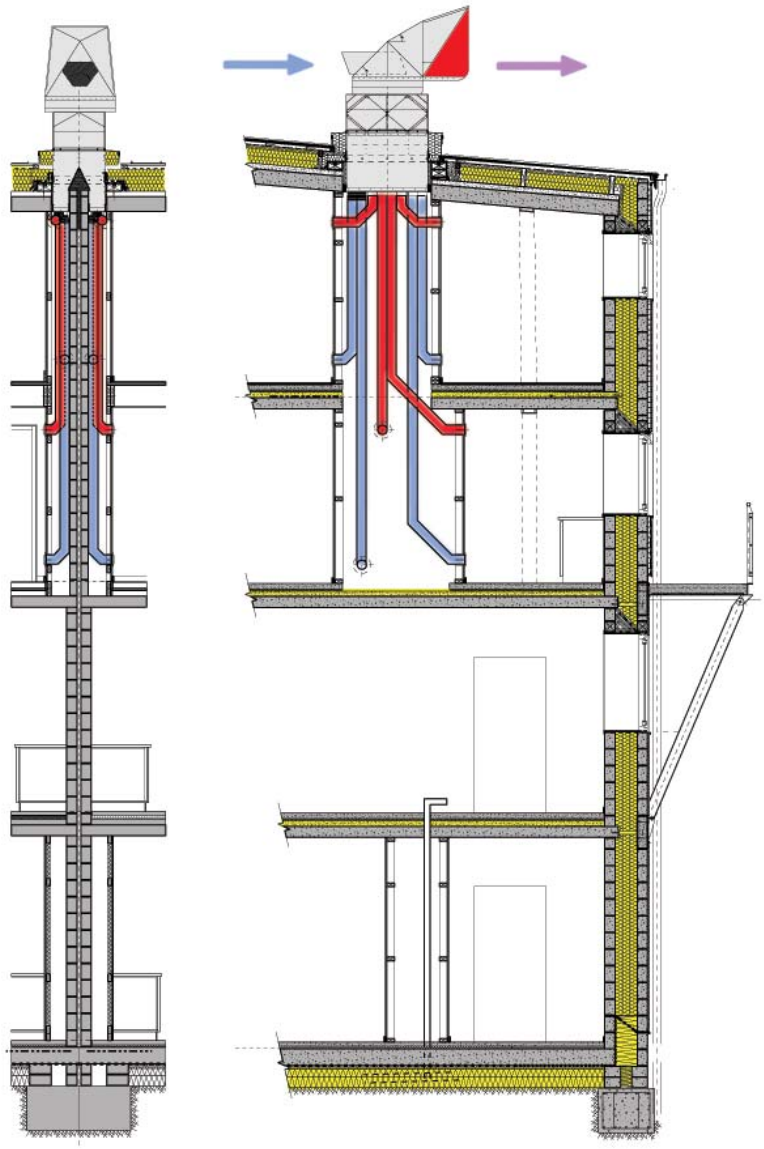


Solar assisted hot water

Hot water at Jubilee Wharf is provided by **Solar Thermal Tubes** mounted on the roof. There is one panel per dwelling which uses the suns energy to heat water. The communal **Wood Pellet Boiler** which provides underfloor heating to the workspaces also provides top up hot water to the private dwellings in winter.

The evacuated tubes are similar to a light bulb in which the air has been removed so that radiant losses are reduced. This means even if the air is at -1^{0}c as long as the sun is shining water will be heated by the tubes

Wind Cowls



Passive ventilation

At Jubilee Wharf the building fabric has been tested to 2 air changes at 50Pa making fresh air supply non conventional

To provide enough fresh air during the winter months (when you want to keep all the heat in the building) a passive heat exchange wind cowl is used.

As this is a passive system it uses no electricity and is highly reliable by providing fresh air at low level and extracting air at high level when the temperature of the air in the room has risen. This form of ventilation is called displacement ventilation and is the main driving force of passive ventilation systems.

The cowl turns to face the wind drawing fresh air in via a heat exchanger which warms the incoming air with the outgoing air. The heat exchanger is around 80% efficient and minimises heat loss from the building yet provides a constant supply of fresh air.

Wind turbines

Electricity Generation

The 4 6kw Proven Wind Turbines mounted outside building 2 provide the majority of the electrical demand for the development. the electricity is primarily used in the buildings, at times of excess production they export to the grid and at times of high consumption electricity is drawn back from the grid. The buildings here at Jubilee Wharf have the capability to at a future date to be installed with enough renewables to cater for both of the buildings during the course of the year providing a net zero carbon production. The turbines do not have a braking mechanism in case of high winds, the turbines which are mounted downwind, have a spring loaded furling mechanism always producing the optimum amount of electricity even in heavy storm conditions.

