Mole INVISIBLE STUDIO

Stage 4 Consultation
May 2021

Stores Development, Haddenham
Forest School Camps
Registered charity no. 306006

30/04/2021

Contents

0 Introduction

This document sets out the current design and puts forward proposals for finishes and fit out of the interior spaces. We have also set out questions for each of the spaces, and made suggestions for items that FSC might want to make themselves.

The outcome of this consultation is to ensure that the proposed buildings will work well for the Stores volunteers; to confirm the specification to be used for technical design; and to clarify what needs to be included in the tender package.

Approach to sustainability

Our approach has been to steer a path between best value, low maintenance, durability and sustainability. The building is designed primarily to be efficient in its use of resources. It sits above the ground (using less concrete than a ground bearing slab) on a steel frame, and while steel is a relatively carbon hungry material compared with timber, it is robust, durable and cost effective, and allows a very light weight timber framed infill for the insulated spaces.

Using timber frame for the primary structure would potentially be around £50,000 more than a steel framed and also be less easily suited to allowing free open spaces with no intermediate supports and high level suspended storage.

We have looked carefully at designing a building where materials last a long time, and recommend fibre cement cladding which is typical of many agricultural buildings in the fens, and, importantly, lasts a very long time with minimal maintenance. In the scheme of the overall carbon footprint of the building, there is tiny percentage increase for fibre cement over timber cladding, with an exponentially large gain in lowering maintenance and increasing longevity.

The building has been designed with high levels of daylight reducing the need for artificial light. The lantern adds an opportunity to naturally ventilate and dry the tents, avoiding the need for any supporting mechanical systems.

Site plan

The planning permission for the whole site includes the demolition of all the buildings on the site (excluding the bungalow), and the construction of two new buildings.

The “Big Roof” is the main focus for this stage of the project, and will replace the Long Barn and Hut 42. It will provide 340m2 of storage space; a covered area for working in and hanging tents to dry; and social spaces for eating together and running training sessions.

The “Little Roof” can be constructed later, and will replace the East and West End workshops.

The planning permission also includes for Building 6 to be taken down. This could be done once the Big Roof is complete, when it won’t be needed, and will free up space around the entrance to allow a new delivery area directly adjacent to the main storage area.

Phase 1:
Demolition of Long Barn and Hut 42, to be replaced with the Big Roof

Phase 2:
East and West End workshops to be taken down and replaced with Little Roof. Building 6 taken down and delivery area reconfigured

1 External appearance

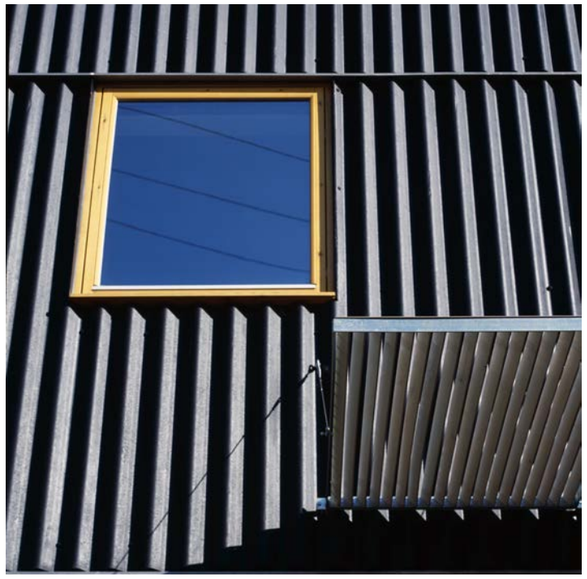
The Big Roof is based on the typology of the agricultural buildings in the area, but its distinctive features mark it out as something rather more special. A dramatic lantern marks the entrance to the main work space, and provides the height needed to hang tents to dry above the working areas. Large sliding barn doors clad in translucent panels will provide light to the storage areas. Oversized gutters provide protection at the edges of the building and become a feature in their own right.

