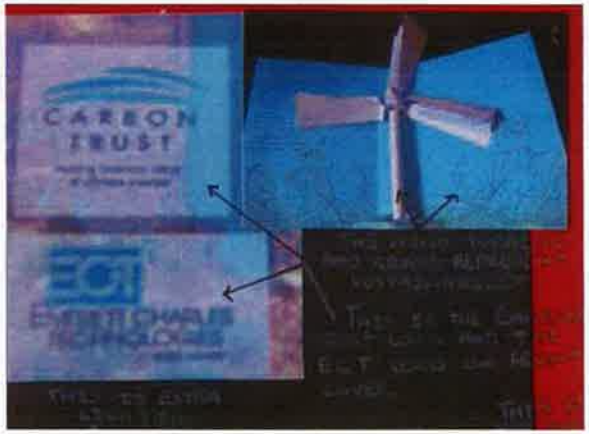
edexcel

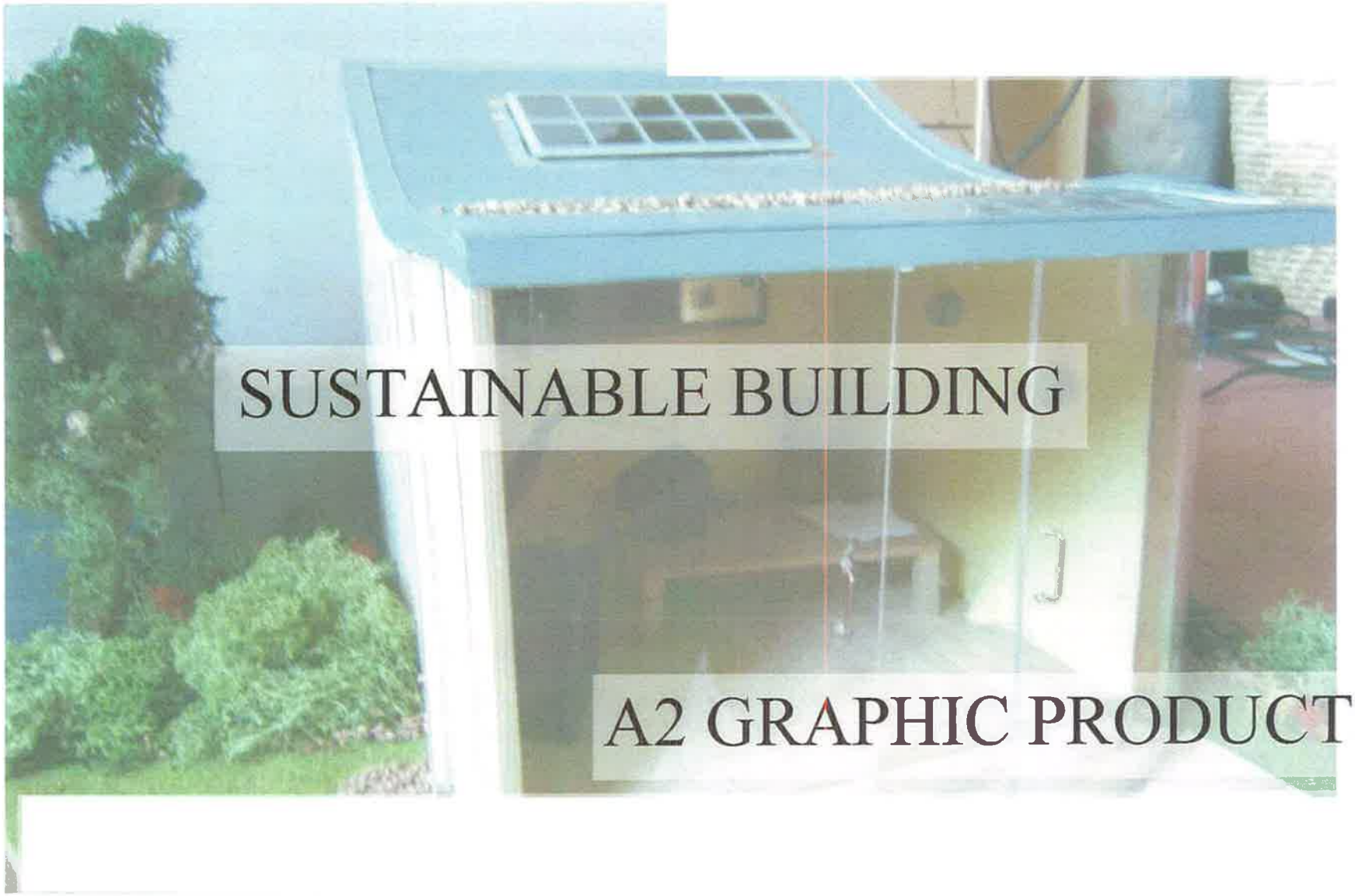
Website Exemplar

GCE D&T Food Technology

Unit: 6GR04

Topic: Sustainable Architecture.


CARBON
TRUST



SUSTAINABLE BUILDING

A2 GRAPHIC PRODUCTS

INTRODUCTION

The environment and its protection is a hot issue in today's society. My friend's father, Colin Moss, has to travel by aeroplane to America and Central Europe quite frequently due to the nature of his position at the Company he works for, Everett Charles Technology. The recent increases in fuel have meant that flights are becoming too expensive, and the manager at Everett Charles Technology has decided to join the Carbon Trust program. Therefore, they have decided for Mr Moss to work at home more often instead of travelling abroad so much.

In light of this, Mr Moss has decided he would prefer an office at home to work from. For a few years now, Mr Moss has been wondering what he could do with a wasted space at the back of his garden. After a conversation with me, he thought he would use this space to combine an office area with a sculptural object, and asked me to come up with a proposal for him, on the condition that it will be sustainable in accordance with Everett Charles Technology's wishes.

The building as architecture is born out of the heart of man, permanent consort to the ground, comrade to the trees, true reflection of man in the realm of his own spirit. His building is therefore consecrated space wherein he seeks refuge: recreation and repose for the body but especially for the mind. So our machine-age building need no more look like machinery than machinery need look like a building.
Frank Lloyd Wright

To design and make a model of a sculptural sustainable office for the space in the back of Mr Moss' garden.

To design and make a 'hints and tips' booklet describing the ways in which a building can be made sustainable.

Sustainability

Sustainable design is a broad concept which aims to reduce the adverse effect of human activities on our world.

Architecture is responsible for about 45% of the carbon dioxide (greenhouse gas) emissions in the UK. Architects are a large part of the problem, and consequently the solution - sustainable architecture. The RIBA, along with the vast majority of architects, recognise this and has taken appropriate strategic action to stimulate the production of sustainable architecture.

The UK government has set a target of reducing CO2 emissions by 20% by the year 2010 – a significant contribution to meeting this target is achievable through sustainable architecture.

Comment

PICTURE this. Upwards of 25,000 people thronging a central square. A carnival, continental atmosphere. And visitors promising to come back again to help keep the city's heartbeat going. Not Paris, Prague or even Plymouth – this was Lincoln in winter and the temporary rink brought to City Square for a two-month period, as the number of people to the ice and no dropped, ate, drank or in Lincoln beforehand. At the same time, there must be a similar number of grandparents and relatives acting purely as spectators – but drawn to the city by the attraction. That is why Lincoln Business Improvement Group is to be commended for its plan to extend and expand the experiment. BIG leaders want to bring farmers' markets, craft stalls and live performances to City Square, as well as an even larger ice rink. Anything which attracts visitors and their spending power into Lincoln should be applauded.

About the Carbon Trust

The Carbon Trust is an independent company funded by Government. Our role is to help the UK move to a low carbon economy by helping business and the public sector reduce carbon emissions now and capture the commercial opportunities of low carbon technologies

What is the Carbon Trust?

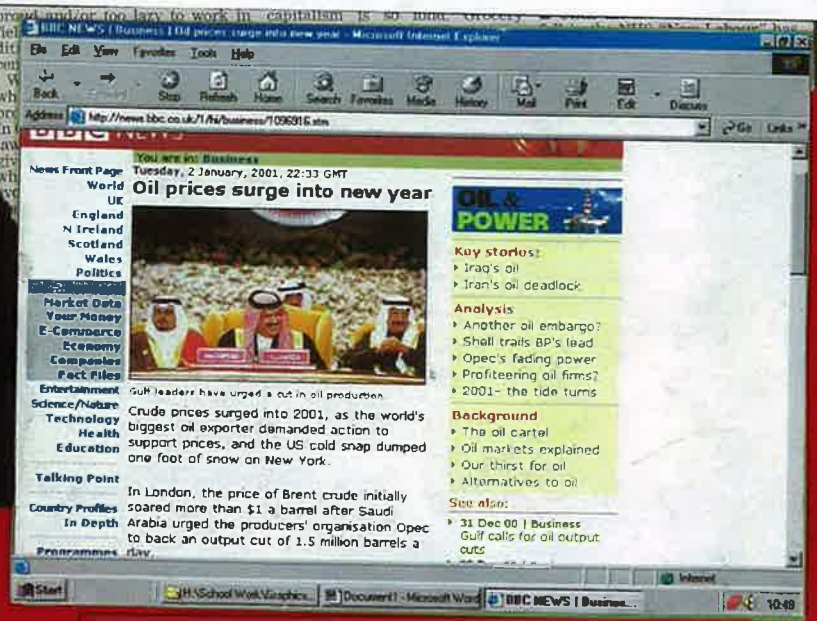
The Carbon Trust works with UK business and the public sector to cut carbon emissions and develop commercial low carbon technologies.

The Carbon Trust People

Our board is drawn from a wide range of stakeholders interested in promoting a UK low carbon economy. Profiles of our management team are also provided.

Contact us

Contact details for the Carbon Trust offices in London, Cardiff, East Kilbride and Belfast.



ANALYSIS

CLIENT

WHAT:

- I must identify my client, Colin Moss', needs and requirements.

WHY:

- This is so I can design this project around Mr Moss' criteria to satisfy him and to make a success of it.

HOW:

- I will create a variety of questions to ask my client in the form of an interview.

MATERIALS

WHAT:

- I mist look at sustainable building materials and their properties.

WHY:

- This is because my client has already specified that the building must display sustainability to some extend.

HOW:

- I will use a variety of resources to find the most suitable sustainable building materials.

SITE/ERGONOMICS

WHAT:

- The site must be looked at in detail before I begin development.

WHY:

- This is so that I can design it to the correct proportions and gain inspiration from the surrounding area.

HOW:

- I will take photographs, measurements and samples from the site and its surrounding area.
- I will also identify any problems and properties I can see on the site.

AESTHETICS

WHAT:

- I must look at the surrounding area and the site and identify any themes and colours that I could incorporate in the design.
- I must also consider colours that like with the theme of sustainability.

WHY:

- This is so I can gain information on how I should design the exterior and interior of the project.

HOW:

- I will use photographs of the site and surrounding area to identify the above criteria.
- I will use a short questionnaire of what people perceive sustainable colours to be

EXISTING PRODUCTS

WHAT:

- I need to investigate existing sustainable buildings that are modern and use materials and processes currently available.

WHY:

- This is so that I can collate ideas and inspirations from other projects for my design work.
- It will also help me decide where materials are best to used.

HOW:

- Using a variety of different sources I will find existing buildings that incorporate sustainability and analyse them for: Materials, shape/colour and sustainability.

RESTRICTIONS

WHAT:

- I must investigate any planning restrictions the local council may have on my proposed project.

WHY:

- This is so I do not design a building that cannot be made because I have neglected to incorporate the necessary requirements.

HOW:

- I will ask the local council to provide me with the necessary documents that tell me the restrictions that must be implemented.

CLIENT

What will be the most important function of the space?

"The two most important functions of the space are to be able to do work at home with the aid of a computer and to be able to produce music."

What kind of environment do you work best in?

"I prefer to work alone and have my own quite space."

What will you require inside the space?

"There are a few things I essentially want: • Chair. • Table • Space for a desk • Electricity supply • Lighting • Internet access • Heating."

CLIENT PROFILE

Colin Moss is married and is a father of three. He currently works for Everett Charles Technology and has one for many years. His hobbies lie in music and his past time is consumed by this hobby; playing guitar is a series of bands.

Is it necessary for you to have more than one room?

