



# Diploma in Permaculture Design 5.

## PROVISION OF BASIC NEEDS ON LAND.

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# OVERVIEW OF PROVISION OF BASIC NEEDS ON LAND

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## Project and Design Aims and Objectives

To create a good environment for people using a piece of land and providing for their basic needs while keeping the human footprint on the land and the use of new materials as low as practical. In doing so the land should be more comfortable for those maintaining it and able to host more diverse uses e.g. for events and gatherings such as Permaculture Design Courses, Woodcraft folk events, food gathering and food processing events etc.

## Project Outline

In order to allow people to work on and enjoy the land, particularly in winter, it was necessary to provide for some basic needs. In order to do this basic facilities were required, these included:

1. Somewhere to stay warm and dry and store equipment.
2. A compost toilet
3. Washing area.
4. Cooking spaces
5. A source of clean drinking water
6. Some power for lighting, phone charging etc.

These projects were to be carried out by myself with some help from family and friends.

## Design Outline

The design involved:

1. Providing for the basic human needs in the short term. This could be done in the form of my small work van, which could be slept in and used for cooking in if the weather was bad, plus a tent. Drinking water could be brought in cans, paraffin lighting could be used and equipment could be stored in a box hidden under a laurel bush.
2. Providing a temporary compost toilet and fire site for cooking.
3. Taking time to **observe and interact** with the site before deciding where any permanent structures should go.
4. Looking at what materials were already available on site, around my home and what could be bought second-hand or scavenged in order to use and value renewables as much as possible, keep costs to a minimum and reduce consumption.
5. Deciding which order the projects should be done in based on time available, practical, monetary and emotional considerations.
6. Carrying out the projects.

## Accreditation and Complementary Criteria involved

Architecture, building and retrofitting.

Site development.

## Holmgren Domain involved

Building, Tools and Technology.

## Permaculture Ethics and Principles involved

- **Earth Care, People Care, Fair Shares.**
- **Observe and interact, Catch and store energy, Obtain a yield. Apply self-regulation and accept feedback, Use and value renewable resources and services, Produce no waste, Design from pattern to detail, Integrate rather than segregate, Use small and slow solutions, Use and value diversity, Use edges and value the marginal, Creatively use and respond to change.**

These are looked at in more detail in my [Assessment of this Design](#).

### **Methods used**

**Thinking tools:** SWOC (Strengths, Weaknesses, Opportunities, Constraints), McHarg's Exclusion method, PNI (Positives, Negatives, Interesting)

**Surveying techniques:** Zones and Sectors, Networks, Resources and Boundaries.

**Design frameworks:** CEAP (Collect info, Evaluate, Apply PC principles, Plan schedule), RANDOM ASSEMBLY and Incremental design.

**Analyses:** Cost/Benefit.

### **Results Summary**

This project has created a comfortable place to stay on the land with the basic facilities we require. There has been a minimal influence on the surroundings and the hut looks in keeping with the local environment.

### **Evaluation Summary**

This project has been successful in a number of ways. It has made the land more comfortable to stay on and able to host more diverse uses. The project aim to buy as little as possible new made me work hard on collecting materials and made for more flexible regarding the designing. Often the problem is the solution and limitations improve design. More than 90% of the materials used were second hand and from skips. The hut and basic facilities work and further projects, for example on cooking with rocket stoves and oven making can be carried out over time.

A more detailed analysis is presented at the end of each project description and in my [Assessment of this Design](#).

### **Reflection**

The project helped me learn how to approach projects. It also made me evaluate the project and so identify and celebrate my mistakes as well as what went well. I am more confident about planning projects and will be more confident about helping others to take them on.

### **Self- assessment**

The design process taken slowly allowed for a better end product than I had anticipated. I have learnt to hold back rather than rush into things. The project has also allowed me to demonstrate design skills and show how I apply permaculture in my own life. My main problem is not communicating and collaborating with others enough, perhaps the whole project would have been better if I had - but my family are very happy with what I have done and friends love the place. A more detailed analysis is presented in my [Assessment of this Design](#).

# INTRODUCTION

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This design aims to create a good environment for people using a piece of land and providing for their basic needs while keeping the human footprint on the land and the use of new materials as low as practical. In doing so the land should be more comfortable for those maintaining it and able to host more diverse uses e.g. for events and gatherings such as Permaculture Design Courses, Woodcraft folk events, food gathering and processing events etc.

The land is in Norfolk and is an area of nearly six acres including a wide access strip of half an acre. The vision for it was to create an edible nature reserve and place to relax in. It was decided that a traditional orchard with fruit trees on large rootstocks and nut trees should be created. Huge numbers of traditional orchards have been lost, even though they are beautiful, productive, hotspots for biodiversity and a romantic part of the local character of our landscapes. In 2007 traditional orchards were added to the UK Biodiversity Action Plan because they support a range of UK BAP priority habitats and species, some of which are rare. It may be that the land under this guise may gain some protection in the future, along with the fact it is productive and a lovely place for people to go to get away to. The woodland area was not very diverse with mostly nettles below a few varieties of tree so increasing this diversity of trees and plants became another ambition.

Initially I did little on the land, I was busy learning about and practicing orchard management, reading a lot and going to workshops to learn how to graft, prune, design and manage orchards. I did the Permaculture Design Certificate and was volunteering with East of England Apple and Orchard Project and community orchards and meeting with some hugely knowledgeable and helpful orchard enthusiasts. I was also coming to realise that planting and maintaining an orchard and woodland requires a lot of work, much of which is done during the colder months, so creating a relatively comfortable place to stay and keep warm was going to have to be a high priority.



# DESIGN

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## Design of positioning of facilities

The most important aspect which would affect the positioning of other needs should perhaps have been the hut but we had used the land a lot by the time we were able to build a hut so we had found which areas we liked to be in and use first.

### Positioning of hut

The first step in deciding on a position was to follow McHarg's Exclusion Method (1), not to ask where something should go but to identify where it shouldn't go: this narrowed down the possibilities considerably. By deciding that it should not be visible from the footpath, very close to the lake edge or far from the stream a lot of the land was excluded. Being out of sight of the footpath was to keep a low profile, keep the visible human impact on the countryside as low as possible and increase privacy and security. Being close to the stream was for ease of water collection and close to somewhere to cool perishable food and drink in the water. Being a little away from the lake edge was for safety reasons should there be very young children staying.

After that the positioning was partly based on our natural networks and zones i.e. the way we found that we traversed the land and which places we found that we used most over the first year. The directional sectors of views to and from, light, wind, noise and neighbours were considered along with topographical sectors of slope and orientation and combination sectors of shade and reflected light from the lake. One of the most important considerations for us in siting it were that it should have a good view. Only two areas were available that filled all our exclusions/wants ([Fig.1](#)). Both had much the same plant composition, dominated by nettles, so nothing to do with conservation favoured one site over the other

On a very local level it felt important that the hut blended in with the environment, so putting it behind some trees rather than nearer the lake was decided upon. This means it would be a bit darker than it could have been and this affected the hut design as a large window became more important. The light reflected off the lake looked like it was helping to lighten the area chosen and after a [PNI analysis](#) and lots of sitting around in the two possible sites this compromise was deemed acceptable.