Cladding Options

Fibre cement

Fibre cement cladding is made from a mix of Portland cement, limestone filler, cellulose fibre and pigment. It is a very commonly used material for agricultural buildings as it is inexpensive, extremely durable, non-combustible, robust and requires very little maintenance. At the end of the building's life it can be re-used or recycled.

Durability: 50+ years
Embodied carbon: 13.9 $kgCO_2e/m^2$
Maintenance: Minimal
Cost: low



Timber cladding

Timber could be used to clad the walls. Depending on the species it can be left to weather naturally to a silver grey, or treated to improve durability and add colour. As the east side of the proposed building is highly shaded, it is unlikely this would weather well if the cladding was left untreated.

Durability: 25-50 years (dependant on species)
Embodied carbon: 8.6 $kgCO_2e/m^2$ (estimate)
Maintenance: Retreatment once every 2-5 years
Cost: medium

Corrugated metal

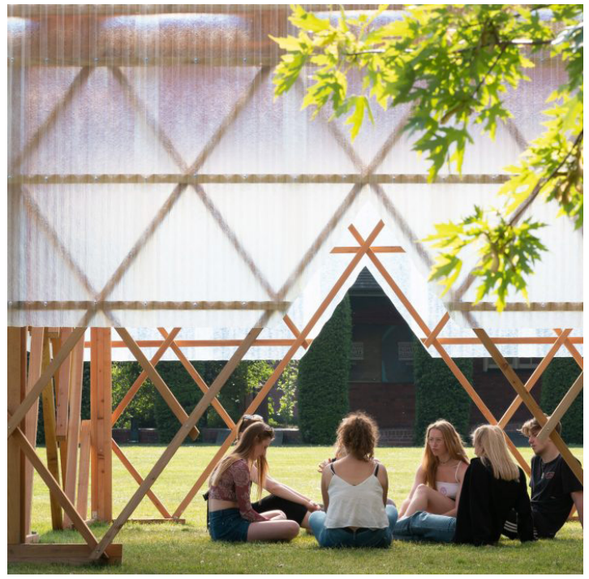
Another common material for agricultural buildings, consisting of galvanised steel sheets with a painted or powder-coated finish to prevent rust. It is also a common choice for agricultural and industrial buildings, although not as long-lasting as fibre cement.

Durability: 20+ years
Embodied carbon: 14.2 $kgCO_2e/m^2$
Maintenance: Recoating 8-12 years
Cost: low

Translucent fibreglass

Corrugated fibreglass sheets can be used in conjunction with metal or fibre cement panels to provide daylight. They can be installed on both the walls and roof, and have a high impact resistance.

Durability: 50+ years
Embodied carbon: 12.2 kgCO2e/m2
Maintenance: Cleaning annually
Cost: low



Recommendation:

We are proposing to use black corrugated fibre cement cladding with fibreglass panels as the main cladding materials for the walls and roof. We think this is the most appropriate option for the project, as these materials are extremely durable, robust and low maintenance. They will last the whole lifetime of the building and will continue to look good in spite of the exposed nature of the site.

We have reviewed the embodied carbon of these different materials. The cladding will only constitute a small percentage of the overall impact of the building. The benefit of fibre cement is that it will not need to replaced, which would lead to an addition carbon 'spend' later in the building's life.

Construction system

Structural frame

The proposed buildings are based around the use of a standard agricultural steel frame, to provide the floor area and spans required in a cost-effective way.

External cladding

Corrugated fibre cement panels with translucent fibreglass panels to provide daylight in the storage areas
Sliding barn doors allow the work and storage areas to be opened up on stores weekends