"No. I only need one room."

What kind of work will you be conducting in the space?

"Only work on the computer that requires basic programs. And also music production."

Will there be more than one person in the space at one time?

"No. Generally only me."

What times in the day will you mostly be using the space?

"From 9 in the morning until 10 at night.

How important is the exterior in terms of your garden and from an aesthetic point of view?

"Very important. I want it to blend in with my garden."

What is the maximum amount you are willing to spend on this project?

"Unlimited."

Is it important for you to be able to see the outside environment?

"Oh definately. It would be good to get light in and I like to look at my garden."

MATERIALS

In building, maintaining and managing houses, vast quantities of natural resources are used-including energy, water, materials and land-and large amounts of waste produced. Residents living in the houses account for even greater resource use than during construction and refurbishment. For this reason it is important that the environmental impacts of the construction, refurbishment and use of homes are considered. Housing accounts for nearly a third of CO output-as much as the entire transport sector combined, and is a major contributor to global warming.

The main agent of delivery is the Sustainable Communities Plan, launched in 2003 and revised in 2005. Under the plan, the rate of construction will increase, with the identification of several areas for increased housing growth. The plan is committed to delivering this growth in a balanced, more sustainable way, in terms of design and construction, impacts on the environment, and in the quality of communities and neighbourhoods created.

In 2003 the government published the Energy White Paper with the aim to shift the UK to a low carbon economy by increasing resource productivity and reducing the impact of CO on the climate. The paper sets four goals and establishes a framework with an emphasis on sustainable energy. Of particular significance is the goal of a 60% reduction of CO emissions by 2050, with evidence of this being achieved by 2020.

ECOHOMES, ACHIEVING VERY GOOD-2006

DWELLINGS USING GAS-V-OTHER TYPES OF FOSSIL FUELS (BRE)

FUEL TYPE	CO EMMISIONS (KG/GJ DELIEVERED)
ELECTRICITY	139
DOMESTIC COKE	106
DOMESTIC SOLID FUEL	103
ANTHRACITE	89
DOMESTIC COAL	81
FUEL OIL	78
LPG	61
OPG	58
NATURAL GAS	53
WOOD	0

ECOHOMES, ACHIEVING VERY GOOD-2006

One of the biggest effectors to the environment is the producing and day to day use of buildings. They can harm the environment not only through the carbon emissions they produce through heating (as shown in the table from the Ecohomes-Achieving Very Good, 2006 edition) but also through the deliverance and usage of materials.

A material can be un-sustainable for many reasons, but it generally depends on where and how the material has been sourced. If a natural material is taken from an environment where it cannot or will not be replaced, then this has serious consequences for the environment. Wood is a prime example, for when a tree is cut down and not replaced, habitats can be destroyed affecting the wellbeing of wildlife. It is also destroying another source of oxygen which is the most essential product of life. If a building is made out of a wood given from these types of forestry, then this has a major affect on the environment due to the large quantities usually required for property in particular.

The area from which a material is transported from also has a negative impact on the environment, though not so intense. For example, if a substantial amount of stone has to be transported from another country or even over a few hundred miles, then this causes impact on the environment through the vehicle that it used to transport it. Either by flight, ship or road vehicle, all use fuel and therefore create carbon emissions throughout the journey.

There are other materials that are instantly un-sustainable. The majority of plastics, if not recycled thermo-plastics, are not only man-made (which essentially means that a lot of energy must be used in order to create the product, hence creating excessive carbon dioxide) but the digging of the oils required to produce the plastics has a serious affect on the landscape and physical environment.

SOLUTIONS

- Cut down on heating loss through accurate ventilation.
- Use materials that com from a natural source.
- Natural materials should be sourced from a maintained site.
- All materials should preferably come from a local area.

MATERIALS CONT.

Below are
being sustain
most commo
availabl

The following environmental issues need to be considered during the materials selection process:

- Embodied energy [climate change, Fossil fuel depletion]
- Ozone depletion
- Freight transport
- Human toxicity
- Waste disposal
- Water extraction
- Acid deposition
- Ecotoxicity
- Eutrophication
- Summer smog
- Minerals extraction

GLASS CONCRETE WOOD
LOCAL MATERIAL
SUSTAINABLE

SARNA

CONCR

Although concrete is traditionally seen as
manipulated in the right way it can prove
especially when it comes to heating. If th
and compact then the concrete will provi
resource. The thermal capacity of concre
or fabric energy storage) enables it to abs
buildings, heat is generated by people, c
solar gain. Thus, buildings, especially of
during the warmer months of the year. E
daytime temperatures can be reduced by
can be delayed by up to six hours. At nig
concrete, priming it for the next day.
By reducing the need for air-conditionin
reduced by 50% over a buildings life.

WOOD

Wood is one of the most sustainable mater
used, but this is only if it is sourced from t
environment. Wood that is cut from manag
those in Canada, can provide a good sustai
trees that are cut are then replaced in a ten
however is far from here, and so importi
will use a lot of energy and create a lot o
from the transportation) will out-weigh
of the environment. It is therefore better in some
circumstances to source the wood from a local area, whether
it be from the site itself, or if unavailable from a foreatry
closer to home.

RAINSCREEN

There are other ways of creating a sustainable building besides using sustainable materials. The following are different methods of doing so.

The essentials of a Rainscreen system are to allow the ingress of air at the base of the system and the egress of air at the top of the system. This ventilated cavity allows any water, which penetrates the panel joints to be partly removed by the 'stack effect' and partly removed by running down the rear face of the panels and out of the base.

Advantages:

- Problems of deterioration are halted with minimal additional load being applied to the existing structure
- Energy saving - lower running costs due to greatly improved thermal insulation
- Easily removed panels for monitoring of structure
- Reduction of the risk of condensation due to the elimination of cold bridges

Principals:

- A Rainscreen system consists of an outer panel, a ventilated cavity and an inner leaf
- In driving rain conditions moisture forms a membrane across the baffled vertical and horizontal joints
- The majority of water is deflected off the outside face - any penetrating water is disposed of through drainage
- Rainscreen systems differ from brick wall sealed construction as the beneficial effects to air movement are utilised
- A Rainscreen system is pressure equalised - the joints are open or lightly baffled, allowing pressure equalisation in driving rain conditions to be instantaneous. Pressure inside the cavity is equal to pressure outside - ie, precipitation has no inclination to be driven into cavity.
- A continuous vertical cavity - At least 25mm deep

VENTILATION

Ventilation with fresh air is vital in a healthy building, and convection plays a leading role in natural ventilation. Hot air rises and escapes through small gaps in the building fabric at the top. As it does so it draws in new cold air through similar gaps at the bottom of the house. The powerful suction created by escaping warm air is called the stack effect, or sometimes the chimney effect because it is the same process that draws smoke up a chimney or smokestack.

When carefully controlled it can produce a low and effective level of natural ventilation. If respected and built into the house design, the stack effect is by far the most effective way of keeping a house ventilated in summer. Over the past ten years environmental building has paid increasing attention to generating a stack effect to create natural ventilation, especially in large buildings. In a typical design tall chimneys at the top of the building create a powerful draw and fresh air is pulled into the building through specially placed controllable vents around the outside wall.

SITE ANALYSIS

INITIAL PROBLEMS

THERE IS ALOT OF DEBRI THAT MUST BE CLEARED BEFORE ANY WORK SHOULD BEGIN.

← MR MOSS'

HOUSE.
- DETATCHED
- WITH CONSERVA-TORY.

THESE TREES AND BUSHES MAY HAVE TO BE CLEARED TO MAKE ROOM FOR BUILDING WORK TO BE DONE AND ACCESS

SIZE

AESTHETICS

AGAIN THIS WAS TAKEN FROM THE SITE. THIS PARTICULAR LEAF CURVES AND FOLDS ↓ THIS I FIND EXTREMELY USEFUL

SIDE VIEW

↓ THOUGH SQUARE, THE SHAPE OF THE SHED COULD BE REFLECTED IN THE DESIGN.

HERE A LEAF NEAR IS QUITE ESSENTIALLY COULD SHAPE DESIGN

↑ IS SAMPLE OF FROM A TREE SITE. THE SHAPE TE BASIC BUT IALLY IT GE USED FOR IN THE

↙ THIS TERRACOTA COLOUR COULD BE REFLECTED IN THE DESIGN PARTICULARLY WITH THE EXTERIOR WALLS.

↓ THIS IS AN INTERESTING FORM. THIS COULD BE MANIPULATED TO FORM EXOTIC PATTERNS FOR THE DESIGN. THE COLOUR OF THE FLOWER MAY NOT PARTICULARLY SUIT THIS DESIGN.

↑ THE COLOUR OF THESE LEAVES, THOUGH NOT SUSTAINABLE (PURPLE) WHEN MAN-MADE LOOKS INTERESTING AND, IF USED, WOULD

THIS DARK GRAY COULD BE MIRRORED IN A STONE OR CONCRETE IN THE DESIGN.

For this questionnaire, 50 people between the ages of 16-60 were asked the following questions:

"What is a Sustainable Colour?" -Questionnaire

WHICH OF THE FOLLOWING DO YOU THINK YOU ARE SUSTAINABLE COLOURS? (TICK AS MANY AS YOU LIKE)

☐ RED	☐ BLUE	☐ BROWN
☐ ORANGE	☐ PURPLE	☐ OTHER
☐ YELLOW	☐ BLACK	IF OTHER PLEASE SPECIFY
☐ GREEN	☐ WHITE	.....

GREEN

Green is most commonly associated with sustainability because it is a colour most commonly seen within the environment e.g. grass, leaves, plant life, some animals, pond life. Sustainability is linked and meant to complement the environment.

WHITE

White is the colour of purity, and so this links with sustainability as it is consider a 'pure' concept because of the purity of nature.

BROWN

Brown is dirt, soil, wood, and wildlife; it is therefore a perfect representation of the environment and the protection of through sustainable building.

EXISTING PRODUCTS

Obviously there is a primary material used in this example: timber. As previously shown, timber is a very environmentally friendly product in the right circumstances (and I shall presume that the circumstances are appropriate). Other materials such as concrete are used in small samples for the support, which is generally necessary as concrete is a very strong material. All the stated materials would be most suited to this project also as they are easy and cheap to purchase. They are also cheap to construct and so there would not be an issue of expense from the actual building process. This is a very flexible design as it looks like a simple building to construct and therefore can be manipulated into a variety of designs if necessary. As it is made out of wood there is a clear issue of maintenance and coats of protector and varnish would have to be applied relatively regularly. For this specific project I think that this design could be well suited. It has the basic constructional needs and could easily be adapted to smaller projects.

CLIENT'S VIEW...

"This is similar to what I had in mind. I certainly like the wooden panels, especially the colour of the timber. I think the soft wood used here would go well in my garden as most of the trees behind it are soft wood trees. I also quite the balcony area in this design. I think it simulates tranquility and, along with the steps, it sets it back from the rest of the garden, which is appealing."

CLIENT'S VIEW...

"I really like the front window in this building. It covers a large part of the building which I like as I really like the concept of glass. I also think the curvaceous form of the building is very nice. Not really sure on the roof."

The main materials used here would probably be stone, thatch and glass with a white wash on the walls. This is very small and compact and looks aesthetically pleasing for a sustainable/country cottage view, but with this comes complications. The thatch roof in particular is very impractical for both maintenance purposes and for the location it could be used in. A thatch roof can be very expensive to maintain and for a smaller project such as this it would be impractical because the maintenance alone would probably cost more than the actual building. Although thatch roofs can be useful for heating purposes, under trees (to which it would be applied if used in my project) mould and mildew would form in the thatch and cause serious consequences. In terms of the shape of the design, it would be very space consuming as it is of a circular shape and the shape of the site would make it look out of place.

EXISTING PRODUCTS CONT.

Though this design is quite unique, the practicality of it is low. The thatch roof has the same impracticalities as the previous design. Under a tree mould and mildew would grow in the roof and the maintenance of such a roof would be extraordinary. The mud stone construction holds similar impracticalities due to the regular rain England gets. It would also cause problems with cost and time as it would be substantially expensive to build. Despite all of this, it would be a fantastic design to mould and shape into a design suitable for this project as the type of material that it is primarily used is very durable and flexible.

CLIENT'S VIEW...