Reclaimed Materials

Cafe flooring

This is made up from a reclaimed dance studio maple floor. the tongue and groove floor was carefully dismantled , dried and remachined when necessary so that it could be fixed down on battens. The floor is heated by an underfloor heating system. A series of tubes have hot water pumped through them and transfer heat up through the boards.

Ceiling of Yoga space

The ceiling is made of reclaimed floorboards from a victorian house in Putney, London. The boards have not been changed but have been treated and cut to length.
All reclaimed materials were provided by Bioregional Reclaimed.

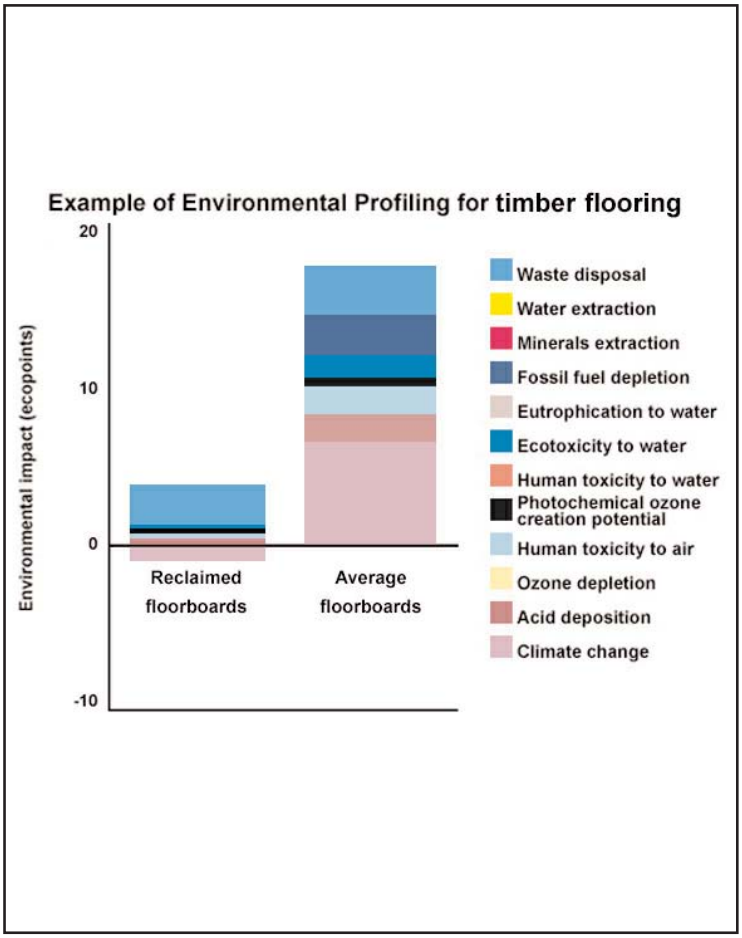
Reclaimed Materials

Granite Quay

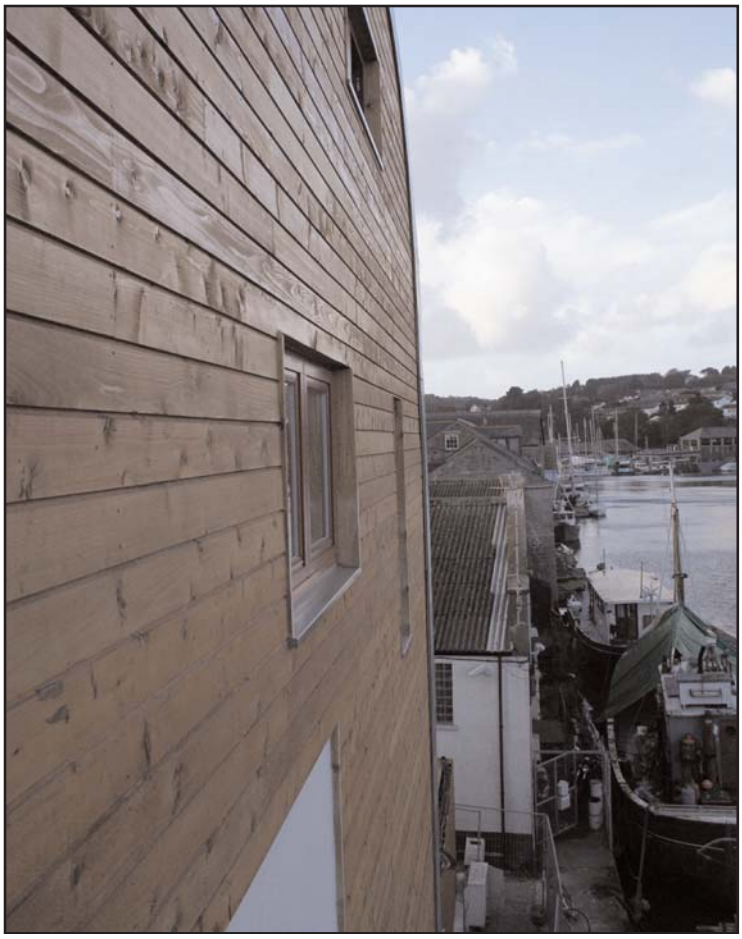
The granites around the site, to the stairs and the quay edge are kerb stones (the kerb stones on the pavement to the site are also reclaimed rather than using the new thinner kerbs seen on the rest of commercial road). These kerb stones were reclaimed from Lewisham, London, but were originally local Cornish granite. To use new Cornish granite would have been prohibitively expensive and to have it imported would have had a large ecological cost. As can be seen with Jubilee Wharf it is important to use local materials whenever possible even when they have to be brought back home!