Foundation and Floor construction

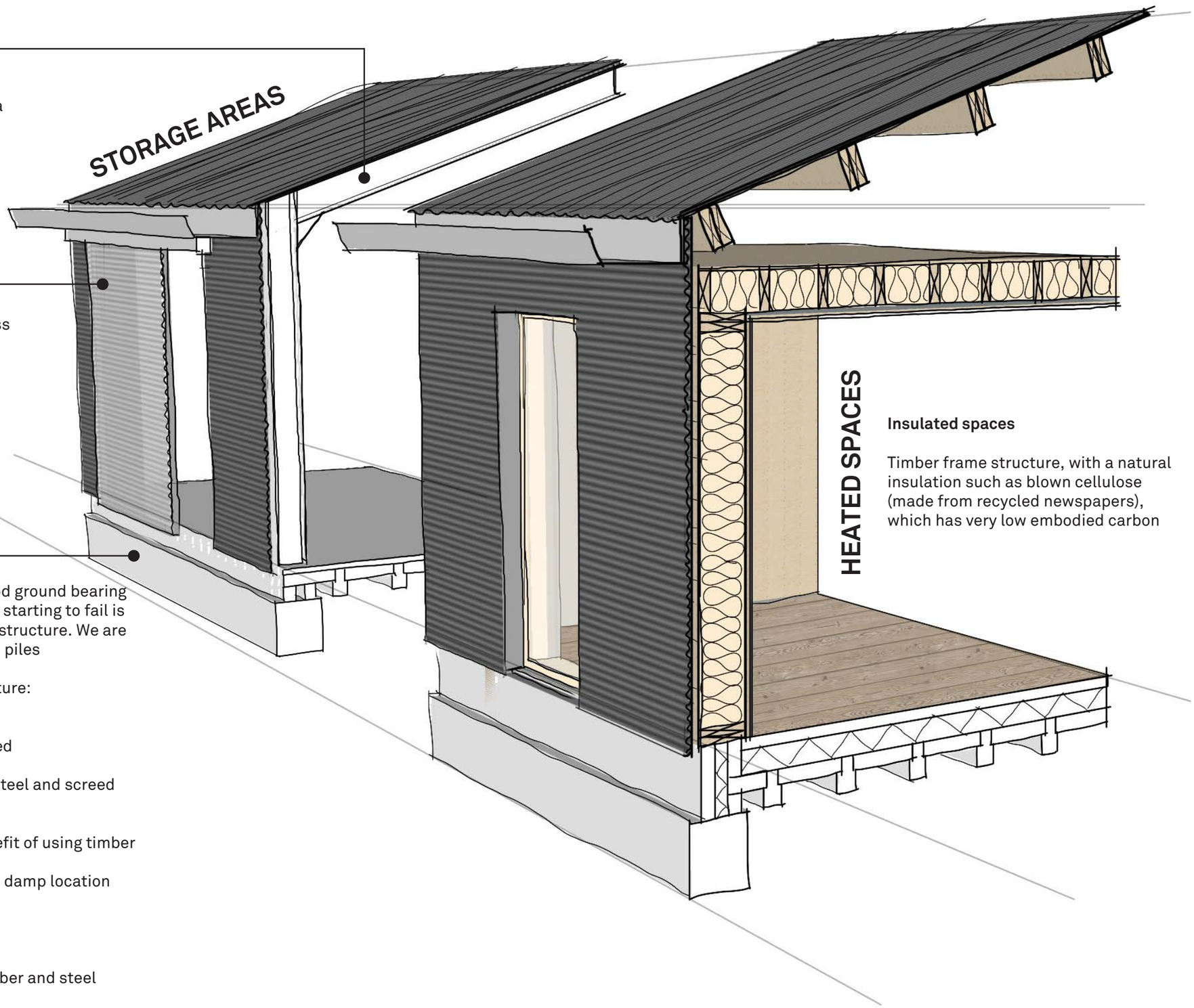
Pile foundations are required, as the site doesn't have good ground bearing capacity. Part of the reason why the existing buildings are starting to fail is because their foundations are insufficient for a long term structure. We are reviewing options to minimise the embodied carbon of the piles

Three systems were considered for the ground floor structure:

Reinforced concrete slab
- Most expensive and high embodied carbon so discarded

Timber joists spanning between steel beams, composite steel and screed deck over to provide a robust floor
- Slightly more expensive than beam and block
- Similar embodied carbon to beam and block - the benefit of using timber is outweighed by the steel beams and composite deck
- Lifespan difficult to guarantee due to using timber in a damp location