"Again, the round circular shape of this building is pretty good. I don't really like the idea of small windows and I wouldn't want solid stone. I prefer texture. Again, not too keen on the roof."

Despite the fact that this is not a detached building and does not have similar purposes as the other, the concept and aesthetical properties are related to this project. Because it is largely made out of glass this creates a sense of sustainability and would create a lot of light. Though the basic frame work in this example is PVC, this could be substituted with timber of a stronger nature (e.g. mahogany). With conservatories, they are usually custom built so it would not be difficult to adapt it to this particular project as it could decide how big and what shape it should be. The life expectancy of such a building would be very good if the frame was made out of PVC. PVC, though not sustainable, it is low maintenance so there would not be an issue where that is concerned, and to make it more sustainable, more glass could be used in place of some of the PVC.

CLIENT'S VIEW...

"I really like the timber on this one. This is definately something that would suit my garden. But I don't really like the finish on the wood. I prefer lighter colours."

CLIENT'S VIEW...

"The two tone structure of this one is good. The brick and the glass works well. I prefer lots of glass, so this is quite good for that, but maybe it shouldn't be so divided. Larger planes of glass is better; makes it look more open."

The slate roofing in this design could be very useful for this project as it would be functional in the site situation. This is because being under many trees, rain and residue will form onto the roofing and so it is important to have a material that will protect the interior for absorbing the rain/residue etc. This is a very flexible design as the wooden panels could be redesigned to form a building on a smaller scale. The life expectancy of such a design would depend entirely on what type of wood it was made from and what finish it had. A varnish would have to be applied that provides security of the wood from all weather conditions and also faded and rot.

RESTRICTIONS

Building Control Guidance Note

Subject

Issued

"SPECIAL LOCATIONS" means a location Showers / Swimming / Paddling Pools or Hot / published by the Institution of Electrical Engine

NOTE: *See I.E.E. Guidance Note 7, which giv risks to people are greater.*

I am intending to build an exemp garage / building or carport – do the Implication on the Building Re

Answer: If you intend to provide electrical li receives its electricity from a source shared wi application is required for the electrical work. F exempting the above works.

Building Cont Guidance Note

How do I make a Bu

Answer: If the notifiab extension to your house – for the extension. Any plan cover the electrical installat

Otherwise ***before works*** plans are provided showing

OR

You can submit a **Building** e.g. does it include kitchens

Both application forms in

IMPORTANT NOTES FO ***PLEASE ADVISE YOUR C***

Office of the Deputy Prime Minister

Creating sustainable communities

Building Regulations

Explanatory Booklet

Llywodraeth Cynulliad Cymru
Wsh Assembly Government

NT NOT NEEDING PLANNING PERMISSION

n & Country Planning (General Permitted Development) Order 1995.)

Enclosures, Swimming or Other Pools
nched garages, greenhouses, sheds, stables, aviaries, etc.)

need planning permission provided that:

- incidental to the enjoyment of the dwelling
- oes not involve satellite antenna
- no nearer to the highway than original dwelling or 20m whichever is nearer
- not within 5m of dwelling if over 10m³ (otherwise counts as extension to dwelling)
- no more than 4m high (pitched roof) or 3m high (flat roof)
- s not, together with extensions etc. cover more than 50% of garden
- ess than 10m³ if in conservation area or within curtilage of listed building

Building Control Guidance Note.

Subject	DETACHED DOMESTIC SINGLE STOREY BUILDINGS – SHEDS / GREENHOUSES / GARAGES AND ATTACHED CARPORTS EXEMPT FROM BUILDING REGULATIONS.							06
Issued	22/10/04	Rev		Page	1	of	2	

Small detached single storey domestic buildings including greenhouses, sheds, garages and attached carports meeting the following conditions do not require Building Regulation approval:

1. Detached garages or structures with an internal floor area **not exceeding 15 m²** and built of any type of construction that does not effect disabled access and contains no electrical supply ***(see notes below**)*** are wholly exempt from Building Regulation approval.

2. Detached garages or structures with an internal floor area **not exceeding 30 m²**, built of any type of construction and sited so as to be a **minimum of 1metre** from any boundary line, that does not effect disabled access and contains no electrical supply ***(see notes below**)*** are wholly exempt from Building Regulation approval.

3. Detached garages with an internal floor area **not exceeding 30 m²** and **built of substantially non-combustible materials***, that does not effect disabled access and contains no electrical supply ***(see notes below**)*** are wholly exempt from Building Regulation approval.

   ***Examples of what constitutes substantially non-combustible materials*:**

   ROOF - non-combustible cement based sheeting fixed to steel roof trusses / tiled or slated roof on timber roof trusses or timbers / timber flat roof covered with felt with applied bitumen bedded 12.5mm limestone chippings.

   WALLS – brickwork / blockwork / concrete panels / steel frame clad in non-combustible cement based boarding.

   FLOORS – concrete slab.

4. Carports **open at least two sides** attached or detached from the main building, with an internal floor area **not exceeding 30 m²** that does not effect disabled access and contains no electrical supply ***(see notes below**)*** are wholly exempt from Building Regulation approval.

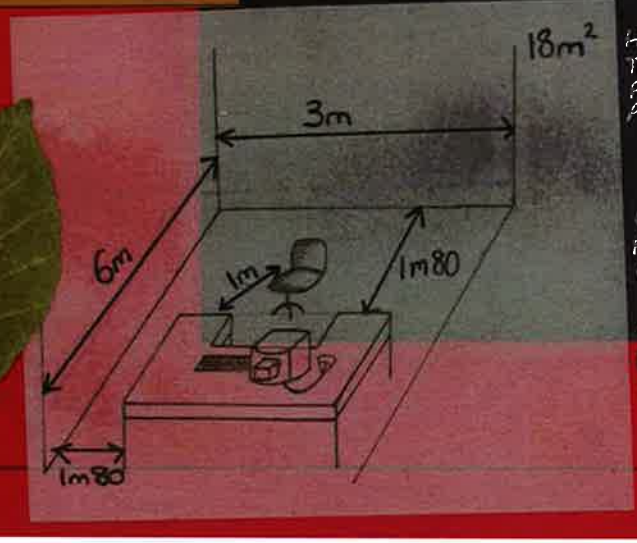
FURTHER RESEARCH

When interviewing my client I became aware of some further research I must do in order to create a product most suitable for him. The response to the question, **"What will you require inside the space?"** brought up an array of factors that I must consider when designing the space. For example I must include an area for a chair and a computer desk. There also must be ports for electricity and therefore lighting and heating, and also internet access. Although the latter is not particularly important for what I am aiming to achieve, I can look into ways of creating more light and heat through use of building techniques. Another issue I found through interviewing my client was that he is keen to be able to play and produce music in this space as well as being able to conduct work in it. I therefore have to look into the sizes of guitars and amps, and also look briefly into sound proofing.

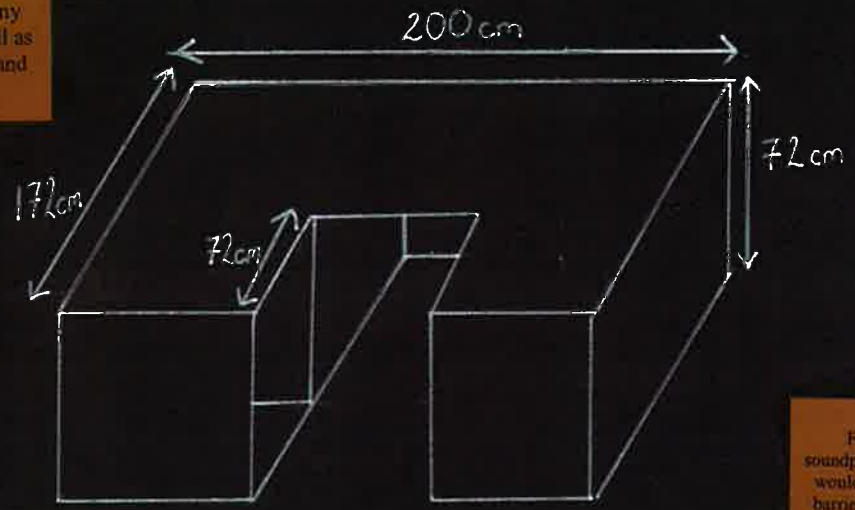
WHAT I MUST LOOK AT FOR FURTHER RESEARCH

- Size of a typical computer desk.
- Size of a typical chair that will match the height of the computer desk.
- Identify different ways of creating more light in a building.
- Size of client's guitar and amps.
- Investigate briefly the use of soundproofing.
- Distances required in between a desk and chair for comfortable use.

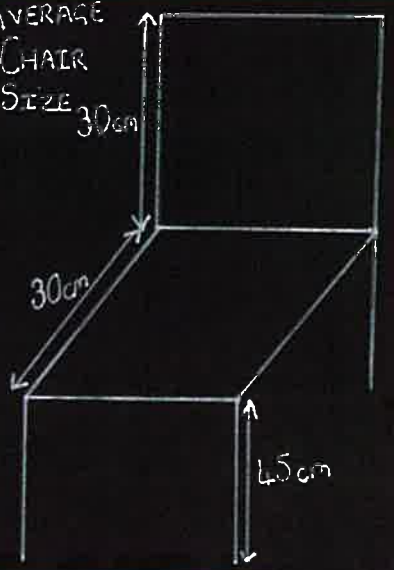
Here is an example of a typical office and the space that is required for a comfortable working environment.



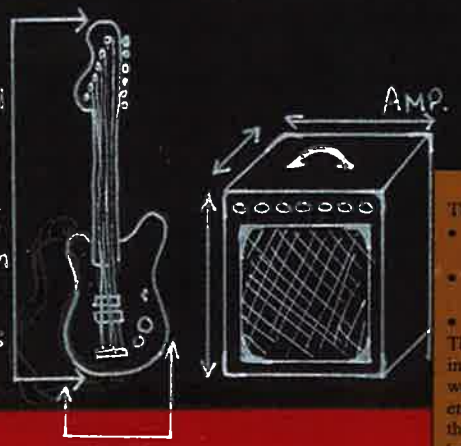
AVERAGE DESK SIZE



AVERAGE CHAIR SIZE



THIS MEASUREMENT HAS BEEN TAKEN FROM AN AVERAGE 101.65 cm OF THREE POPULAR DESIGNS OF GUITAR (NOT INCLUDING ACCOUSTIC)



SOUNDPROOFING

For this particular project, the soundproofing that would be most useful would be wall soundproofing. A noise barrier can be constructed from almost **any non-porous material**. This means that materials such as stone (and stone based products such as concrete) treated wood, dense plastics (e.g. polystyrene) and dense metals. Soundproofing can also be achieved by the use of compact layers of materials.

CREATION OF LIGHT

There are many simple ways of creating more light in a building:

- Creating more window space to maximise the amount of light coming into the building.
- Situating the building strategically so that during the day, the maximum amount of light can fall on the building.
- Installing sufficient electrical lighting in the building.

The latter is not very environmentally friendly so it's not suitable to introduce more electrical lighting. With a combination of the first ideas, it would allow the most amount of light to enter the building whilst saving energy. The only problem with creating more window space is that when the sun is shining through the windows, it will cause the interior of the building to heat up dramatically.

FURTHER RESEARCH

Further research should be carried out to investigate means of creating electricity in a sustainable fashion, and for useful information that can be included in the information booklet.

Solar energy can be captured by solar panels. There are 2 main types of solar panels which uses complete different technologies to make use of the energy from the sun:

- Solar Water Heating collectors: These panels absorbs the energy from the sun and transfer it to heat water.
- Photovoltaic or solar electric panels: These panels transform the solar radiation directly into electricity.

For maximum efficiency, solar panels should be mounted on a south facing roof at a 30° angle with the horizontal and away from any shadows from trees, surrounding buildings or chimneys.

Solar water heating
Solar Power Solar water heating systems are the most popular form of solar energy used in the UK. The system is connected to the hot water system. Solar water heating systems can provide over half of a household's hot water requirements over the year. There are two types of solar water heating collector: flat plate and evacuated tubes.

Flat Plate Collectors: Solar water heating panels in their simplest form are made from a sheet of metal painted black which absorbs the suns energy. Water is fed through the panel in pipes attached to the metal sheet and picks up the heat in the metal. For the UK climate the pipe work contains non-toxic anti-freeze. The pipes are often made of copper for better conduction. The metal sheet is embedded in an insulated box and covered with glass or clear plastic on the front. The system is usually installed on the roof.