Figure 1. Possible sites for position of hut

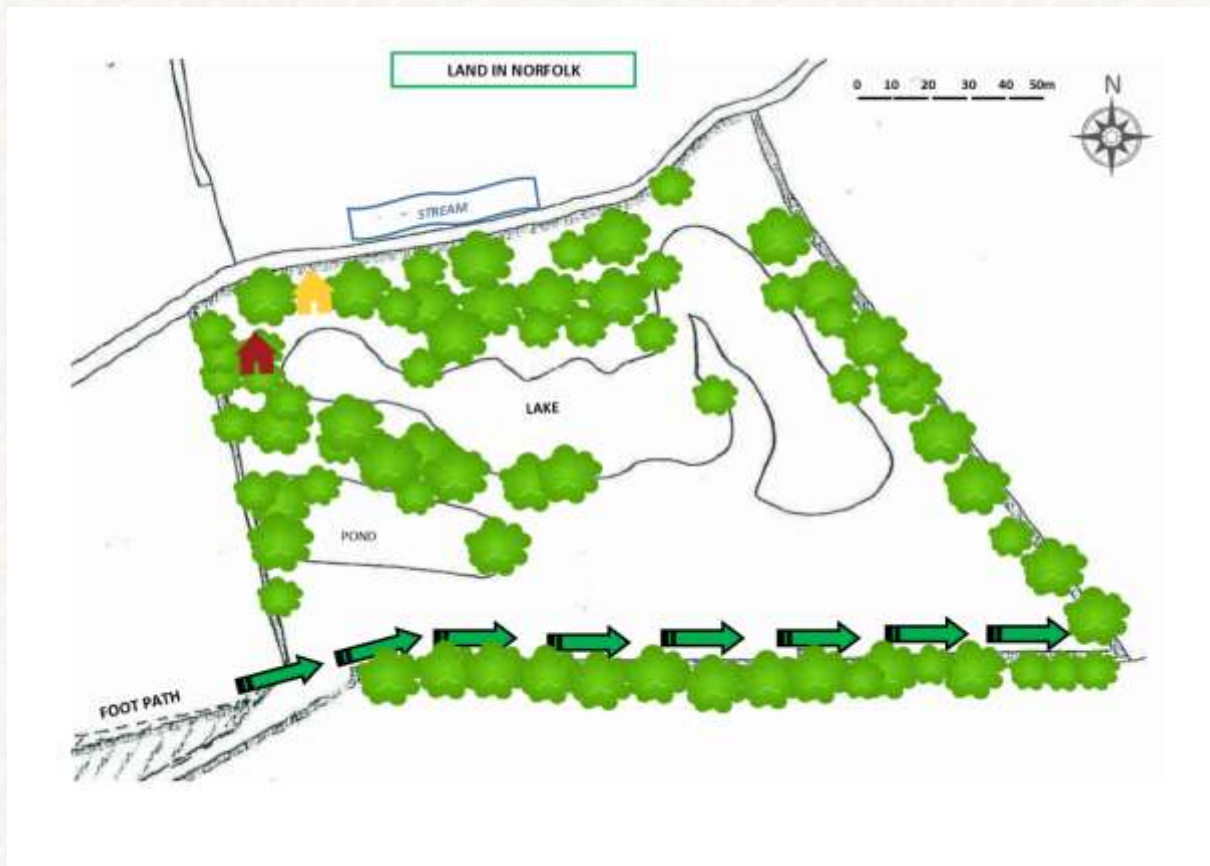








Table 1 PNI analysis for hut position

 <b>POSITIVES</b>	 <b>NEGATIVES</b>	 <b>INTERESTING</b>
<p>Fairly close to stream.  Close to birch copse between pond and lake where fire site is.  Fairly close to bush that can house compost toilet.  Good views down lake.  Helps create privacy from land to West.  Morning light would come into hut down the lake.  There is the possibility of clearing some trees to the south to increase light.  Nice view across field to NE from area Flat land.  Space behind to store things out of sight.  Hut would be in amongst trees on three sides so reducing impact.</p>	<p>Increased shade under trees.  Shaded to the South.  Not much flat land in front of hut as it slopes down to lake.</p>	<p>How much light might be reflected off the lake.</p>
 <p>Slightly closer to stream for access.  Better light than other site.  Light from both sides.  Facing south so warmer.  More flat land in front and around.  Nice view down woodland.  Could have good view of field to north where lambing occurs in Spring.  Would have view of the end of the lake and the birch copse.</p>	 <p>Less good view of lake than other site.  Better light but still shady.  Steep bank behind  Less well hidden area where things might be stored behind hut.  Further to the birch copse between pond and lake  Further to toilet.  May be more exposed to NE cold winds.  Wouldn't get such good light first thing</p>	 <p>Neighbour is more apparent.  Feels less comfortable.</p>

## Positioning of toilet, stream access, shower and outdoor cooking facilities.

The design was to some extent dictated by the opportunities the site offered. A large laurel bush made a good natural screen for a compost toilet so that dictated its position in zone 2. The access route to the stream was chosen by our desire line naturally created to reach a low area of bank already used by the deer rather than through analytical thought.

There was a grassy birch copse where we made a camp fire when we first bought the land and it proved to be our most comfortable and favourite spot for camping as well so it was zone 1. With the hut this would change and another outdoor kitchen area would also need to be made close by the hut.

Zone1. The hut, equipment storage and the outside cooking area just beside it as these are used most.

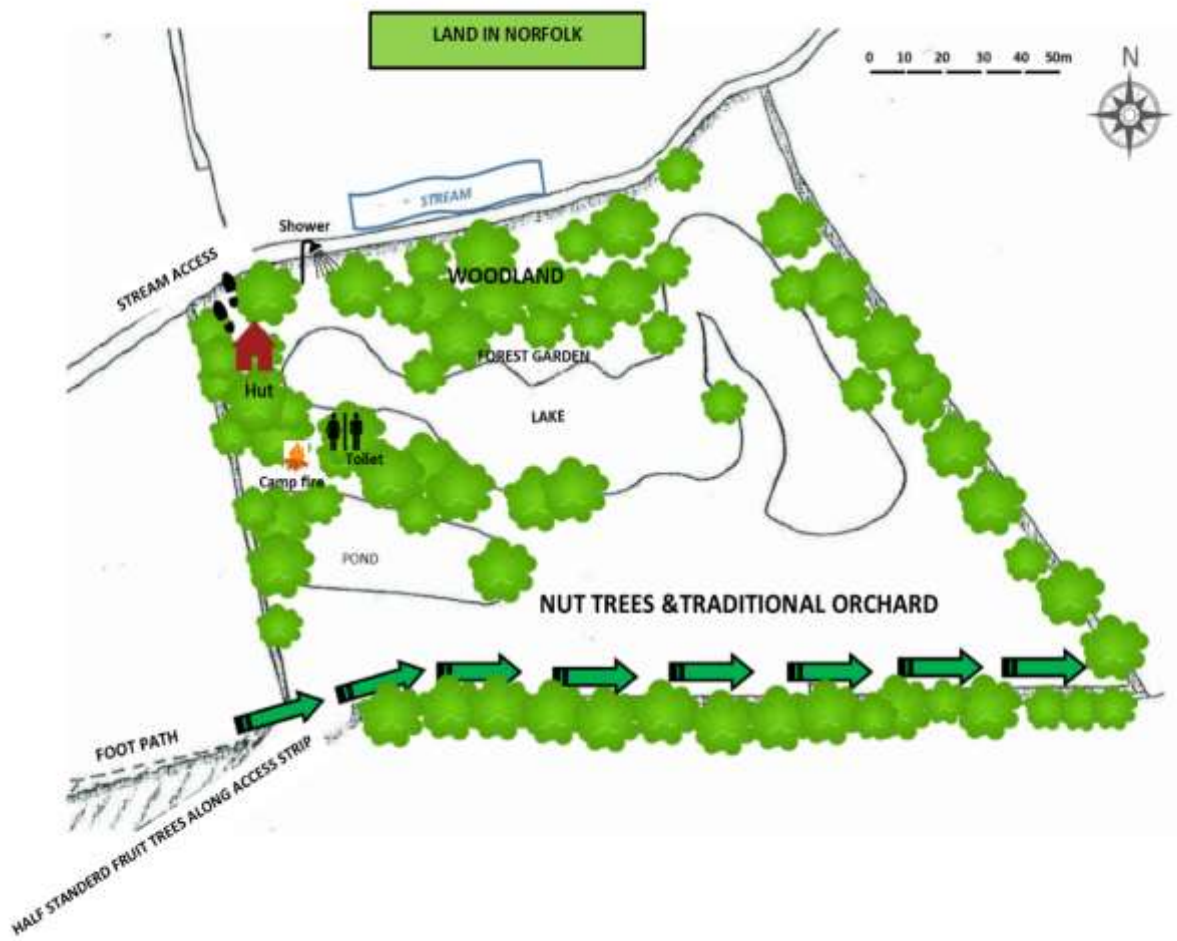
Zone 2. Close by are the stream/water access, shower, camp fire and toilet.

Zone 3. The woodland with forest garden and the field with access, nuttree and orchard.

Zone 4. The eastern end of the lake and SE corner.



Figure 2 Positioning of all facilities



## Design of facilities

### 1. Somewhere to stay, keep warm and dry and store equipment.

#### Goal clarification

Figure 3. Hut from outside



This was an important first step and involved analysing and clarifying our needs and wants at the present time while keeping in mind future changes such as grandchildren and providing for land based events. It was good to clarify this before starting the design process - while accepting that the design process might alter things to a certain degree.

#### Positioning of hut

The goal included:

- A secluded space that could not be seen from the footpath.
- A lovely view.
- Somewhere fairly close to the stream for water collection.
- A space that hopefully enhanced the looks of the land rather than detracted from it

Figure 4. Hut inside

#### Requirements from the hut.

The goal included:

- A comfortable double bed.
- A place that could be kept warm.
- Room for more than one bed,
- The ability to prepare food and cook inside during winter.
- A table and at least two seats.
- Storage for land maintenance equipment, tents and camping gear.
- Lighting
- Heating
- Charging for phone and computer.





**The overall goal was to have a hut that:**

- Could supply these with the minimum footprint on the land.
- Looked in keeping with the immediate surroundings and locality.
- Used the minimum of new materials and was relatively low maintenance over time.

### **Thinking Tools**

A structured PNI was used when considering the siting of the hut.

## **Design of hut**

### **Collect Information**

The building of the hut didn't start until after more than a year of owning the land and there was a lot of time to observe and interact and mull over of ideas during this time.