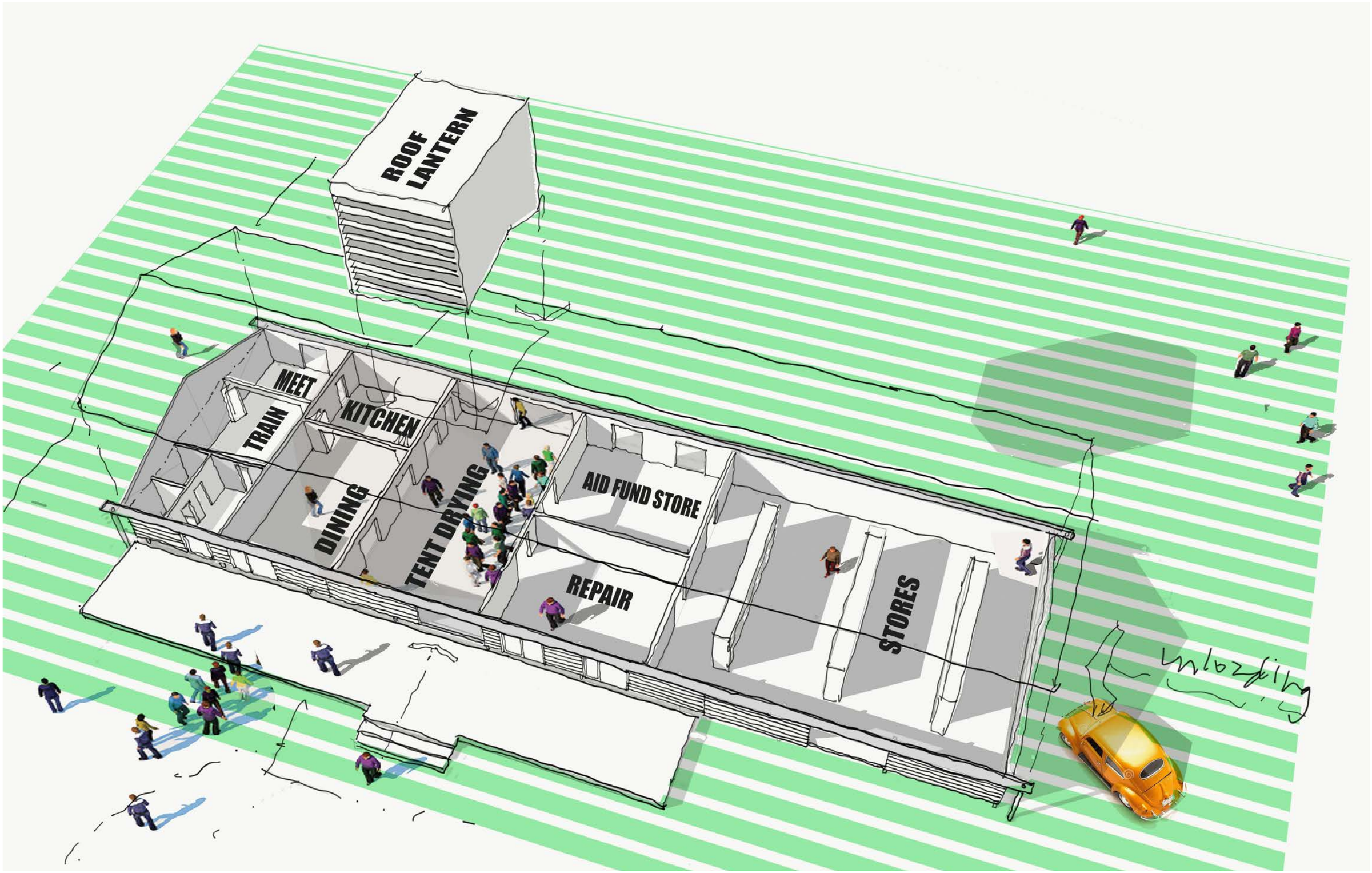
Beam and block (recommended)
- Cheapest and simplest option to construct
- Durable and robust
- Embodied carbon cost is not much higher than the timber and steel option, and can potentially be reduced further