Evacuated Tubes: The evacuated tube system is a series of glass heat tubes grouped together. The tubes are highly insulated, due to a vacuum inside the glass.

Cost
The cost of installing a solar hot water system ranges from approximately £500-£1500 for a DIY system, to £2000-£5000 for a commercially installed system. These prices however, are dependent on the size of the system. A typical installation in the UK has a panel of 3m2 to 4m2 with a storage tank of 150- 200L (2m2 for evacuated tubes). However, the optimum size will depend on actual hot water use. This can be calculated using software to simulate system performance throughout the year.

Photovoltaic (Solar Electric)
Photovoltaic (PV) or solar electric can offer us all the ability to g
electric are numerous. Photovoltaic (PV) cells are used in simple
systems can be integrated into buildings to generate electricity fo

PV applications today are more common place than we might exp
system. In Milton Keynes, parking meters are powered by solar p
lighting in caravans and nautical instrument.

The daylight needed is free, but the cost of equipment can take m
expensive, PV can be the most cost effective power source.

Passive solar
The use of passive solar design is possibly the simplest form of s
possible. The location and orientation of the building are all key f

Passive solar design can be best applied in new buildings, where
within an area, and materials used for the remainder of the structu
need not add to the price of construction.
Studies on houses in Milton Keynes have shown that low cos
40%. Savings paid back the costs in two years.

1. Improve installation
Around half the heat lost in your home escapes through the walls and roof. Cavity wall insulation costs about £260, can take a couple of hours to install, and could save you up to £160 a year on fuel bills.

2. Use timers and thermostats
Take control of your heating and you could save energy and money. Reducing the temperature on your thermostat by 1 degree could save up to 10 per cent on heating bills.

3. Switch to energy saving light bulbs
Choosing energy-saving light bulbs is one of the easiest ways of cutting your energy use. If every household in Britain replaced just three normal bulbs with energy savers, enough energy could be saved to run all the country's street lighting.

4. Wash clothes at 30 degrees
Your washing machine uses energy and water more efficiently when it's full, and washing at lower temperatures saves energy too.

5. Turn off appliances
Electrical appliances left on standby waste six to ten per cent of all energy used in the average home. Switch TVs, stereos, mobile phone chargers and other gadgets off at the switch or the plug when you're not using them.

6. Install water saving products
Low flush volume toilet cisterns and aerating heads on washbasin taps help reduce your water use significantly.

SUMMARY OF RESEARCH

FURTHER RESEARCH CONT.

To generate electricity in a sustainable way the following things could be used:

- A 12w wind turbine could be used as it is small, compact and relatively in expensive.
- A Photovoltaic (Solar Electric) panel could be used as this converts heat into electricity.
- It would only be necessary for one of these type of energy generators to be used as the building will not require large amount of electricity, however both could be used as a safe guard.

- There are several ways to ensure maximum sustainability for a house, all are inexpensive and can be done during the daily routine. These can be listed in the leaflet for further information on who live in a sustainable manner.

CLIENT

- The client has two priorities for the space: to play his guitar and produce music, and to have space for a computer. This means I will have to create enough space for a desk for a computer (and the relevant necessities that go with this e.g. chair) and there must be space for a guitar and an amp.
- The client prefers to work alone in only one room so it is not necessary to create a space with more than one room or to make space for more than one person.
- It is important for the client to have a building that blends in comfortably with the site, and there should be methods of seeing the outside environment from the inside. Therefore methods of creating more light should be included (e.g glass).
- Primarily the client would like to use the space from 9 am to 10 pm during the day, so lighting inside the building must be considered for different times in the day.

MATERIALS

To make a building sustainable the following factors must be considered:

- Accurate Ventilation
  SOLUTION
  Use stack effect-this controls the level of hot air and cold air circulating the building.
- Naturally Sourced Materials
  SOLUTION
  Materials such as wood and glass can be sourced naturally. Specialist glass such as *Pilkington Activ* and bioclean glass helps to create a more sustainable building as they are self cleaning.
- Materials From Maintained Site
  SOLUTION
  The wood that is used should be collected from a maintained site such as those in Canada and Sweden so that the wood used can be efficiently replaced.
- Materials Should Come From A Local Area
  SOLUTION
  If concrete is to be used, then the materials used should be from the site or local area (e.g. old crushed brick from an destroyed building).

SITE

- Before any work must be done, the site must be cleared of all debris.
- The maximum size that the building should be is 4.27m x 4.29m.

AESTHETICS

- Key inspirations should come from leaves, flowers and trees from the surrounding area.
- Green, White and Brown are the colours most associated with sustainability, so these colours should be considered more than others.

RESTRICTIONS

- There are few restrictions for a building as small as this.
- The building must be at least 1m away from the boundary of the property.
- The building must be no more than 30m .

EXISTING PRODUCTS

- Wood is the easiest material to build smaller projects with.
- Tile roofing is the most suitable for this project because of the trees near the site.
- The client particularly likes the wooden style with plenty of glass, so this should primarily be used.

FURTHER RESEARCH

- For a comfortable working area, an office must be at least 18m .
- The average guitar is 1.02m x 0.34 m.
- The average amp is 1m x 0.5m x 0.3m.
- The average desk is 0.72m x 2m x 1.72m.
- The average chair is 0.3mx 0.3m x 0.45m.
- The easiest way of creating light is to maximise window space, situate the building so that it is central in the east and west (sun rises in the east, sets in the west) so that the maximum amount of light can go in the building.
- A non-porous material should be used, such as concrete, for the walls so that it can be soundproof.

SPECIFICATION

1. The building should be identified as sustainable. This is because Everett Charles Technology has specifically asked for this in accordance with the Carbon Trust Program.

2. The space must be a maximum of 4.27m by 4.29m (or 4.3m x 4.3m approx) in length, and have an interior space size of at least 18m² (4.25m x 4.25 approx). This is because this is, firstly, the maximum space available in the site, given the 1m boundary recommendation by the Lincoln City Council building restrictions guide and it is in accordance with the guide given for a comfortable working environment. It also means that it will be less than 30m² so it will class as a small property and therefore will need no planning permission.

3. An entrance point should be applied to the building so that Mr Moss can enter and exit the building.

4. There should be plenty of window space that Mr Moss can see out of. This is because he has specifically required that he would "like to look at [his] garden" when he's inside the space.

5. Preferably the building should have two straight sides as this will ensure that the maximum about of space can be used inside the site because the two fences are not to be moved so create a fixed boundary.

6. Aesthetically the building must blend in with the garden by the use of inspiration from the site its self as this has been specified by the client.

7. The building should be representative of the following colours: green, white and brown. This is because, when doing a questionnaire, these were the three colours most clearly identified with sustainability. This is particularly important as it was specified by Everett Charles Technology (Mr Moss' company) be sustainable, so therefore if it were to look sustainable also it would be a bonus.

8. Accurate Ventilation should be used as this was identified to be a sustainable method of heating and cooling, which is important for this building.

9. Naturally Sourced Materials should be used as this was found to be a sustainable way of finding materials.

10. Materials should also be sourced from a maintained site. This means that the materials used will be sustainable as they will be a renewable material.

11. Some materials should come from a local site as this was found to be a suitable method of gathering sustainable materials.

12. Wood should try to be used somewhere on the building as Mr Moss particularly liked the wood style used on the some of the existing products, and wood was also found to be a sustainable product when sourced from the correct location and means.

SPECIFICATION-INTERIOR

12. A desk should be provided in the space that can accommodate a computer. The desk should be 0.72m x 2m x 1.72m in size. This is because this was the average size of a desk found from a mean average of 3 desks likely to go in Mr. Moss' space.

13. A chair should be provided in the space for Mr Moss to work at the desk comfortably. The chair should be 0.3m x 0.3m x 0.45m in size as this is the average size of a chair taken from the mean average of 3 chairs most likely to be used by Mr Moss.

14. In the space there should be room allocated for a guitar and amp which are approximately 1m x 0.35m (guitar) and 1m x 0.5m x 0.3m (amp). This is because a function Mr Moss has asked for is that he would like to play his guitar and produce music in the space as well as do work.

15. The space must contain one room as the client states "I only need one room" and also for the amount of work he will conduct in the space, it is not sufficient that he needs more than one room.

16. The space should provide plenty of natural light that will enter the space for as long as possible. This will satisfy Mr Moss' need to be in the space from 9am until 10pm as light will be entering the building for as long as the sun is shining, which, apart from in autumn and winter, will be largely for most of his required time.

17. For the autumn and winter months and the later nights that Mr Moss will be using the space, extra lighting inside the building should be provided. This is so that Mr Moss can work efficiently in his space with the aid of lighting when natural light is insufficient.

SPECIFICATION-2D

1. The booklet must contain clear and concise information explaining to the reader how to make a house sustainable. This is so that it is easily accessible for any reader to analyse and use effectively.

2. It must be suitable for batch production as this will be the inevitable intention for Everett Charles Technology to re-produce this.

3. Aesthetically it must be representative of Everett Charles Technology and the Carbon Trust as they will be the sponsors for this booklet and will require their presence to be known on the product.

4. It also must reflect its contents aesthetically. T s so that it is obvious to the reader as to what the booklet is about.

15.

INITIAL IDEAS

THIS IS A DRAWING OF SOM LEAVES FOUND ON TH SITE.

THIS IS A DRAWING OF A FLOWER FOUND ON THE SITE.

THOUGH THE CURVES MAY BE DIFFICULT TO CREATE, IT WILL BE POSSIBLE. CONCRETE IN PARTICULAR IS

FOR THIS DESIGN I TOOK THE OUTER SHAPE AND TRANSLATED IT INTO THE FRONT SHAPE OF THE BUILDING.

ALTHOUGH THIS DESIGN DOESN'T HAVE STRAIGHT SIDES AS SPEC. POINT 5 SAYS, IT COULD BE POSITIONED TO FIT THE SITE.

MEETS SPEC. POINTS: 1, 3, 7

CLIENT VIEW

"I like the curves in the design. The general shape is pleasing but glass would be better if it was more prominant"

THIS DESIGN IS QUITE FLEXIBLE IN TERMS OF MATERIAL USE. WOODS, CONCRETE AND GLASS COULD ALL BE USED TO CREATE THE SHAPE.

WINDOW SPACE

THE SHAPE OF THE ROOF HERE COMES FROM THE SHAPE OF ONE OF THE ABOVE LEAVES. HERE IT IS USED AS A CANOPY-TYPE ROOF WITH A GLASS FRONT.

CLIENT VIEW

"I really like this. I particularly like the curved glass front and the reused idea shown. The roof simulates a leaf which is also quite an attractive

THIS IS QUITE A STRONG DESIGN IN TERMS OF ADAPTABILITY AND AESTHETICALLY IT WOULD BLEND WITH THE GARDEN AS SPEC. POINT 6 REQUESTS.

MEETS SPEC. POINTS: 1, 4, 6, 7, 12, 16

WOODEN SUPPORTS

THE GLASS FRONT MEETS THE CRITERION OF SPEC. POINT 4 AS IT WILL PROVIDE ADEQUATE SPACE FOR MR MOSS TO VIEW HIS GARDEN. IT WILL ALSO MEET SPEC POINT 16 BECAUSE IT WILL PROVIDE EXTRA LIGHTING.

A MAIN PROBLEM WITH THIS DESIGN IS THE LACK OF AN ENTRANCE INTO THE SPACE!

HERE I TOOK THE SHAPE OF THIS LEAF TO CREATE THE TOP OF THE DESIGN.

BIRDS EYE VIEW.

STACK VENTILATION SYSTEM COULD BE EMPLOYED HERE.

MEETS SPEC. POINTS: 1, 3, 7

DRAINING SYSTEM OR POROUS MATERIAL MUST BE APPLIED HERE AS CONCAVE SHAPE COULD

THIS PARTICULAR DESIGN IS PROBABLY TOO BIG WHEN YOU TAKE INTO ACCOUNT THE SIZE OF THE DOOR. HOWEVER THIS COULD EASILY BE ADAPTED

NO WINDOW SPACE ALLOCATED.