Having chosen a site which resulted in part because of some boundaries such as views and privacy there were other boundaries to consider. On a physical level there was the space available between trees to site the hut and the distances between the trees would also dictate where the windows were to be positioned. There were also financial boundaries, and the availability of materials.

There was not much money for materials but there was no pressing time limit and we had the required practical skills and tools. As a result I could take some time to accumulate second-hand building materials before designing the hut and starting the project.

### **Evaluation**

The required resources (inputs) would be high for such a small dwelling, especially the time aspect but the building would also be fun to build and the hut should last a long time. Having the hut would allow for more care of the land, especially as much of the tree work needs doing in winter. Having the storage area would be of real benefit for both working on the land and camping. In general the hut would make the land a much more useable space for a wider range of people to enjoy a more diverse range of activities. Considering the law of return, the outputs would be great over time compared to the inputs, especially once the trees and other food producing plants were planted and productive. I feel that if there is not a benefit to humans in the long term then the land may become neglected. Thinking long term (7<sup>th</sup> generation) the hut benefits both humans and the local environment.

### **Apply Permaculture**

To adhere to Permaculture principles and keep consumption down the hut needed to be built using as few new materials as possible. I also wanted to use as little land space as possible so some stacking would be likely to be involved in the internal design. I wanted the hut to have a low maintenance and high efficiency so it would be as small as practical and built of durable materials while capable of supplying my requirements for storage and living space. I had considered a yurt but thought it would not really be low maintenance, durable or safe for the storage of equipment. Where possible it would be important to go local when sourcing materials.

### **Plan schedule**

No schedule was planned as there was no way of knowing when materials would become available or when people would be free to help. The design of the hut was incremental in some ways as it was felt best to leave it fluid until materials were gathered. However the requirements (above) were clear so there was some plan behind what was to be gathered. A second hand play house was used. Much of the wood cladding, inside and out, came from the dismantled play house along with the doors, dormer window and window shutters. Cambridge had a recycled wood shop which was a great asset and all the flooring, extra plywood for roof and bed and many joists and beams came from them.

There were some priorities though and a loose schedule of work was planned after some basic materials had been collected.

**In the short term** (within months)- get the basic structure up and plywood roof on and felted before winter and paint the outside.

**In the medium term** (over the next year) - insulate, run in electric cables, clad the inside, fit a wood-burning stove and cover roof with old corrugated iron.

**In the long term** (within two years) - make it practical, comfortable and nice inside.

### The Design

Having lived in and restored small spaces (22-35 foot boats) for about 20 years designing the hut was to some extent instinctive, however in order to spark ideas and look at the possibilities of novel relationships Mollison's design framework **Random assemblies** (2) was used with slips of paper but required the addition of "between, view, behind, near and avoiding" to the possible connections as seen [here](#).

Because I wanted to take up as little ground space as possible to limit environmental impact plenty of stacking was required inside and the hut was made to be higher than it might otherwise have been to accommodate this. Careful thought needed to be taken over where to put the frames for structural support, windows and doors. Having already got the large window shutters, doors and dormer window meant things would be designed around these and double checked as the framework was built but a basic outline plan for building was needed.