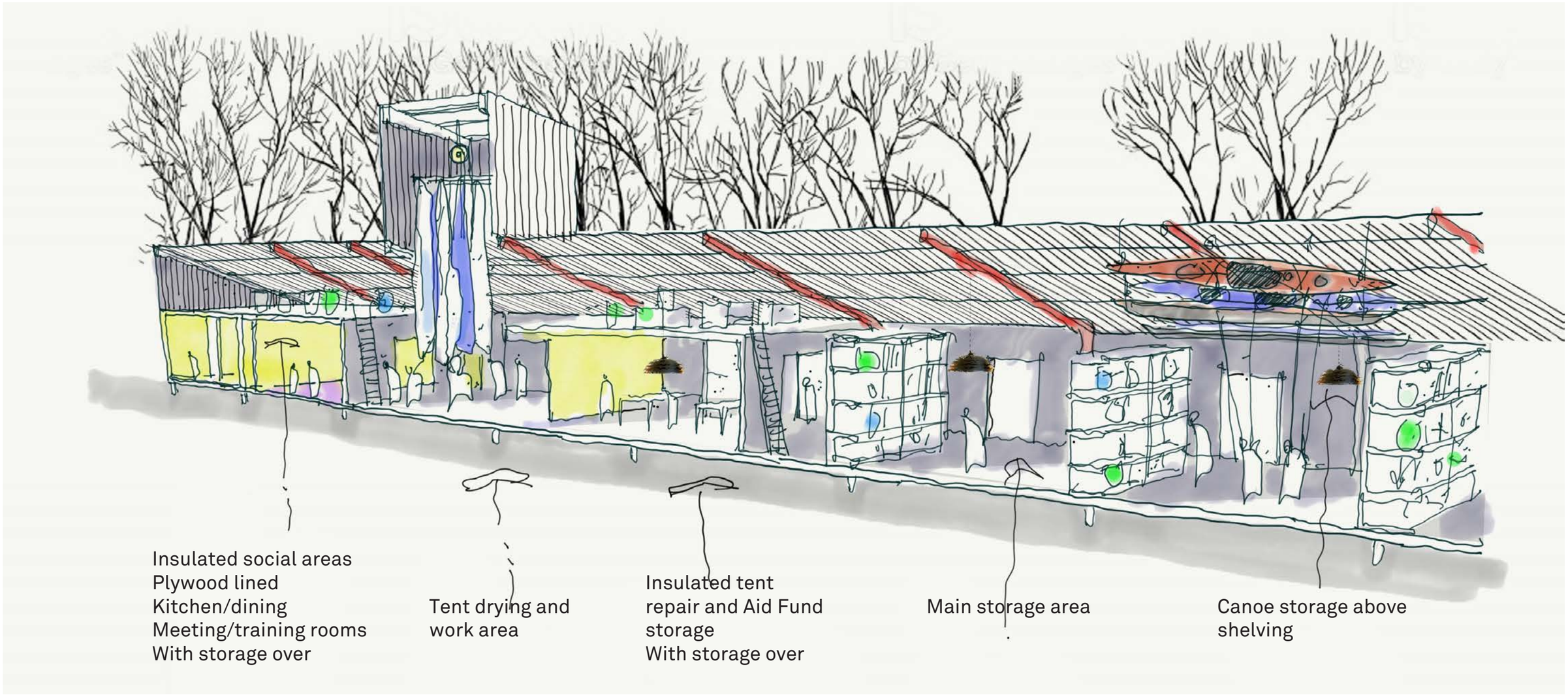
Insulated spaces

Timber frame structure, with a natural insulation such as blown cellulose (made from recycled newspapers), which has very low embodied carbon

2 Internal Spaces



Internal Spaces



Covered workspace and drying area

The work area and tent drying bay forms the heart of the building, marked by the roof lantern above. The large barn doors on either side allow this space to be opened up into a breezeway in the summer. In winter it will provide a place to work while sheltered from the wind and rain. From this space both the social areas and the work areas can be accessed, so it will act as a busy hub for volunteers.