THE IDEAL MATERIAL FOR THIS IS PROBABLY WOODEN PANELS WITH AN INITIAL CONCRETE INTERIOR. THIS IS PRACTICLE AS IT WILL MAINTAIN HEAT INSIDE THE BUILDING.

I IDENTIFIED THIS INTERESTING SHAPE FROM THE RUBBING AND THOUGHT IT COULD BE TRANSLATED INTO A DESIGN.

HERE IS A RUBBING FROM THE TRUNK OF A TREE ON THE SITE

THE 'HEAD' OF THIS SHAPE IS QUITE UNATTRACTIVE AS IT REPRESENTS SOME SORT OF ANIMAL THOUGH THIS IS NOT INTENDED.

THE SHAPE FOR THIS DESIGN CAME FROM THE SPACE IN BETWEEN THESE LEAVES

CLIENT VIEW

"The roof here is very interesting. A shaped roof like this may be something to consider"

THIS DESIGN IS LIKELY TO BE TOO TALL AS THE WINDOW AND DOOR CURRENTLY LOOK DISPROPORTIONATE.

CLIENT VIEW

"The large glass front is definately something I was looking for."

THE PRACTICALITY OF THIS ELEVATED SHAPE IS NOT VERY GOOD. TO MAKE THIS WORK EFFECTIVELY, A SUPPORT SYSTEM SHOULD BE APPLIED.

MEETS SPEC. POINTS: 1, 4, 3, 6, 7, 12, 16

E.G. WOODEN OR METALIC SUPPORT SYSTEM.

CLIENT VIEW

"I don't like the shape at all. It looks too animal-like. No, I can't see this in my garden at all."

AGAIN A DRAINING SYSTEM MUST BE APPLIED AS THE CURVE WOULD COLLECT SUBSTANTIAL WATER WHEN IT RAINS.

MEETS SPEC. POINT 1, 3

IT IS DIFFICULT TO IMAGINE HOW THIS SHAPE WILL MOULD INTO THE SITE. IT IS TOO LONG AND THIN WHIC IS FAR FROM THE SHA

16.

INITIAL IDEAS

AS THE 3D SHAPE IS WOULD BE ALMOST PYRAMID, IT WOULD BE SUITABLE FOR THE LAYOUT OF THE SITE.

GLASS FRONT

MEETS SPEC. POINTS: 1, 3, 4, 6, 7, 12, 16

THIS MEETS SEVERAL SPEC. POINTS AND LOOKS ATTRACTIVE IN THE SENSE THAT IT BLENDS COMFORTABLY IN WITH THE SHAPE.

BY ENSURING THE MAJORITY OF THE FRONT IS GLASS, IT COULD RESULT IN A REFLECTION OF THE HOUSE AND GARDEN APPEARING IN THE GLASS THEREFORE CREATING THE ILLUSION THAT THE BUILDING HAS BLENDED WITH THE GARDEN.

THE WALLS COULD BE CONSTRUCTED HERE OF A COMBINATION OF CONCRETE AND WOOD.

LEAF SECTION FROM SITE.

CLIENT VIEW

"Again, I really like the glass panel in this design. The shape is quite elegant but I don't think I could realistically imagine it in my garden."

THIS WOULD BE EFFECTIVE AS IT WOULD PROVIDE THERMAL PROTECTION

A KEY PROBLEM IS THE LACK OF AN ENTRANCE. AN ENTRANCE PLACED AT THE FRONT MAY SPOIL THE CONTINUOUS FLOW OF THE TREES AND BUSHES TO THE BUILDING.

THE CURVE ON THE FRONT ELEVATION IS PARTICULARLY ATTRACTIVE. IT HIGHLIGHTS THE SUBTLE CURVE ON THE SITE AND IT WOULD MAKE THAT PART OF THE GARDEN SEEM CONTINUOUS.

THE ROOF COULD BE SLIGHTLY DOMED TO ENSU WATER IS SUCCESSFULLY DRAINED DURIN RAINFALL.

MEETS SPEC. POINTS: 1, 3, 4, 5, 6, 7, 12, 16

AGAIN, HERE SHOWS THE MAJORITY OF THE FRONT MATERIAL USED IS GLASS. THIS HAS A LOT OF POTENTIAL IN TERMS OF MEETING SPECIFICATION CRITERIA.

SIDE ELEVATIO

BECAUSE THIS DESIGN IS A TRIANGULAR FORM, AS SHOWN, IT WOULD FIT SUITABLY INTO THE SITE.

CLIENT VIEW

"Interesting shape, and again the wood and glass combination works really well."

MEETS SPEC. POINTS: 1, 3, 4, 5, 6, 7, 12, 16

THE WOOD SIMULATED HERE COULD COME FROM THE WOODS AT THE BACK OF THE SITE DEPENDING ON THE TRI

CLIENT VIEW

"This is certainly one of my favourite designs. I really like the shape and curved glass front. This design is also quite practical. It would fit smoothly in my garden."

MEETS SPEC. POINTS: 1,

THE GENERAL SHAPE IS SOFT BUT HAS A SUBTLE COMPLEXITY THAT GIVES IT SUFFICIENT CHARACTER.

POSSIBLE WOODEN POST.

GAP UNDER BUILDING

FRONT ELEVATION

THE 'TWO-TONE' CONCEPT OF THIS IDEA IS CERTAINLY AN IDEA THAT COULD BE LOOKED INTO FURTHER AND USED SUCCESSFULLY.

ALTHOUGH THIS DOOR IS AN INTERESTING DESIGN, IT IS DIFFICULT TO IMAGINE HOW IT WOULD FUNCTION SUCCESSFULLY.

SIDE ELEVATION

BECAUSE THE MAJORITY OF THE GLASS IS FACING THE SIDE, THIS IS IMPRACTICAL AS THERE WILL BE NO VIEW FOR MR NOSS AND NOT AS MUCH LIGHT

CLIENT VIEW

"In this one the gap under the building is attractive, but it might limit the space."

AN IMPORTANT FACTOR HERE IS THE LACK OF GLASS AND WINDOW SPACE.

AS A SINGLE-ROOMED BUILDING IT WOULD NOT BE FUNCTIONAL AS THE CURVE WOULD WASTE SUBSTANTIAL SPACE.

TO ENSURE IT IS MORE FUNCTIONAL AN ADDITIONAL FLOOR MAY HAVE TO BE INSTALLED.

EXAMPLE OF INTERIOR LAYOUT.

ADDITIONAL FLOOR

STAIRWAY

INITIAL IDEAS

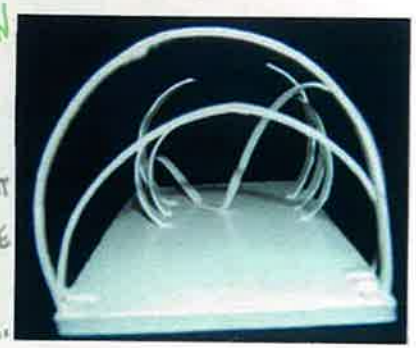
HERE ARE TWO PHOTOGRAPHS OF LEAVES FROM THE TREES AROUND THE SITE. I USED THE CURVES AND LINES FROM THESE PICTURES TO CREATE MODELS. USING THESE MODELS I FOUND 3D FORMS WHICH I TRANSLATED INTO CONCEPTUAL DESIGNS.

MEETS SPEC. POINTS: 4, 3

CLIENT VIEW

"I don't really like the 'tunnel effect'"

THE CURVE NOT ONLY LOSES SPACE INSIDE BUT WOULD BE DIFFICULT TO CREATE.

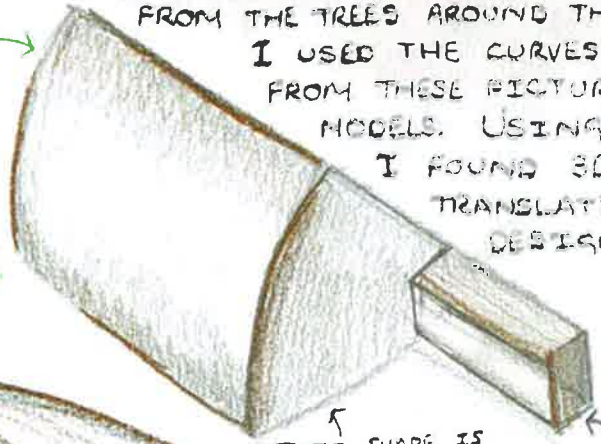


THIS IS EXTREMELY DULL AND HAS NO COLLERATION TO THE SITE.

THIS DESIGN SHOWS RESEMBELANCE TO A TUNNEL AND HAS NO RESEMBELANCE TO THE SITE OR ANY OF ITS FEATURES.

CLIENT VIEW

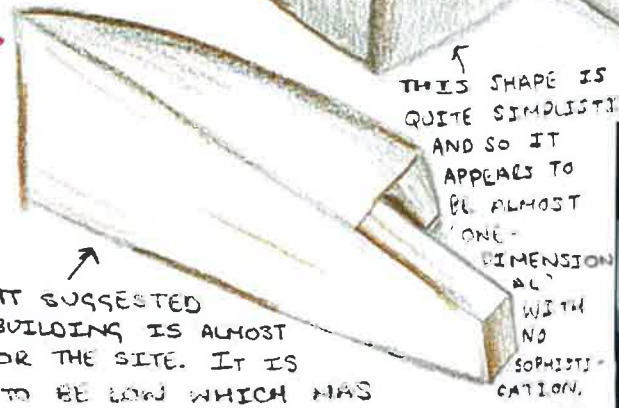
"I think the combination of shapes here is quite interesting but I don't think it works at all."



THIS FEATURE, THOUGH IT GIVES THE DESIGN MORE CHARACTER, IT DOES NOT FIT AND LOOKS OUT OF PLACE.

THIS DESIGN JUST MEETS TWO SPECIFICATION POINTS: IT HAS AN ENTRANCE AND WINDOW SPACE.

MEETS SPEC. POINTS: 7



THIS SHAPE IS QUITE SIMPLISTIC, AND SO IT APPEARS TO BE ALMOST 'ONE-DIMENSIONAL' WITH NO SOPHISTICATION.

THE HEIGHT SUGGESTED IN THIS BUILDING IS ALMOST PERFECT FOR THE SITE. IT IS SUGGESTED TO BE LOW WHICH HAS SEVERAL BENEFITS. FOR EXAMPLE IT WILL SUIT THE HEIGHT OF THE BUSHES EITHER SIDE OF THE SITE WHICH WILL CREATE SUBTLETY. IT WILL ALSO MEAN LESS SPACE WILL BE WASTED WHICH WILL REDUCE HEAT LOSS AND MATERIALS.

MEETS SPEC POINTS: 3, 4, 12

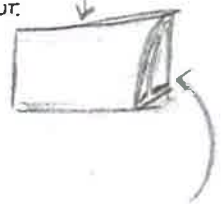
THIS IS QUITE A BLAND DESIGN IN GENERAL AND IS NOT AN OVERALL POSSIBILITY.

THE STRONG LINES BARE NO RESEMBLANCE TO THE GARDEN AESTHETICALLY AND WOULD LOOK TOO BOLD AND OUT OF PLACE IN

GLASS FRONT WITH WOODEN FRAME IS A GOOD POSSIBILITY HERE

SIDE ELEVATION

FENCE LAYOUT.



FRONT ELEVATION

CLIENT VIEW

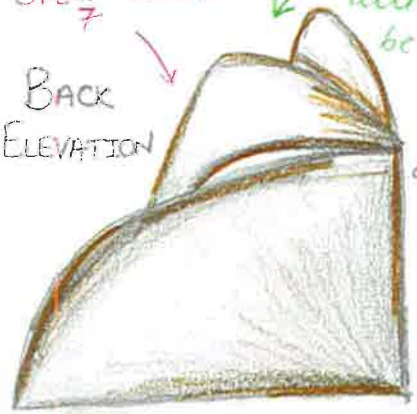
"I don't really think this is complex enough. It's too basic for what I was looking for."

INITIAL IDEAS

MEETS SPEC. POINTS: 7

"From this angle, this design looks very attractive and would definately be an interesting aspect."