Figure 5. Plan of hut's inside layout

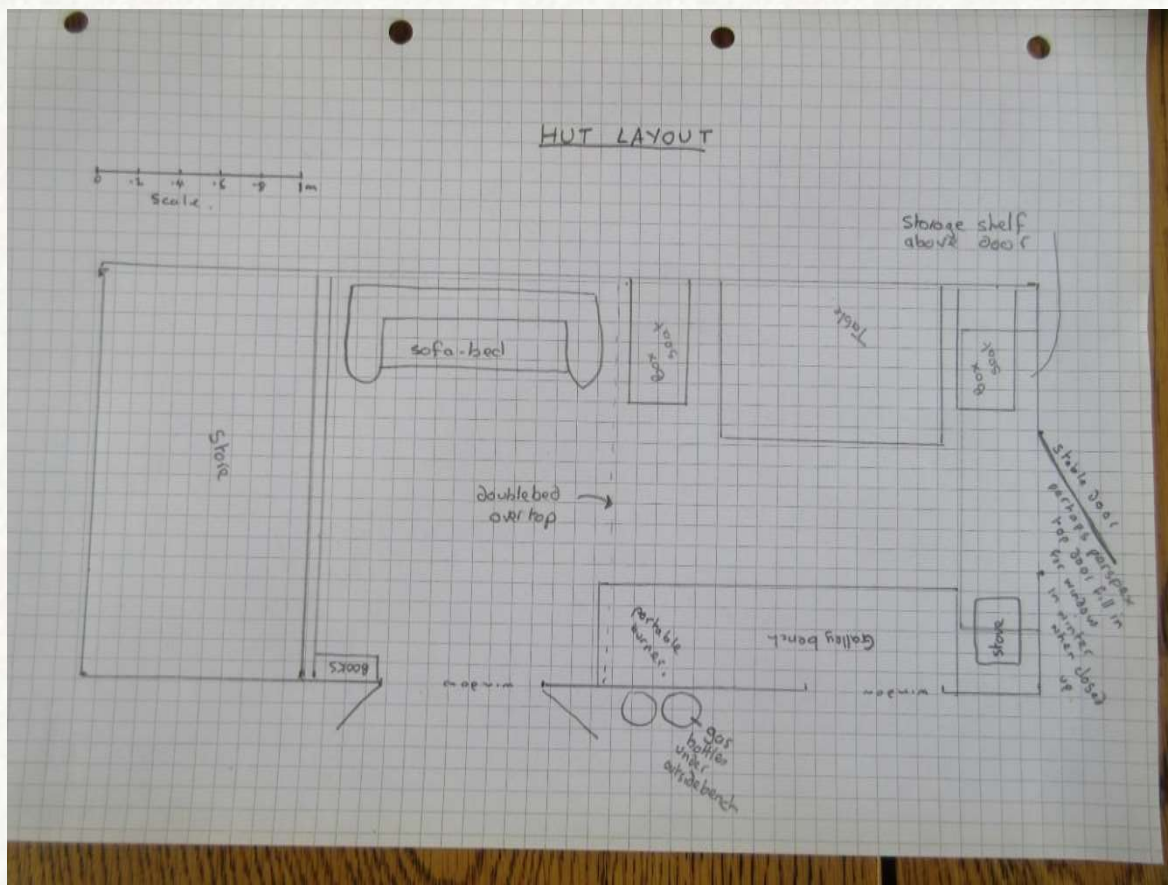




Figure 6. Outline plans for windows, doors, division and frames

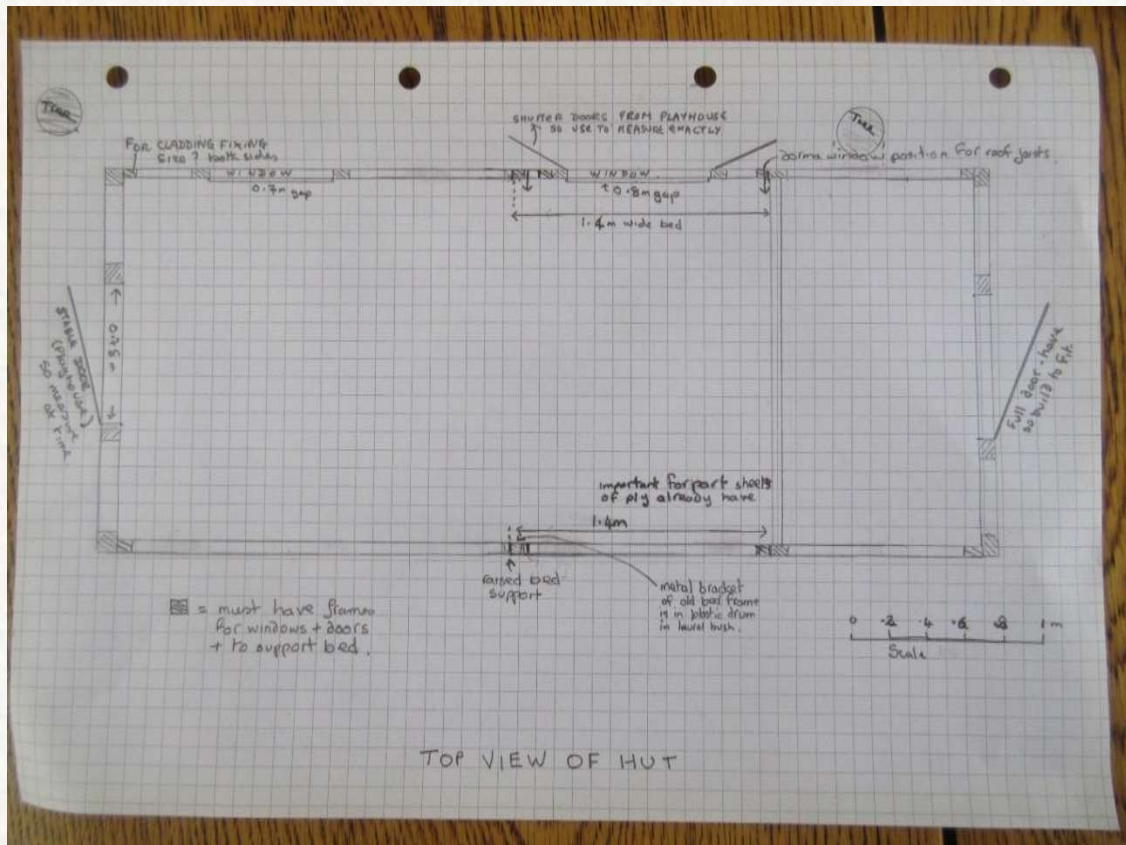
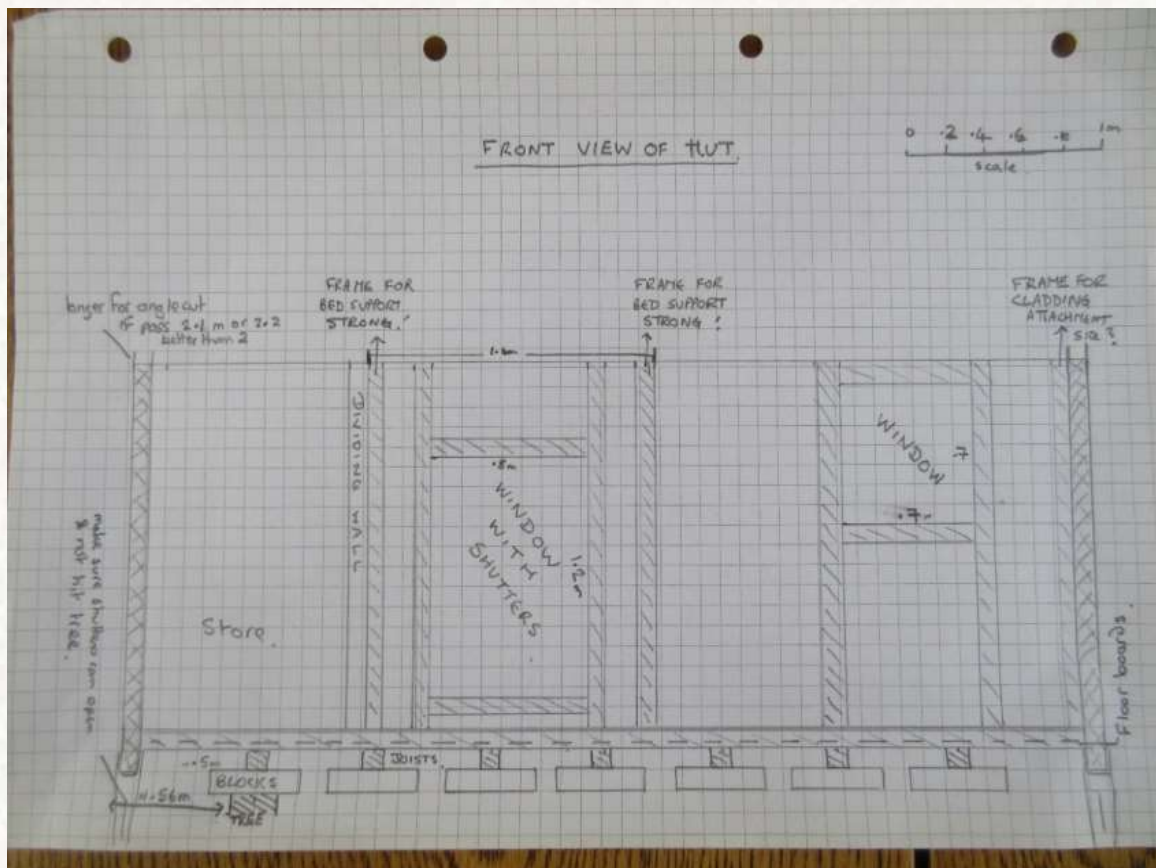


Figure 7. Materials and framework building





## Implementation

Note Dates and times on the photographs are not correct

Figure 8. Materials from old play hut.



Figure 9. Old floorboards from Cambridge Woodworks



Figure 10. floor joists



Figure 12. Framework for front of hut



Figure 11. Wall frameworks complete





Figure 15. Roof framework going up



Figure 16. Dormer window fitted



Figure 14. Roof framework nearly complete



Figure 13. Cladding on back wall





Figure 19. Roof goes on



Figure 18. Floorboards laid



So many small bits of  
chipboard used to make  
dividing wall.

Figure 17. Roofing felt goes on





Figure 20. Felt roof on



Figure 21. Corrugated iron roof and chimney enhances looks





Figure 22. Electric cabling and some insulation in



Figure 23. All insulated and clad inside



Figure 24. Plenty of shelving for storage thanks to the high design.





## Evaluation and reflection.

In general things have gone really well and I am very happy with the outcomes. I can now stay and work on the land during the winter months which is when much work needs doing. I can have friends, who are a little more fussy than me, stay.

The storage space allows me to keep a big bell tent for gatherings at the land as well as the land maintenance equipment. In fact the land could now be used for PDC courses and similar events.

### What went well

Collecting the materials and equipment went really well, we live in an era when so much can be found in skips and second hand. This process was helped to a great extent by not having deadlines or an order for the jobs. Having flexibility in time and design was a huge benefit. There are lots of skips with building materials in around Cambridge and all the insulation for the hut was easily found in these. Having the recycled wood shop was a huge benefit too. I like the fact that the hut's black weatherboarding fits with the local architecture. The rusty corrugated iron roof, which is mostly for visual effect, gives the hut a very settled in look and me great pleasure as I like old corrugated iron. I love the big window where I can sit on the sofa and look down the lake.

### What was challenging

Getting the hut up was relatively easy but lining it seemed to take forever. Waterproofing around the dormer window was tricky. Probably the most difficult aspect of building the hut was finding the time slot to build the basic structure, after that things could be carried out when time allowed.

### What I would do differently

I wouldn't buy a second-hand play house again unless it was constructed in sections as it is so much work to dismantle and the lengths of wood are short. I love the dormer window, and may not have bothered to make one if it hadn't been part of the play house, but it could do with being an opening window as it gets very hot in the mezzanine bed in winter with the stove on and even in summer sometimes because of body heat. Perhaps less insulation above it would have been better. I will put a vent in first and then put in an opening window if necessary.

### Costings

I didn't keep a close record of how much things cost financially but a [cost /benefit analysis](#) showed, I believe, that the outputs are greater than the inputs in that the hut allows for a greater resource over time than that used. I estimate that the hut is 90% recycled materials. The wood-burner came from a narrowboat and all the furnishings were second-hand.. The stove and chimney was £100 but came with a new heat powered fan which is now used on my son's wood-burner as it has more use. I have probably spent about £800 - £1000 on this project as a whole including furnishings etc. In terms of time it has taken up a lot but this has been enjoyable and rewarding

### Interesting things

I have been surprised to find that it's not just me, a lot of people like rusty corrugated iron roofs.

The place was swamped in nettles and having cleared the land and sown woodland grasses and wild flowers it was a surprise to find some Star of Bethlehem (*Ornithogalum umbellatum*) growing at the base of a sycamore. This is apparently native only in Eastern England although it has now been widely naturalized in grassland in the UK. In the Middle Ages it was also known as Dogs' Onions and its bulbs are edible so I will try to help it spread through the woodland. I won't bring any others in as the current plants may be natives and genetically different to the naturalised ones.

When the hut was first built it was full of mice, this was a nuisance as they were eating everything even our shoelaces when we were there. I eventually bought a sonic deterrent and it seemed to help but now it is not needed and the mice are no longer a problem. I imagine we ousted them out of their habitat and it took a while for them to come to terms with it, I don't know.

### Thoughts on the future.

The wood stove keeps the hut very warm but the mezzanine bed gets too hot both in winter and summer. A vent needs to be put in high up and the dormer window made so it can be opened.

I would like to make a rocket stove system for cooking on as I would like us to be able to process food grown on site such as making jams, juices etc.

I would like to make an oven system to go on or in the open fire or as part of a rocket stove.

I would like to share the land more with others now that the basic needs are provided for.

## **References**

*Permaculture, A Designers' Manual*. Bill Mollison. Tagari Publications. 2009.

*Permaculture Design, A Step by Step Guide*. Aranya, Permanent Publications 2012

General internet browsing for information.

\*\*\*\*\*

## **2. Compost toilet**

Figure 25. Short term compost toilet set-up



I have presented its simple design just in pictures and have highlighted how it fits with the ethics and principles of permaculture [here](#)

Because of the immediate need for a toilet a very old canvas camping one was erected so I had time to observe and interact with the site before expending any energy on something I might later regret.