A pulley system for hanging the tents will be installed as part of the construction package. There will also be sinks installed for cleaning equipment.

Proposed internal finishes

Internal face of corrugated cladding; floated screed finish to floors; plywood lining to insulated pods

Lighting:

Suspended LED ceiling lights

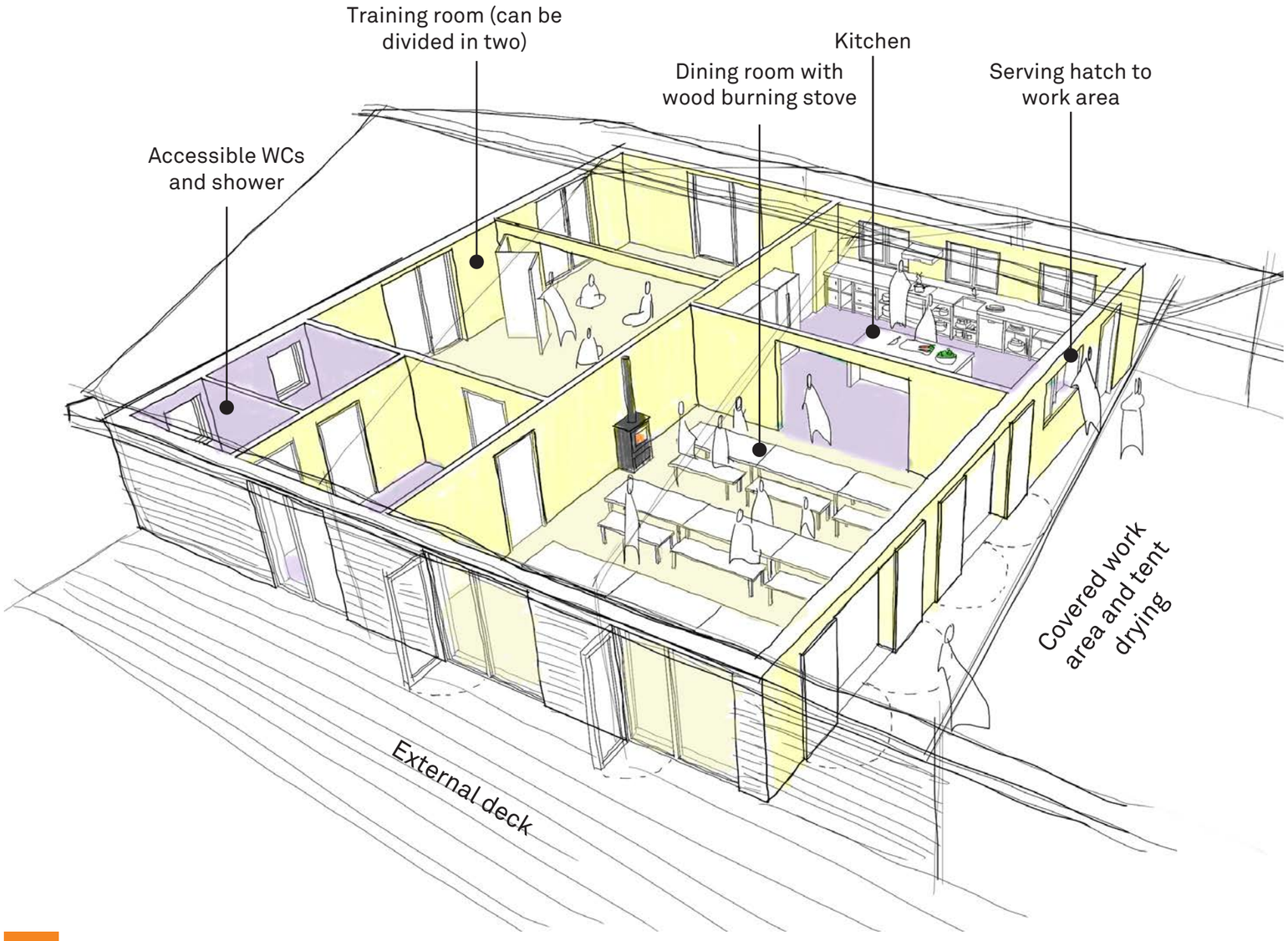
LED wall lights

Social spaces

The social spaces are housed in a timber framed, insulated pod within the main structure. They will be heated with a wood burning stove in the main dining room, with direct electric heaters elsewhere.