BACK ELEVATION



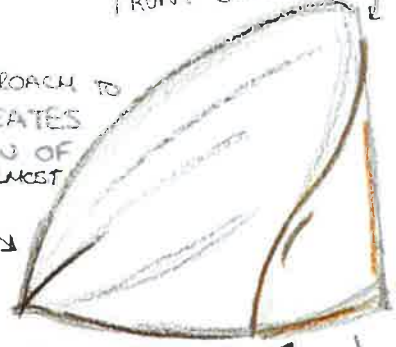
THERE ARE NO OBVIOUS SIGNS OF ENTRANCE OR WINDOW SPACE

THIS IS AN EXTREMELY COMPLEX DESIGN. IT WOULD BE EXTREMELY DIFFICULT TO RE-CREATE, WITH ANY MATERIAL

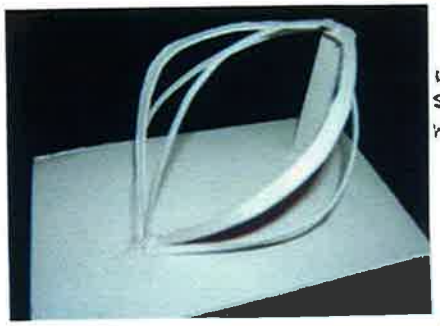
THERE IS NO WINDOW SPACE ON THIS DESIGN. IT'S DIFFICULT TO IMAGINE HOW THIS COULD BE INCORPORATED.

FRONT ELEVATION

THIS CYCLICAL APPROACH TO THE DESIGN CREATES THE IMPRESSION OF NATURE WITH AN ALMOST SEED, NUT-LIKE IMAGE.

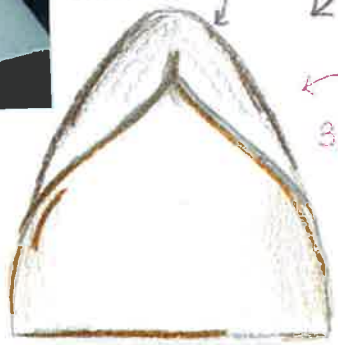


SIDE ELEVATION

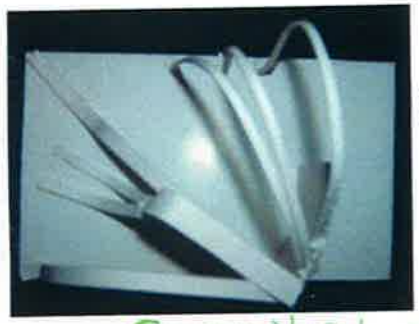


TWO TONE WOODS IN THIS SITUATION WORKS WELL AND HELPS INDENTIFY THE ENTRANCE.

SIDE ELEVATION



MEETS SPEC. POINTS: 3, 7, 12



SIDE ELEVATION.

THE DESIGN SHOWS NO PROMISE OF INTERIOR SPACE, AS THE DESIGN IS NOT AT ALL WIDE OR THICK.

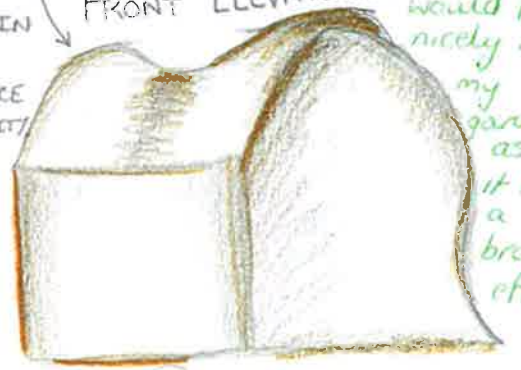
CLIENT VIEW

"This is far too complex for my liking."

"Though maybe it would fit nicely in my garden as it has a branch like effect."

THIS LOOKS SLIGHTLY MORE REALISTIC IN TERMS OF INTERIOR SPACE AND PRACTICALITY

FRONT ELEVATION



ALTHOUGH THE SHAPE OF THE DOOR IS QUITE IMPRACTICAL AND WOULD NEED TO BE ADJUSTED IN ORDER TO FUNCTION PROPERLY, AESTHETICALLY IT RELATES DIRECTLY TO THE ENTIRE CONCEPT AND TO THE SEED, NUT-LIKE IMAGE PREVIOUSLY MENTIONED.

CLIENT VIEW

"I'd like the idea of the door in this design and the two toned timber effect. Perhaps glass would be more appropriate."

14.

INITIAL IDEAS

CLIENT VIEW
"This design reminds me too much of a boat. I don't really like it."

AS THE BACK HERE IS SLOPING DOWN, IT WOULD NO BE VERY PRACTICAL TO HAVE A GLASS ROOF BECAUSE OF THE NILOEN FROM THE TREES.

MEETS SPEC. POINTS: 6, 7, 12,

IN A PRACTICAL SENSE, THERE IS NO ENTRANCE AND IT MAY BE DIFFICULT TO INCORPORATE ONE.

THIS DESIGN THEREFORE WOULD BLEND WELL WITH THE GARDEN AS SUGGESTED.

THE SLATS OF WOOD SHOWN HERE THAT STICK OUT HAVE A SIMILAR EXTERIOR TO BRANCHES ON A TREE.

CURVED BARRIER - ABSORBS LIGHT AND REFLECTS

GLASS TOP

MEETS SPEC. POINTS: 3, 12

SOLAR PANELS COVERING THE EXTERIOR ALL AROUND.

A FAULT WITH THIS DESIGN IS THE LACK OF WINDOW SPACE AVAILABLE. IT WOULD MAKE IT VERY DARK INSIDE.

PLATFORM TO CONTAIN ELECTRICAL EQUIPMENT

"This is interesting but I don't think it would suit my garden. It's not very elegant."

THIS DESIGN IS QUITE UNUSUAL. IT HAS AN INTERESTING FORM THAT CLOSELY REPRESENTS A LIGHTHOUSE/TREE. FOR THIS REASON IT PROBABLY WOULDN'T BLEND WITH THE REST OF THE GARDEN.

THE DOORS WOULD BE QUITE COMPLEX TO OPEN AND CLOSE, ALTHOUGH THEY ARE QUITE INTERESTING.

THIS IS AN INTERESTING DESIGN. IT HAS PLENTY OF WINDOW SPACE AS REQUIRED.

MEETS SPEC. POINTS: 3, 4, 5, 6, 7, 16

BECAUSE OF THE VAST AMOUNTS OF GLASS IT MAY BECOME QUITE HOT INSIDE.

THIS ISN'T A PRACTICAL DESIGN

THE ROOF THAT REACHES OVER THE TREE TOPS COULD HOLD A GOOD PLACE FOR VENTILATION.

CLIENT VIEW
"This design is one of my preferred designs. I especially like the roof design"

CLIENT VIEW
"I don't like the idea of being underground"

GLASS ROOF

ENTRANCE

AESTHETICALLY THIS DESIGN WOULD BLEND WITH THE GARDEN AS IT WOULD BARELY BE NOTICABLE.

THIS DESIGN IS PLACED UNDERGROUND.

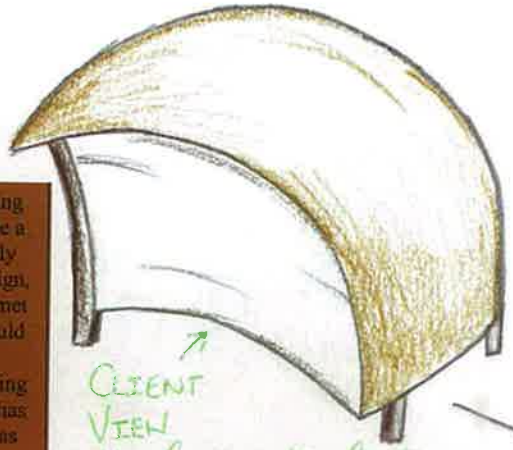
INTERNAL HEATING WOULD HAVE TO BE PROVIDED AS IT IS UNDERGROUND AND THEREFORE WOULD BE COLD.

MEETS SPEC. POINTS: 3, 6

DEVELOPMENT

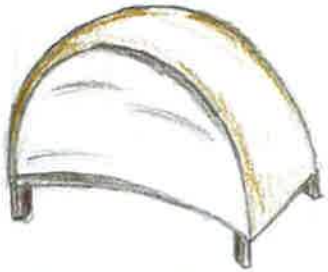
Summary of Ideas.

I have decided to choose this idea because of it's interesting exterior and its potential for development. It also would be a prime candidate for sliding into the space allocated simply and effectively. The client also felt strongly about this design, which I feel is a very important factor to consider. It also met several specification points, including point 4: 'There should be plenty of window space', point 6: 'aesthetically the building must blend in with the garden', point 7: 'the building should be representative of the following colours'. It also has the potential to fit in with other specification points such as points 3, 8, 9, 10, 11, and 12.



CLIENT VIEW "My favourite feature here is the curved front and the roof."

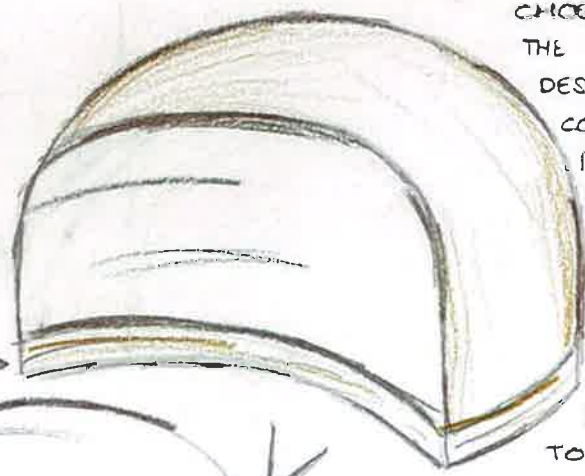
INSTEAD OF HAVING A HALF ROOF, I HAVE EXTENDED THAT SO IT IS A FULL ROOF. THIS IS SO THAT IT IS EASIER TO WORK WITH AND GIVES BETTER COVERAGE IN TERMS OF RAIN PROTECTION.



CLIENT VIEW "I'm not really fond of the shape of this. But this is a good direction to go in."

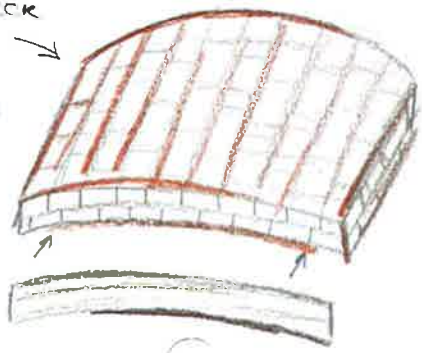
This particular design was also used, because of it's accurate portrayal of several specification points; all similar to those shown in the other design chosen but with the addition of point 5: 'preferably the building should have two straight sides', and point 12: 'wood should try to be used somewhere on the building'. Again it has a similar potential to have other specification points integrated into it. The client also stated that, 'this is certainly one of my favourite designs' meaning that this design in particular would be very effective to use.

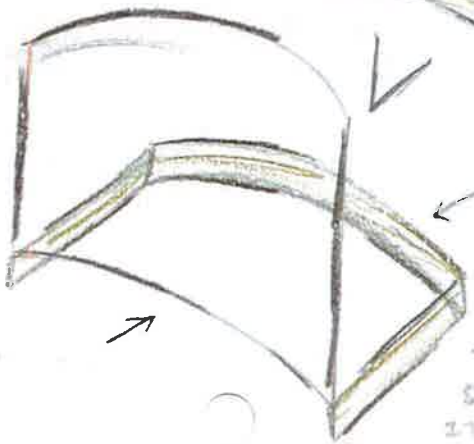
CLIENT VIEW "My favourite features here were the wooden 'border'."



IN THIS DESIGN I CHOSE THE BASE OF THE SECOND INITIAL DESIGN IDEA AND CONVERTED THE WOODEN POSTS INTO A SOLID WOODEN FRAME FOR THE BASE. THIS IS MORE PRACTICAL AS IT GIVES A LARGER SURFACE AREA FOR THE STRUCTURE TO STAND ON.

A MORE SENSIBLE OPTION FOR THE BASE IS A BRICK FOUNDATION SEALED WITH MORTAR WITH WOODEN PANELLING ON THE EXTERIOR TO COINCIDE WITH THE PREVIOUS AESTHETICAL QUALITIES.