My final choice of space was decided on by one major factor which outweighed any negatives. This was that it couldn't be seen.



Figure 26 Outside view of compost toilet



Thanks go to Elinor Wombwell for  
weaving the screen



## Evaluation and reflection.

**Positives:** The system works well. My favourite things about it is that there is no visible sign of it yet it provides a large private compartment. There is plenty of ventilation. It only needs occasional pruning to keep the entrance clear and the bush thick. All the equipment apart from the Separett bowl and seat were second-hand.

**Negatives:** I would have preferred a pit toilet so there was no need to move the partly composted matter from a bucket to the dustbin but with so much water nearby this isn't advisable. It is cold in the winter. It is dark inside in the evening. Some people may feel it isn't isolated enough and should be further away from the camp fire site. It is not comfortable when the weather is bad and not good for night time use so a bucket with a seat positioned just behind the shed does if one needs to get up in the night.

**Interesting:** I considered putting a skylight in the bush to keep the space drier but in fact it stays pretty dry anyway so that idea has been abandoned. Sometimes there are nests in the bush which makes us feel like intruders but the birds don't seem to mind occasional visitors. There is a lot of pleasure gained from the little things like the toilet roll being held on a chopped off branch and the hand washing equipment being an old copper tea urn and bowl.



### 3. Washing area

This was placed to be pretty close to the stream yet still far enough away for the water to have to travel through the soil to get back to the stream for filtration and cleanliness. It was also placed a bit of a distance away from the centre of activities for some privacy

Figure 27. Shower area without screen

The base is an old wooden gate cut into a circle, the washing bowl is held between tight ropes. The shower is an aluminium container with one side painted black. It can be filled with stream water and left in the sun to heat up or filled and then placed over a fire to heat up or filled with warm water. It is hoisted up the tree with a block and tackle and connected to the shower head with a hose pipe. Simply bending the hose in a tube adjusts the flow. Some hooks were screwed onto the tree trunks to hang equipment and clothes.

The shower screen is only fitted when people are around and want to use it. It wraps around the surrounding saplings. This is to keep the human visual footprint low. The camouflage material used for the screen was the only thing that was bought new. I didn't design or make the tank and block and tackle showering system, thanks go to Ben Evans for this.

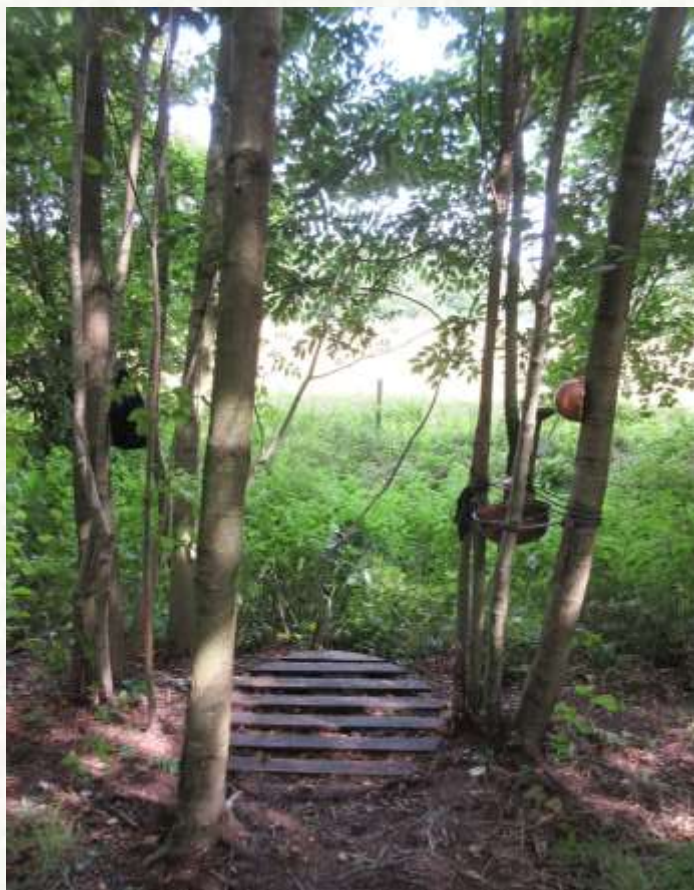


Figure 28. Shower with screen up



### Evaluation and reflection

**Positives:** It is a great space, for washing especially in Spring when you can see the lambs in the field behind over the screen. There isn't much to it and it is simple.

**Negatives:** It is too cold in Winter and can't be heated so using a bucket of warm water in the hut is necessary. The shower water tank is heavy to raise even with a block and tackle.



**Interesting:** The hooks screwed into the trunks, using aluminium screws, were engulfed by the bark within two years making them difficult to remove and reset on the outside.

## 4. Cooking areas

After buying the land the first thing we did was make a small open fire. The placing of this was not considered carefully as we wanted it immediately and it could easily be moved. However, the space initially chosen works well and we have felt no inclination to move it. The stones surrounding the fire were from the bilge of a narrow boat, they had been being used as ballast but were dumped on the bank in Cambridge. Later the fire place was dug out and filled with sand because the soil is peat and can be set alight - as I discovered in the orchard area.

Figure 29. Camp fire



Figure 30. Outside cooking and washing up area



Another cooking and food preparation space was made for cooking without an open fire. This was made using a piece of corrugated iron as a wind break, cable drum, and old fishing umbrella.

There is a 2 burner gas cooker in the hut for use in bad weather.

### Evaluation and reflection.

It is lovely to be able to cook on an open fire and the logs around it make it a sociable central point and friendly space to be. Just to boil a cup of tea when working I still use a gas ring and for cooking and washing up we use the cable drum space with a gas ring as well as the open fire. Having different spaces and types of cooking definitely makes the space more versatile.



The open fire is a less efficient use of wood than a rocket stove and avoiding as much bottled gas use as possible is the aim so building a rocket stove that can be kept outside is a project I am looking at for the future. I had intended to make a cob oven but don't want any more permanent outside structures than necessary.

The cable drum rotted within two years and has been replaced with an old metal circular table.

## 5. A Source of clean drinking water

Figure 31. Steps and platform for accessing stream



The stream that runs down the side of the land has a small catchment area and there is not much habitation within the catchment. There is livestock and arable land around so I decided to buy a water filtration system that removes all microbes and chemicals such as herbicides and pesticides.

Figure 32. Water filtration system





Figure 33. Mushroom impregnated logs under shade cloth



The stream is also used for keeping food cool, washing, watering newly planted plants and watering mushroom logs which are stacked nearby.

### Evaluation and reflection.

**Positives:** The filter does save lugging water cans around and, it is a luxury to have good drinking water with no chemicals in it.

**Negatives:** The water filter was a major expense at a little over £200. I am happy with the filter but it is slow. However I can get two more cartridges to fit to speed things up. I will wait and see how things go.

**Interesting:** Some people are still nervous of the water and so we boil it as well for them.

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## 6. Some power for lighting, phone, computer charging etc.

To do this in an ecologically sound manner has proved difficult. We had a solar panel and regulator, from an old boat, sitting in the shed so I have used these although they may be a bit over the top for the amount that needs charging. A [SWOC analysis](#) shows there are many weaknesses and constraints and given that the land isn't occupied for most of the year. I do not see this as an ecologically sound option even though we have only had to buy the battery. On the other hand I can now do my online tutoring work from the land and if this means I travel to and from the land less often now that I can work there the system may more than repay itself. Paraffin lighting that gives a decent light such as the Aladdin and Tilley lamps use a large amount of paraffin. I was probably using 20-30 litres a year. With young people using the land being able to charge phones etc. will make it more favourable for them to stay. With their little children staying, not having paraffin lights in such a small space is much safer.

### Solar power system design.

Old metal box used as container for the regulator and battery. Piece of old secondary glazing used at back to keep things dry.

Figure 34. Solar power system design



## Evaluation and reflection

It is a system that works well.

A smaller portable solar powered charging system for the laptop with a couple of solar powered LED lights that could be left out to charge might be more ecologically sound, however in winter I doubt there would be enough power from these systems.

I could have made the struts that hold the lid of the box up at an angle adjustable so

different angles could be provided for the different seasons but I thought this might be over designing it. I have yet to see if there is a problem with power in the winter. If so I will make the struts adjustable to get a better angle.