Why reclamation works

The graph to the right shows the difference in environmental impact between reclaimed floorboard and an average new floorboard. The chart shows that reclaimed boards actually have a positive impact on climate change compared with new floorboards.



Local Materials



Weather boarding

The weather boarding is western red cedar sustainably harvested (FSC) from Duchy of Cornwall land. This was then machined by Tino Rawnsley Woodland Products based in Wadebridge.
Western red cedar is a hardy timber that is ideal for maritime applications but does grey silver when exposed to the sun. It was decided to treat all the timber to give it the same appearance rather than a patch work of differing colours depending on its exposure to the sun.

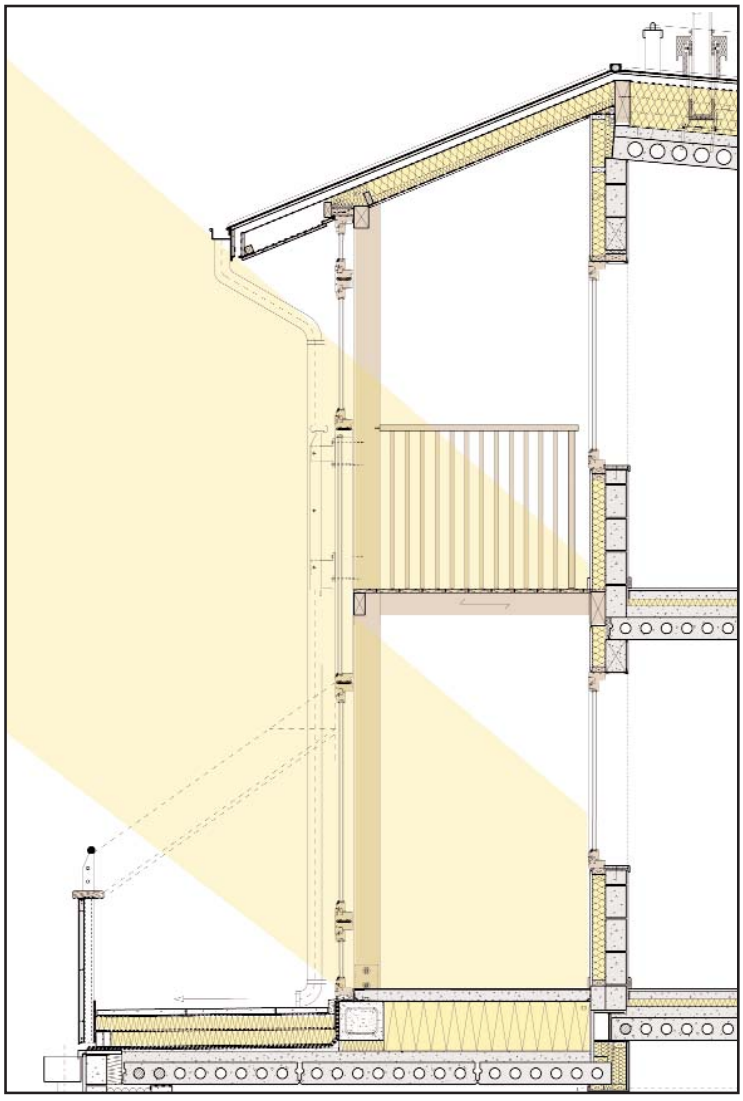
Ladds paving

Whenever reclaimed or recycled materials cannot be used it is always best to use a local product.
All paving slabs on the site were provided by ladds based in Redruth. As they use local materials the paving slabs fit into the local environment. Ladds also provided the concrete stair to building 2.