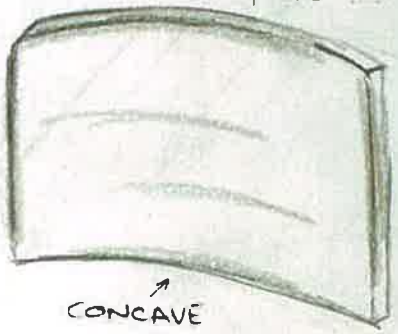




HERE I TOOK AWAY THE FRONT PANEL OF THE FRAME TO SEE IF IT WOULD LOOK MORE AESTHETICALLY PLEASING. THIS, HOWEVER, I BELIEVE POSES THE PROBLEM OF RIGIDITY AND STABILITY AND SO I DON'T THINK IT WOULD BE A PRACTICAL SOLUTION.

DEVELOPMENT

I WANT TO FIND OUT WHICH WAY, CONCAVE OR CONVEX IS BETTER. IN TERMS OF LIGHT PENETRATING THROUGH THIS GLASS PANEL.



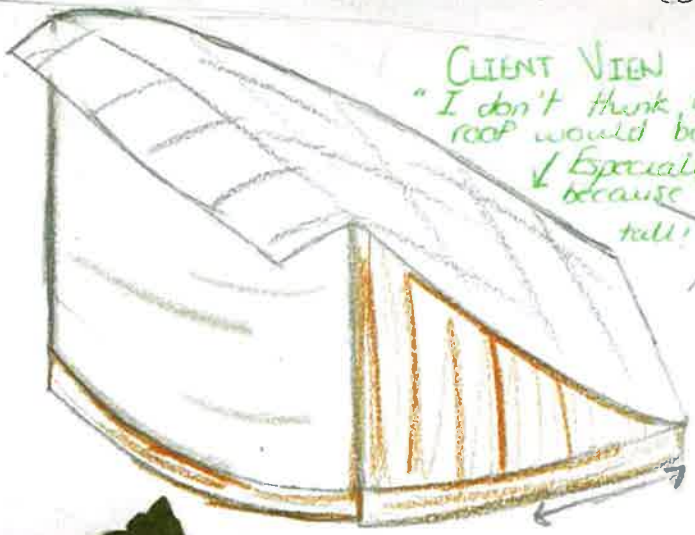
CONCAVE

OR

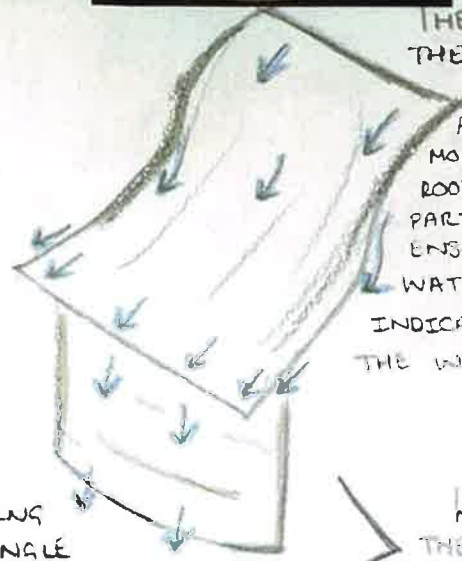
CONVEX

I DID A BRIEF EXPERIMENT TO HELP AID MY DECISION. I CREATED A MODEL, MADE FROM CLEAR ACRYLIC, THAT HAD BEEN HEATED THEN CURVED INSTANTANEOUSLY. I THEN PLACED THE MODEL IN A DARK ROOM AND SHONE A LIGHT THROUGH THE ACRYLIC BOTH IN A CONCAVE AND CONVEX POSITION. BY DOING THIS IN A SIMILAR FASHION TO WHICH THE SUN MAY SHINE THROUGH THE GLASS PROVED THAT HAVING THE GLASS SET IN A CONVEX POSITION WOULD MEAN OPTIMAL LIGHT WOULD ENTER THE ROOM.

ROOF FORM DEVELOPMENT

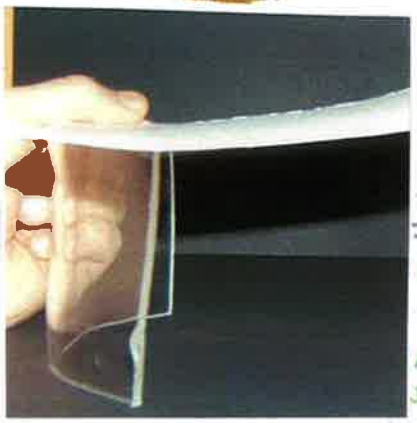


CLIENT VIEW
"I don't think a sloping roof would be practical. ✓ Especially because I'm tall!"



THE QUESTION, THEREFORE, POSED HERE IS WATER EXPULSION FROM THE ROOF. AS MODELED HERE, THE ROOF HAS TO BE SET AT A PARTICULAR ANGLE TO ENSURE FULL FLOW OF WATER. THE ARROWS INDICATE THE FLOW OF THE WATER.

THE PARTICULAR SLOPE OF THIS MODEL, THOUGH SUCCESSFUL IN CLEARING WATER FROM THE ROOF, WOULD MEAN THAT THERE WOULD BE LIMITED SPACE INSIDE THE BUILDING.

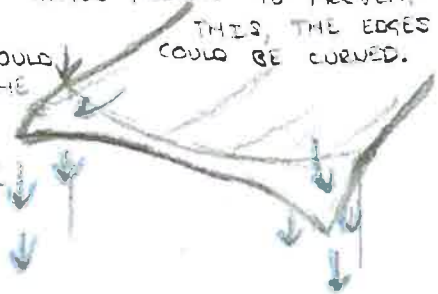


REVERSING THE ANGLE OF THE SLOPE INCREASES THE AMOUNT OF INTERIOR SPACE.

CLIENT VIEW
"Personally, I think this roof shape is more visually pleasing."

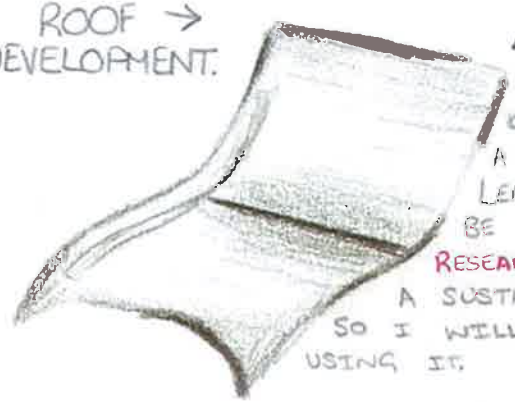
WHAT WAS EVIDENT IS THE DIRECTION OF WATER FLOW OVER THE GLASS FRONT. TO PREVENT THIS, THE EDGES COULD BE CURVED.

THIS WOULD DIVERT THE FLOW OF WATER EFFECTIVELY.



DEVELOPMENT

ROOF → DEVELOPMENT.



← SHEET METAL

TO CREATE THE CURVES OF THIS, A METAL SUCH AS LEAD WILL HAVE TO BE USED. FROM MY RESEARCH LEAD IS NOT A SUSTAINABLE MATERIAL, SO I WILL REFRAIN FROM USING IT.

← SOFTWOOD

SLATS OF WOOD CAN BE USED TO CREATE THE CURVES OF THE MAIN SHAPE. HOWEVER THEY CANNOT CREATE THE ADDED CURVES ON THE END THAT ARE USED FOR DIRECTING WATER OFF THE ROOF.

OVERLAPPED SO WATER CAN RUN OVER.

I DON'T THINK WOOD WOULD BE A SUITABLE MATERIAL AS IT WILL HAVE TO BE TREATED REGULARLY. FROM MY RESEARCH I FOUND THAT ON THE SITE THERE ARE ALOT OF TREES THAT CREATE MILDEW AND WILL THEREFORE DAMAGE THE ROOF IF IT IS WOODEN.

FROM MY RESEARCH I FOUND THE MOST EFFECTIVE WAY OF ROOFING WAS TILING. THIS IS BECAUSE IT IS WATERPROOF.

IT CAN BE SUSTAINABLE TOO AS RECLAIMED TILES CAN BE USED, MAKING IT SUSTAINABLE.

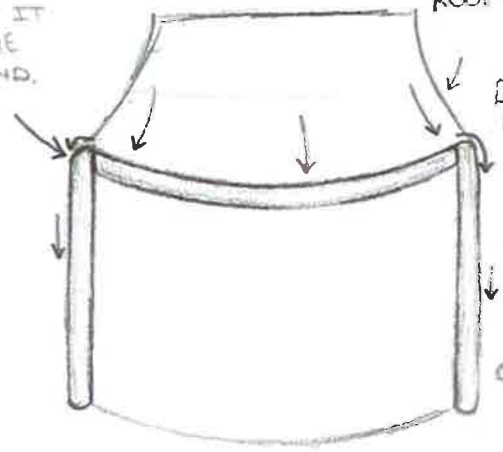
BECAUSE TILES WILL NOT MAKE ADEQUATE CURVES FOR REDIRECTING THE WATER. I WILL NEED TO USE A DIFFERENT SYSTEM OF DRAINING.

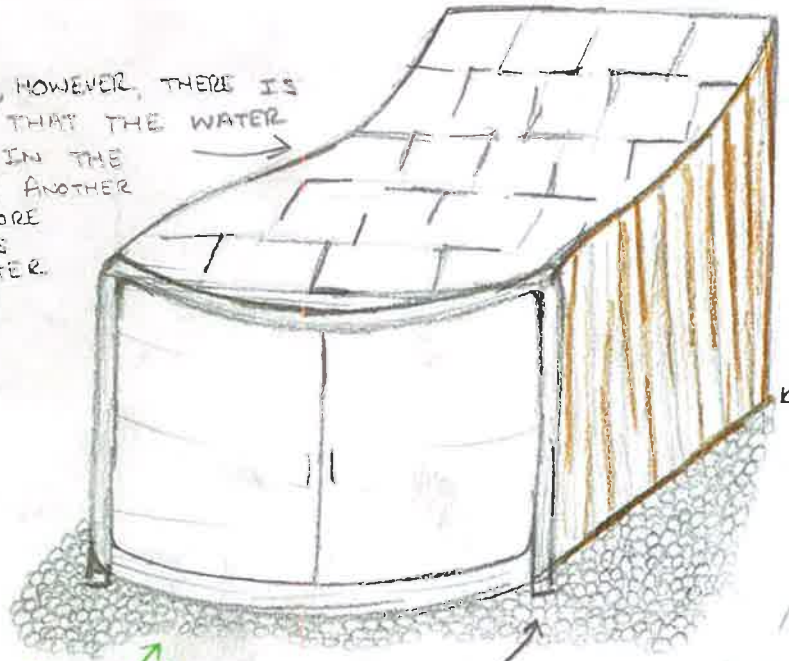
DRAINAGE DEVELOPMENT

HERE, HOWEVER, THERE IS A RISK THAT THE WATER MAY LINGER IN THE CENTRAL DIP. ANOTHER WAY MAY BE MORE EFFECTIVE, AS LINGERING WATER WOULD CAUSE DAMAGE TO THE ROOF.

← GUTTERING

← PIPING TO DIRECT IT ↓ TO THE GROUND.

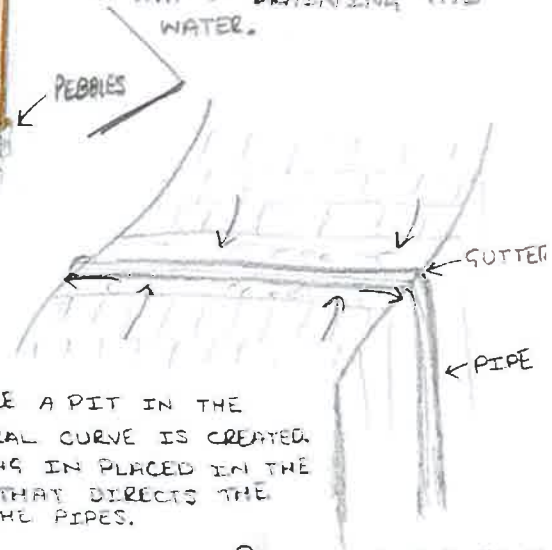




CLIENT VIEW "I like the idea of glass front doors."