## References

(1) McHarg's exclusion method <https://knowledgebase.permaculture.org.uk/design-methods/mcharg-exclusion-method>

(2) Random assemblies method *Permaculture, A designers' Manual*. Bill Mollison. Tagari Publications. 2009

*Permaculture Design, A Step by Step Guide*. Aranya, Permanent Publications 2012



# APPENDIX

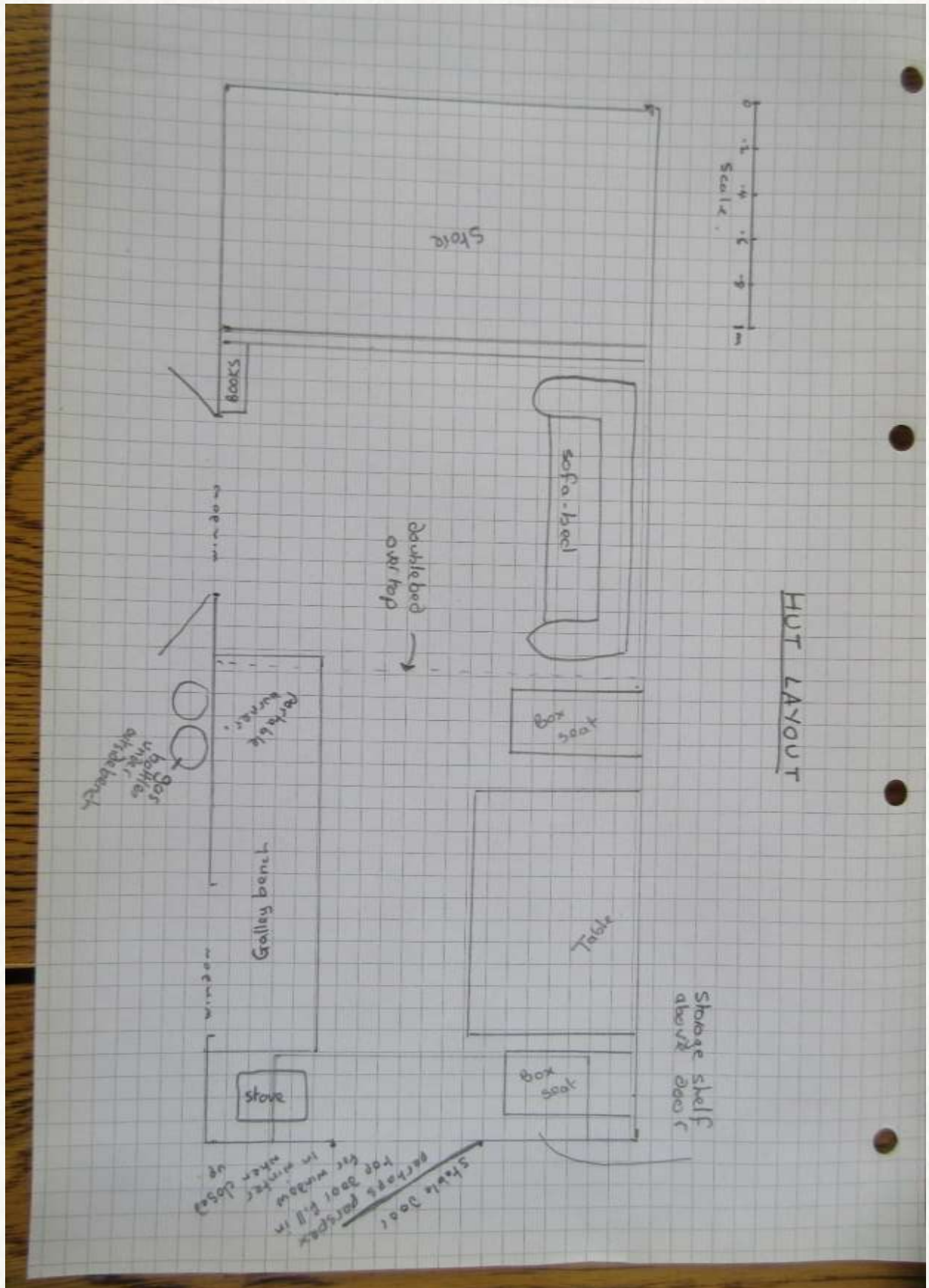
## Supporting documentation.

### Random assemblies thinking tool for hut layout.

Figure 35. Random assemblies analysis for hut layout before designing hut.

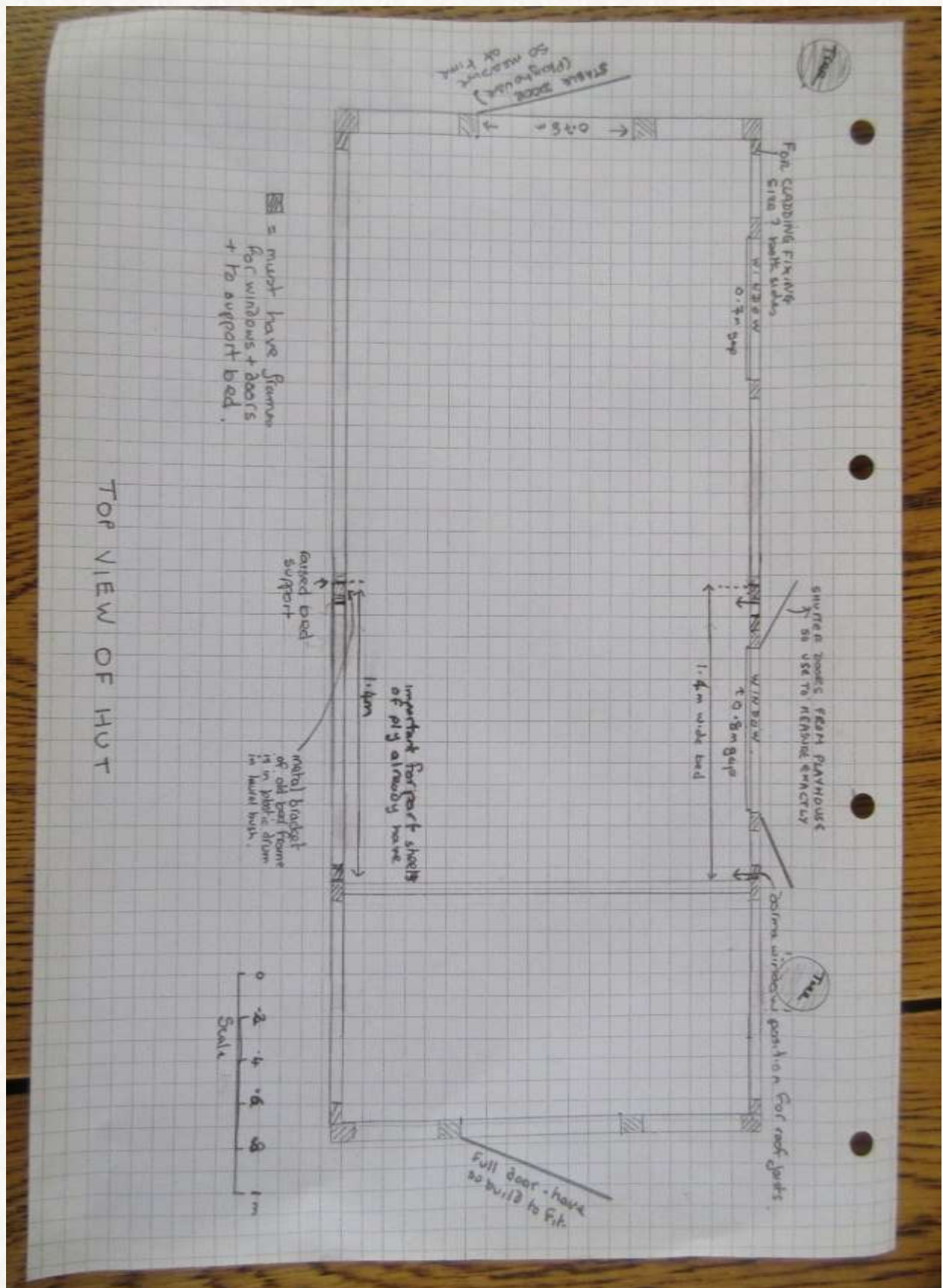


Hut layout (Fig. 5)