We are proposing to use plywood to line these spaces, to make a warm and welcoming set of spaces in counterpoint to the black external cladding. Plywood is slightly more expensive than plasterboard, but is lower in embodied carbon, and won't require painting so will need less maintenance over time. Where we need a higher performing material for wet areas or fire protection, we propose to use Fermacell. This is similar to normal plasterboard, but is fibre-reinforced and so is much more robust. It is made from the waste of other industrial processes, and so its environmental impact is much lower than normal plasterboard.

Similarly, we are proposing rubber flooring for the wet areas as, although more expensive than vinyl flooring, it is made of natural materials rather than plastic.



Self-fit

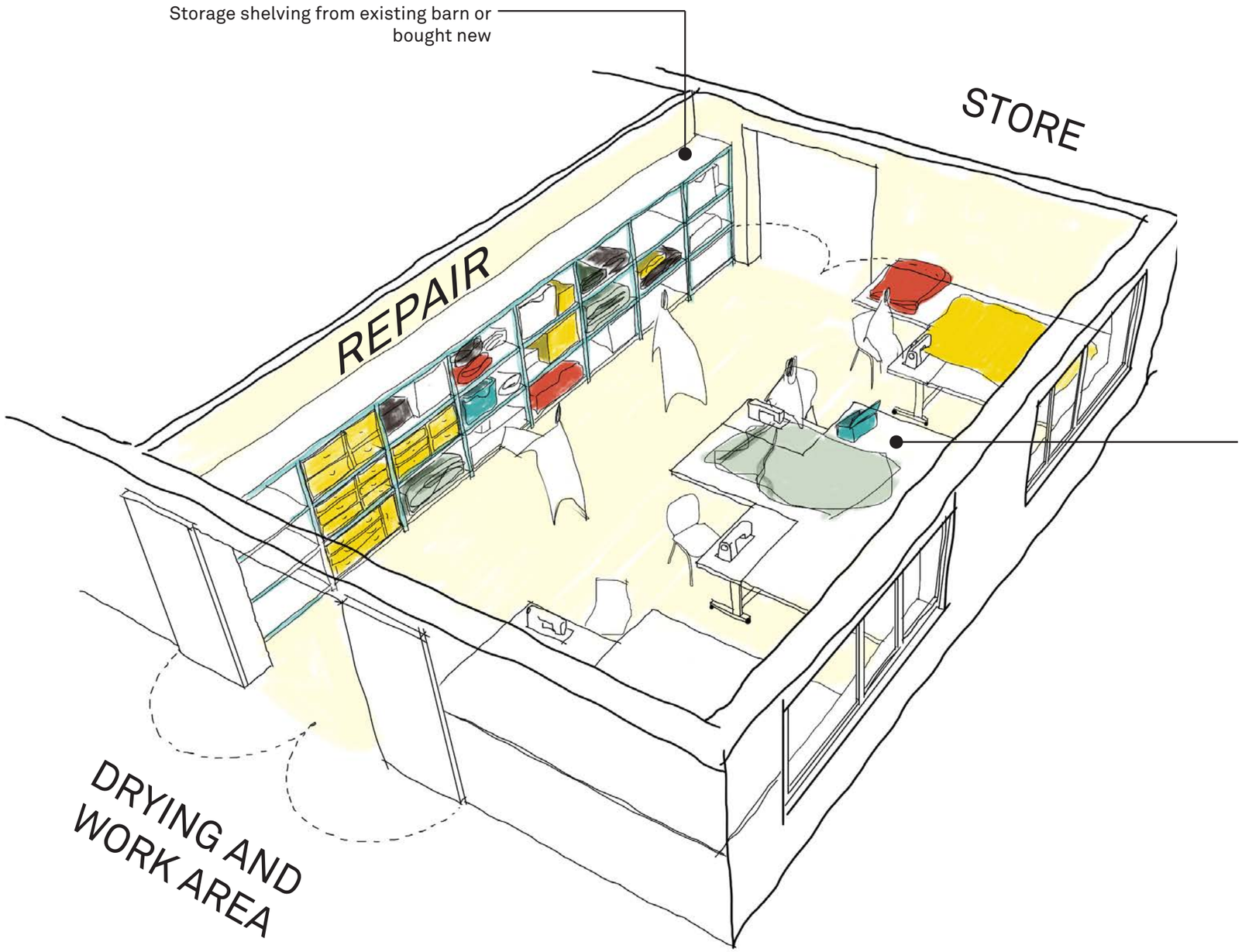
There are lots of opportunities for FSC to have input in making furniture and fittings for these spaces, depending on the time and skills you have available. The kitchen and furniture could be handmade, and the internal linings could be fitted by volunteers. More ideas are given later on in this document.