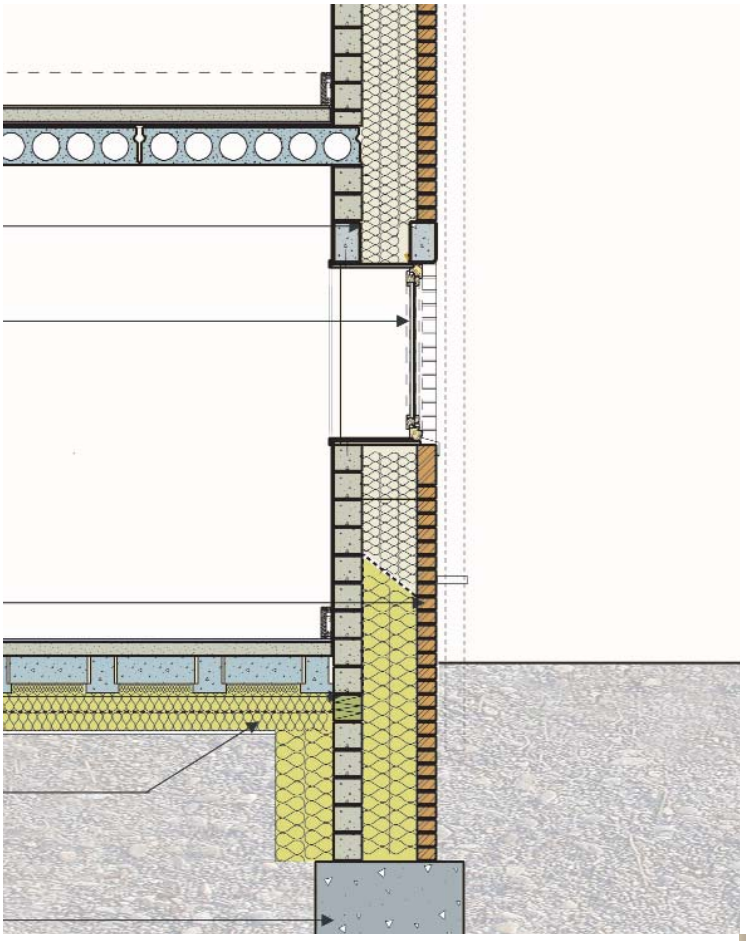
Sunspaces

Solar orientation

South facing homes have lower winter fuel consumption than East West facing units. High performance windows ensure that large areas of glazing can be used to give excellent daylight and good solar gain (with shading on South facing windows to prevent summer overheating)
With a southerly aspect incorporating a sunspace, it is possible to build solar homes that maximise the use of passive solar design to such an extent that no conventional heating system is required.
Any glazing to the South, can achieve a net gain in energy over the year, whereas North facing glazing a net loss. Hence the emphasis on orientation for large glazed openings.
On very warm days, the inner doors can be closed and the sunspace acts as a ventilated bufferzone to shield the home from extreme temperatures.
Experience has shown that these spaces not only provide warmth, but considerable amenity value, and a substantial increase to the sales value.



Building Fabric



Super-insulation

By providing a superinsulated, highly airtight building the home minimises heat loss.
Any heat generated within home from domestic activity is kept and stored in the thermal mass (all the exposed dense materials e.g. concrete) This heat is then released slowly into the room on cloudy days or during the night when domestic activities cease.

ZEDstandard typical wall, floor and roof construction has a U value of 0.1W/m2/k. This means that if it is freezing outside and a normal room temperature of 20deg.C inside, a square metre of wall, floor or roof will only loose 2 Watts of heat to the outside. (A typical adult male gives off 106W of heat, a woman 92W and a cat 16W!)

High air-tightness

Once superinsulated the biggest heat losses from a home are due to ventilation. Ventilation is required for breathing, moisture control and odour control. The building fabric at Jubilee Wharf is made airtight by the use of wet plaster being applied directly to the block walls, care is taken to make sure that the plaster meets the screed floor at the bottom of each wall. (in most buildings the plaster does not reach the screed and is covered with a timber skirting board which does not provide the airtightness required) With high airtightness acheived the ventilation of the building can be controlled via a heat exchanger to further minimise heat loss.