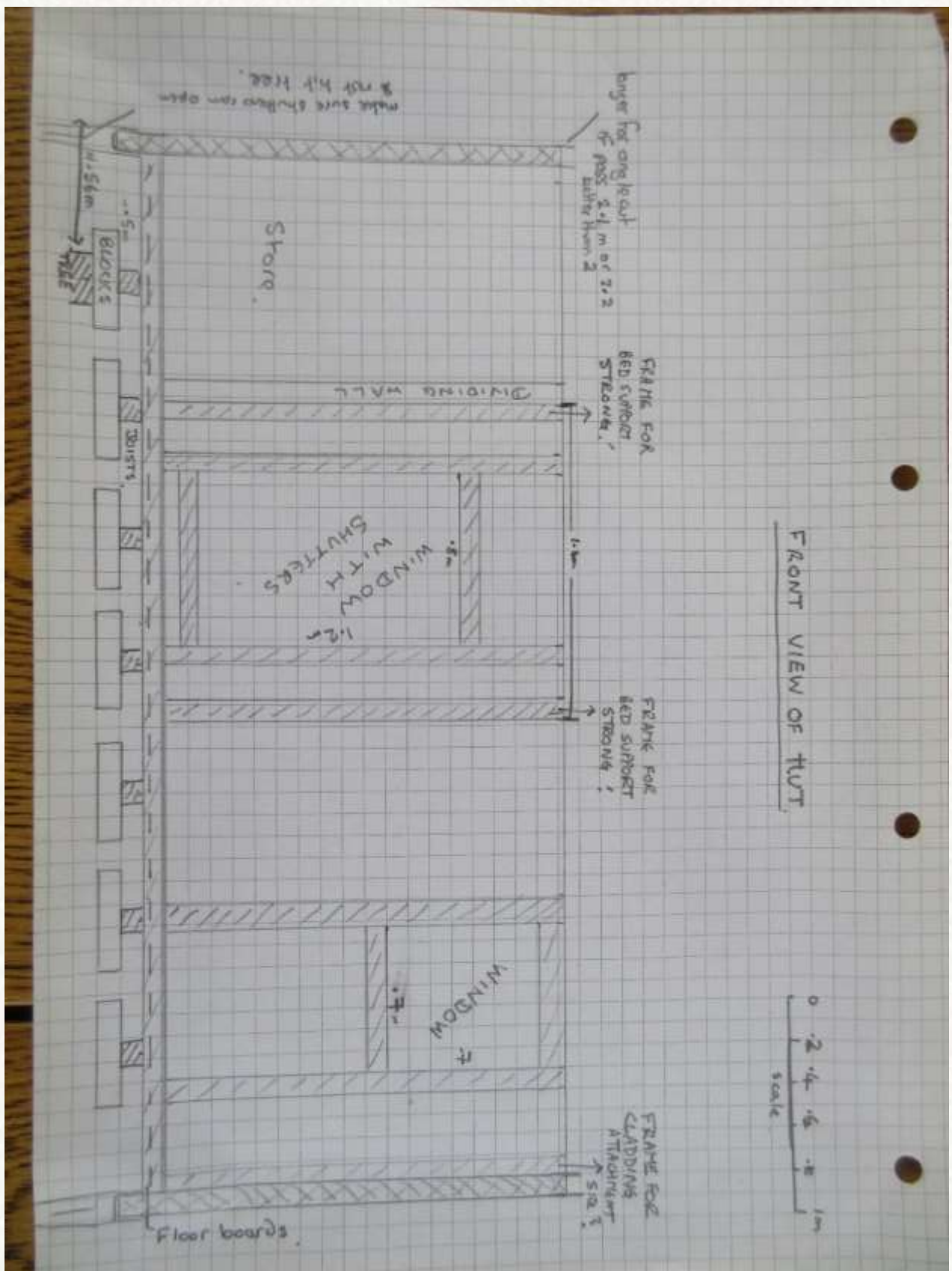




Outline plans for windows, doors, divisions and frames (Fig.6).



Materials and framework building plan d (Fig. 7)





## Cost/benefit analysis for hut design

Table 2. Cost/Benefit analysis for hut

COST	BENEFIT
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Approximately £800-£1000 in materials to build and furnish.	Much of the money spent supported Cambridge Wood Works which was a Community Interest Company recycling wood.
Materials used were mainly second-hand or thrown out (approx. 90%) but new materials were used.	Many things taken from skips so have not ended up in landfill.
Time taken to build was quite high for space created.	The time spent also resulted in increasing my knowledge and it was enjoyable and rewarding.
Impact on the natural environment. It appears that the hut ousted some mice from their habitat.	Space taken up on land is small for the resource created. A hedgehog appears to like living under the hut.
The site was covered in nettles which are now gone and the soil has been compacted where we walk around.	Where the nettles have been cleared some “Star of Bethlehem” has flourished. I have also sown woodland grasses, foxgloves and campion and these are also flourishing, creating more diversity.
Polluting materials such as paints and stains were used. These were all water-based.	Much of the land is swamped by nettles.
Was the work necessary? The standard could have been lower perhaps.	The work has created a space to keep warm and dry and as such will be a long term asset for the land and world as we will look after the land better and travel less.
Land less natural and wild looking.	

## SWOC Analysis for solar power system

Table 3. SWOC analysis for solar power system.

STRENGTHS	WEAKNESSES
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<b>Allows online tutoring work while staying</b> <b>Allows good lighting</b> <b>Reduces paraffin consumption</b> <b>Reduces fire risk</b> <b>Reduces burns risk, especially with small children around</b> <b>Reduces toxic fumes</b> <b>Provides enough power for winter use</b> <b>Makes staying for holidays more desirable</b> <b>Lead in batteries is recycled</b>	<b>Lead acid battery used</b> <b>Need to situate away from hut in sun so have to carry battery.</b> <b>System may be stolen or vandalised</b>
<b>OPPORTUNITIES</b>	<b>CONSTRAINTS</b>
<b>Already have panel and regulator</b> <b>Have box and plastic to make the shelter</b>	<b>Buying of battery required</b> <b>Time to make and set up</b>

# ASSESSMENT OF THIS DESIGN

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## Evaluation

Each project has been evaluated and reflected upon under its own section above. Overall the land is now a lovely place to stay with everything very organised and convenient. Going down to work on the land is therefore something to look forward to. Thinking tools such as SWOC and PNI were used along with the design framework CEAP and analyses using cost/benefit and zones, desire lines etc. I am more confident and now think more naturally in a permaculture way. I am particularly pleased with the hut, I love staying there and it allows me to apply permaculture in my own life more as I develop the landscape to create my dream of an edible nature reserve. I love the fact the others are really enjoying the land, in particular friends of my children who don't get much chance to camp out, chop wood, have fires, make things, sit and read in large trees and sleep outside in improvised shelters. On a scale of 1-10 I currently feel this project deserves a 9 for outcome but a 7 for process.

Below are some pictures

Figure 37. Winter sunrise from sofa-bed



Figure 36. View from sofa bed in winter





Figure 38. View from mezzanine bed



Figure 39. Wintery views







Figure 40. Cooking area works well



Figure 41. Outside animal proof cool safe and rubbish bag

Figure 43. Time for a rest from play.

Figure 42. Whittling away time waiting for shower water to heat.





Figure 44. Green woodworking



Figure 45. Bell tent for gatherings





## How this project meets the Ethics and Principles of Permaculture

### Provision of basic needs

The whole project fits with the ethics and principles of permaculture but the two main parts of the project which involved materials and alteration of the natural environment are the hut and the compost toilet. These are discussed below

### How positioning, design and building of the hut meets the ethics and principles of permaculture

#### Earth Care

By ensuring that the footprint of the hut on the land is as small as possible. The hut allows for the creation of a diverse edible nature reserve and the looking after the lake for wildlife. In the future this highly patch of land may be given some protection because of this work. For the gains in land management it is hoped the hut will pay for the disruption it has caused and materials used by providing an incentive to look after the land.

#### People Care

By providing for people's basic needs the project looks after people and although this has some negative impacts on nature it does mean that the land is appreciated and looked after.

#### Fair Shares

By keeping the human footprint as low as possible physically and improving the value of the surrounding land for nature.

**Observe and interact.** A lot of time was spent observing and interacting with the environment before deciding where to site the hut and designing and then building it. Time was also spent discussing what we, as a family, might want from the hut and how it might be most versatile providing **multiple yields** for the future

**Catch and store energy.** The hut is made from materials which were recycled, this is catching energy that was due to be thrown out, keeping **consumption down**. The hut allows us to stay healthy and fit which are forms of energy.

**Obtain a yield.** We have a hut as our yield and the experience and knowledge gained during the process. We also have the yield of the ability to stay on the land to maintain it.

**Apply self-regulation and accept feedback.** The discussions with family and the **integration** of ideas along with the questioning of my decisions were important. Adhering as much as possible to the ethics of permaculture are also a form of self-regulation.

**Use and value renewable resources and services.** The hut is built mainly (ca. 90%) from second-hand wood, much from a Community Interest Company, and where new wood was bought it was FSC certified.

**Produce no waste.** Very little waste was produced when building and any spare wood was taken to the wood recycling rather than burnt. Care was taken not to buy any more than needed.

**Design from pattern to detail.** The positioning of the hut was based on the pattern created by analysing zones, sectors and networks. The position's detail came down to the exact position of the trees where the hut was going to be located and so the positioning of windows in order that there wasn't a tree between it and the view. The overall design of the hut was the pattern, the detail came down to exact placement of details such as windows, stove, shelving etc.

**Integrate rather than segregate.** Working with family and friends was done to some extent although I have observed that I usually prefer to work alone and should perhaps try to integrate more. By



putting the right things in the right place relative to each other things are integrated and work well to create a system/hut that is practical and efficient.

**Use small and slow solutions.** The hut was designed to function at the smallest scale possible as this is energy and space efficient. The collecting of materials was slow and this was good in that it gave time for ideas to develop and the positioning to be well thought out.