Proposed internal finishes

Dry areas:
Plywood internal lining and timber flooring

Wet areas:
Coloured square format tiles and rubber flooring

Tent repair bay



The tent repair bay is within the second set of insulated spaces. It has been laid out to provide a through-route from the drying area to the main stores, so that after tents have been sorted and dried, they can be placed in the tent bay for repair or taken straight through to be stored.

There is space for 3 or 4 large sewing tables on the window side of the bay, which could be made by FSC.

Self-fit:
Large sewing tables made from full sized sheets of plywood

Proposed finishes:

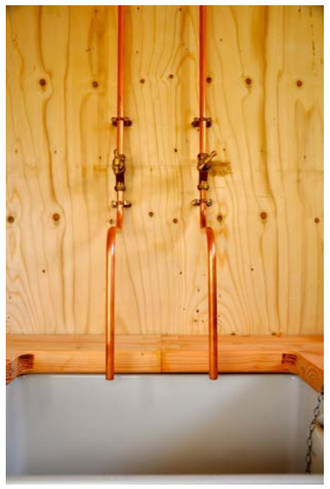
Powerfloated finish to screed floor
Plywood lining

2005: FSC Stores, Haddenham

Self-fit opportunities

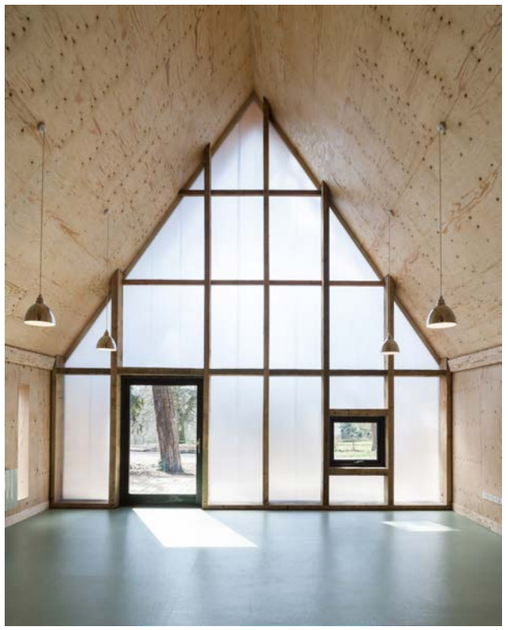
We have made a few suggestions throughout this document of items that could be made by FSC, making the most of the skills you have within the charity and providing an opportunity for you to make the spaces your own. Many of the images on this page are examples from previous projects by Invisible Studio of items that were made by the users.

Kitchen worktop of solid timber



Handmade taps

Cast concrete worktop and plywood cabinets made by volunteers



Plywood lining installed by volunteers

Kitchen made from off-the-peg stainless steel worktops
Ladders made from timber offcuts

Ideas for simple timber furniture