**Use and value diversity.** In order to reduce impact on the environment's natural diversity as much as possible the hut was designed to have as low a physical footprint on the land as possible. The use of recycled materials also values nature and its diversity by minimizing harm.

**Use edges and value the marginal.** The hut is situated on the edge of the lake and wooded area with a large window in front of the sofa which looks out on an area that I hope will be super diverse and interesting as I relax with a cup of tea.

**Creatively use and respond to change.** The hut is a creative use of changing circumstances as it provides a space for holidaying for family and friends who no longer wish to fly and travel long distances. It also provides somewhere to stay while working to create a valuable habitat type that has been being destroyed over recent decades.

### **How the compost toilet meets the ethics and principles of permaculture**

#### **Earth Care**

Creating compost for the land and not creating any pollution. Keeping materials used to a minimum and local and renewable.

#### **People Care**

Providing a private and comfortable space for people to use. Not impinging on the beauty of the environment.

#### **Fair Shares**

Keeping the human footprint as low as possible physically by not building and closing the area in.

**Observe and Interact,** Much of this was done before deciding where to put the toilet. It is also necessary to observe what is going on in the bucket in order to ensure conditions are right for composting

**Catch and store energy,** composted matter is caught and kept on site as is the urine.

**Obtain a yield,** compost and urine are obtained as a yield. The urine can be collected in a container, diluted with water from the stream and used to water the fruit trees and bushes

**Apply self-regulation and accept feedback,** keeping an eye and nose on the contents of the toilet and assessing its condition (feedback) is necessary to decide what it needs to make it good compost.

**Use and value renewable resources and services,** the composting by bacteria, fungi etc. is a much appreciated service as they make the renewable resource of compost. The structure of the compartment is a bush and woven willow screen. Both of these are growing on site.

**Produce no waste,** sewerage disposed via flush toilets is a very wasteful system, the compost toilet makes a valuable product which stays on the land from our waste.

**Design from pattern to detail,** The overall pattern for the toilet was to design a way of treating human waste on site without polluting the land and water close by and provide a private space for people to use. The details came down to how to provide this with a minimum human impact on the environment both visually and physically. The private space chosen was a large laurel bush which I pruned the centre out of. This was pretty private but to increase privacy a willow structure was woven around the central area. Almost all the equipment used for the toilet, dry matter bin, toilet roll container, hand-washing equipment and watering can were things bought second-hand. The only

equipment bought new was the separating bowl and toilet seat. Because of the proximity to water the waste needed to be contained rather than just going into a pit. This was achieved using a dustbin with a pipe in the bottom but fixed up the side of the bin with fly proof covering on end to let air in at the base and a vent on the lid.

**Integrate rather than segregate**, the toilet waste becomes an integrated part of the land as it is used to feed the plants.

**Use small and slow solutions**, the system is a small local system when compared to the standard sewerage system. The process of designing it was not rushed as we made a temporary compost toilet in an old camping toilet tent until we had had time to get used to using the land and work out where we would build the hut, camp, cook etc.

**Use and value diversity**, The microbes doing the composting are a much appreciated diverse community. With different people with different sensitivities using the space it was important to create a space that was acceptable to a diverse range of people if they were to feel comfortable using the toilet.

**Use edges and value the marginal**, toilets are generally felt to be marginal, to be kept private and on the edge of spaces, thoughts and language - this can be seen in the number of euphemisms for describing them. However, being without one makes you realise just how much you really do value them. Making the space nice and functional helps people to value it.

**Creatively use and respond to change**. The microbial community within the toilet are constantly creatively using and responding to change. The use of a compost toilet over a chemical toilet, which might have been the choice for such a site many years ago, is a response to how we are changing as we learn more about the needs and abilities of our environment.

## Assessment of Individual Design for Feedback Table

### DIPLOMA in APPLIED PERMACULTURE DESIGN System 5.2

#### ASSESSMENT of INDIVIDUAL DESIGN for FEEDBACK

Effective from Oct 1<sup>st</sup> 2013

<b>Diploma Apprentice's name:</b>	<b>Charlotte Synge</b>
<b>Date first registered for Diploma:</b>	<b>26<sup>th</sup> January 2015</b>
<b>Date of this feedback:</b>	
<b>Name of Personal Tutor:</b>	<b>Aranya Austin</b>
<b>Name of Assessment Tutor:</b>	
<b>Project Title:</b>	<b>Provision of Basic Needs on Land</b>



<b>Date Started:</b>	<b>2014</b>
<b>Date Completed:</b>	<b>2017</b>
<b>Implemented:</b>	<b>Yes</b>
<b>Design Number</b>	<b>5 of 10</b>

**ACCREDITATION CRITERION: 1. Demonstrating design skills**  
**(Section C3 in the Guide to Accreditation Criteria)**

	<b>What's gone well?</b>	<b>What could have been done differently?</b>
Accurate and appropriate use of an intentional design process.	Yes. The use of the CEAP design framework and inevitable Incremental design, along with the constant Evaluating and Tweaking throughout has worked well. The observation stage was long and there was much discussion. The Planning Schedule part was a bit haphazard as there were too many variables to make a definite plan.	Design was partially based on the materials available at the time and this may have limited our decision making.
Use of permaculture ethics, principles and theory is appropriate to the situation.  The solutions are relevant and appropriate to the activity and content areas.	Yes. Aiming to meet the permaculture ethics and principles has been relatively easy in this project, especially with a good place to buy second-hand wood and the old playhouse to recycle. Using the Random Assemblies approach to the hut design was an interesting new approach that I was glad to have tried and would like to try in an area that I am less familiar with. Approach strategies such as: stacking in space, keeping consumption down, thinking about relative locations and positive connections were appropriate.	More structured thinking and analysis could have been undertaken. Because of my familiarity with using the land and living in small spaces I tended to go by instinct more than I might have done.
Use of a variety of tools which suit the needs of the client and the situation.	Yes. Thinking tools such as Mc Harg's Exclusion Method, PNI, SWOC analysis and Random Assembly were used along with the design framework CEAP and incremental design and plenty of Visioning.	
Design is intelligible, coherent and effective (i.e. it met the needs of the client).	Yes. The hut is great and we all feel it is a bit grander than we envisaged but not too grand.  The other utilities suit us very well.	Some people might be concerned over privacy in the compost toilet. In the night it is a long way from the hut.



Documentation for and presentation of the design is appropriate for clients & third parties.	Yes. The plans are clearly drawn with appropriate scale drawn in and relevant information is clear. I took several photocopies of the original building plans, from experience I knew they were going to be mistreated and quite likely lost over the course of the project.	
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## ACCREDITATION CRITERION: 2b. Applying permaculture to your work and projects

### (Section C2 in the Guide to Accreditation Criteria)

	What's gone well?	What could have been done differently?
Identify which of the 15 categories of application the design applies to from the checklist in the Guide to Accreditation Criteria, and provide feedback on each.	<p><b>Site Development</b></p> <p>The development of this site as a base to work from and for simple enjoyment of the land makes the land a more valuable place meaning it will hopefully be looked after in the future.</p> <p><b>Architecture, building and retrofitting</b></p> <p>The physical and visual footprint is very low and the resources to build all the utilities were minimal. On many levels the project shows permaculture in action.</p>	<p>I wonder whether the hut could have been made larger to incorporate a covered shower and toilet. This is still possible as there is space behind the hut.</p>
Clear explanation of how the solution was developed using design process and Permaculture theory.	<p>The solutions are relevant and appropriate to the activity. The project shows clearly how the solution to the problem of providing for basic living needs were addressed using appropriate permaculture techniques. Permaculture approach strategies were used, for example: stacking in space, thinking about relative locations, considering the law of return and keeping consumption and impact down.</p>	<p>Lots could have been done differently and a different arrangement may have worked better but we are very happy with the outcome. I believe that the resources used, which</p>

		were not destined for recycle or landfill, were as low as could practically be.
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### **ACCREDITATION CRITERION: 3. Learning from and developing your permaculture practice**

#### **(Section C5 in the Guide to Accreditation Criteria)**

	<b>What's gone well?</b>	<b>What could have been done differently?</b>
Evaluation of the effectiveness of your design work on this project.	The designs have proved effective. My methods used were straight forward. The design work resulted in the practical side of building being a lot of fun and rewarding as many potential problems were eliminated.	
Reflection on use of design tools and processes, and use of Permaculture theory and practice.	I like the use of design frameworks, thinking tools, and the principles and various permaculture sayings/tips. They provide good, pragmatic advice and keep you on track when things get a bit chaotic.	
How the design shows that your competence and skills in practice and learning is progressing.	The designing to provide for our basic needs has been good and it has helped me take a more structured approach. However, I believe that the most important thing about the whole project has been the realisation of how important it is to observe and interact. I am much better at this than I was before and now fully appreciate its importance.	



Comments about project format, general or specific issues	
Any other comments?	
Conclusions	
How ready is this design for presentation?	
What are the apprentice's next steps?	
The highlight of this design for me was....	

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