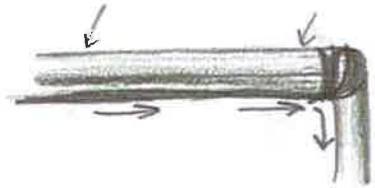
CLIENT VIEW "Tiles are my preffered choice here."

FROM MY RESEARCH I FOUND ANOTHER EFFECTIVE WAY OF DRAINING THE WATER.



HERE A PIT IN THE CENTRAL CURVE IS CREATED. GUTTERING IN PLACED IN THE MIDDLE THAT DIRECTS THE WATER DOWN THE PIPES.

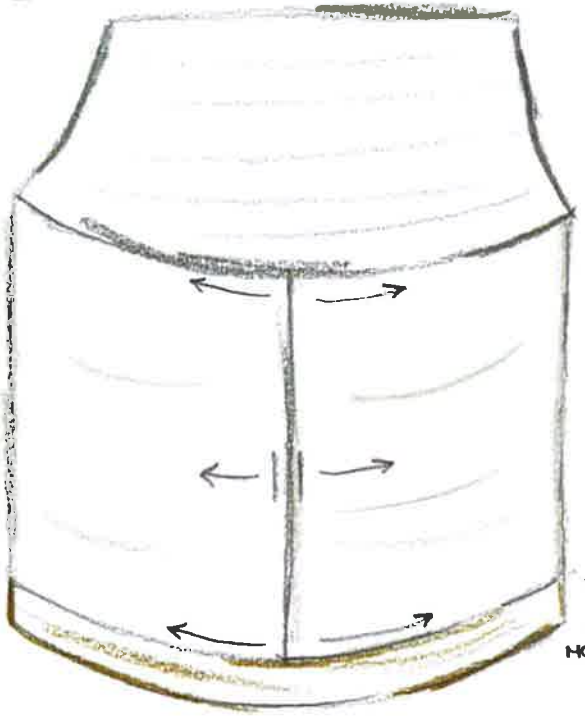
GRAVEL IS PLACED IN THE PIT TO PROTECT THE ROOF FROM THE SUN RAYS THAT WOULD BE REFLECTED BY THE WATER

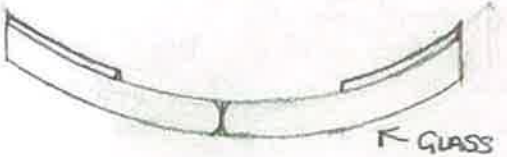


Door Development

DEVELOPMENT

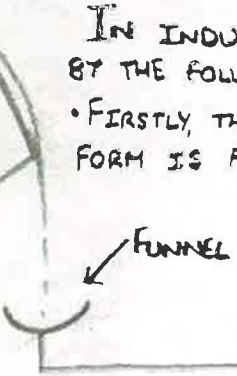
Curving Glass In Industry.

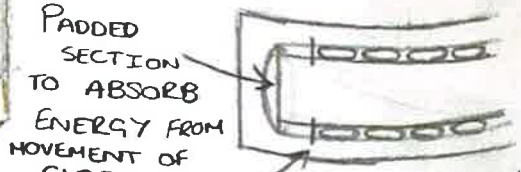


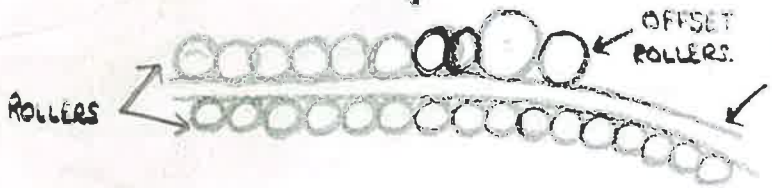


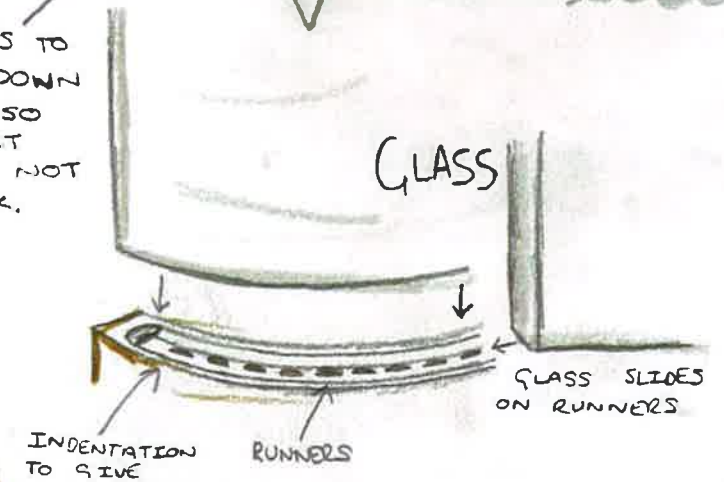
In industry, glass is curved by the following process:

- Firstly, the glass, in it's molten form is funnelled into a tray.
- At this point the glass is compacted into a solid form by a set of rollers.
- Some of the rollers are offset. This then makes the glass curve.
- The glass is then cooled.





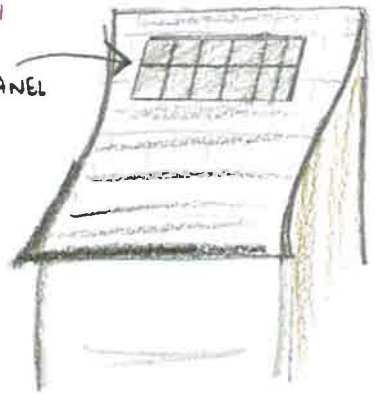




Energy Development.

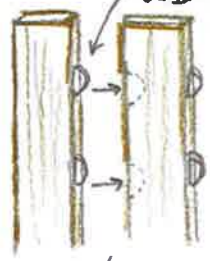
To ensure the building has energy to run things such as lighting and electrical equipment, an energy source must be applied.

From my research I believe a Photovoltaic Panel will be effective and should be applied in the following way shown in the diagram.



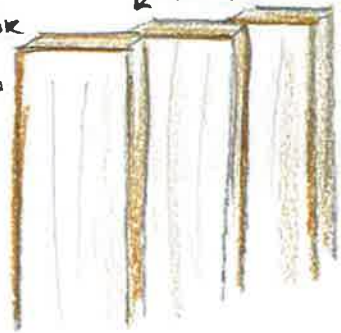
DEVELOPMENT

WALL DEVELOPMENT.



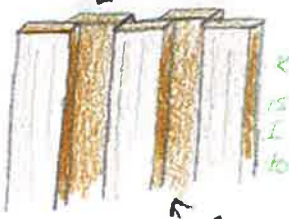
THIS ENABLES THE PANELS TO FIX TOGETHER AND CREATE A SMOOTH - UN-CONTOURED SURFACE.

THEREFORE I DO NOT THINK IT WOULD LOOK APPROPRIATE.



THIS IS TOO SIMILAR TO THE ROOF DESIGN AS IT IS OVER-LAPPED IN THE SAME WAY.

THE OVER-LAPPING OF THE WOODEN PANELS GIVES THE DESIGN MORE TEXTURE.

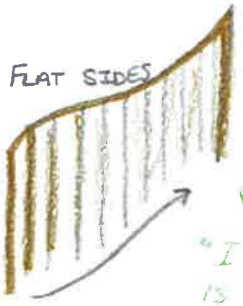


TEXTURE ON THIS PARTICULAR PART OF THE DESIGN IS QUITE ATTRACTIVE.

CLIENT VIEW "Yes, this is the style I wanted to go in."

BECAUSE THE OVER-LAPPING DESIGN WAS NOT SUITABLE, A MORE CONTOURED EFFECT GIVES ADDED CHARACTER.

THIS WILL BE THE TYPE OF PANELING I WILL USE BECAUSE OF AESTHETIC REASONS, AND MY CLIENT PREFFERED THIS DESIGN WHEN SHOWN.



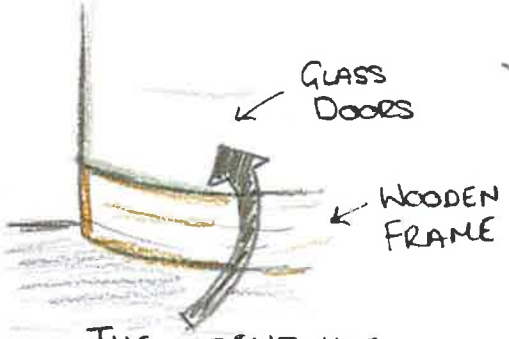
THE WOODEN PANELS WILL BE MADE FROM CEDAR IN A COMMERCIAL SITUATION.

CLIENT VIEW "I think this design is too conventional."

CLIENT VIEW "This is definately the step I was thinking of going."

ENTRANCE DEVELOPMENT.

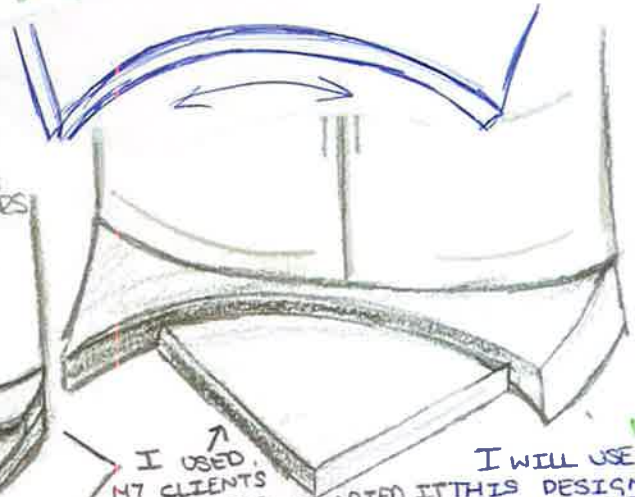
CURRENTLY THERE IS NO SUITABLE WAY OF ENTERING THE BUILDING THROUGH THE DOORS.



THE CLIENT HAS TO STEP UP.

THE TWO STEPS ARE SLIGHTLY BASIC BUT ARE FUNCTIONAL. THE STEPS ARE SLIGHTLY SMALL AND WOULD BE INAPPROPRIATE WHEN STANDING WHILST OPENING THE DOORS.

THIS IS AN IDEA FOR THE STEP THAT MY CLIENT CAME UP WITH.



I USED MY CLIENTS DESIGN AND ADAPTED IT SLIGHTLY.

I WILL USE THIS DESIGN FOR THE STEPS AS IT GIVES THE FRONT MORE CHARACTER AND THE FRONT TRIANGULAR STEP PROVIDES A GOOD PLATFORM. MY CLIENT ALSO FELT IT WAS THE BEST IDEA.

RESEARCH

CONCRETE

WOODEN PANELS.

WOULDN'T BE VERY SUPPORTIVE.

CLIENT VIEW "I like the way my idea has been adapted. This is definately what I want here."

Interior Development

DEVELOPMENT

Wall Colour

Client View
"Blue would be too cold. It would be too dull."

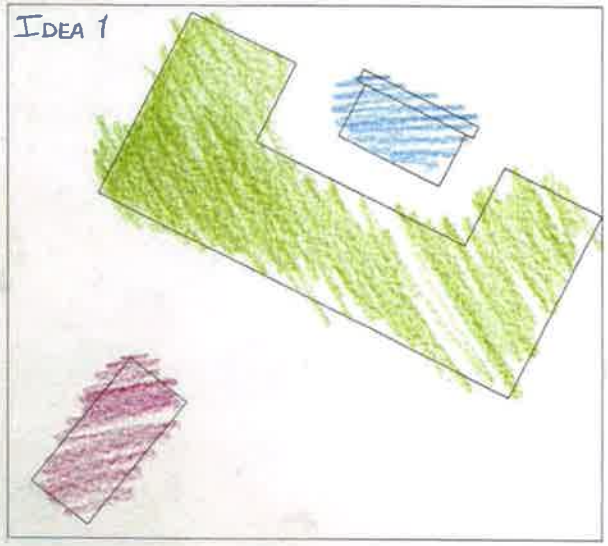
Client View
"Green could work but I think, as I'll be surrounded by green outside, I wouldn't want green."

Client View
"This is a strong contender I think this'll be ideal."

Client View
"Again another good option. But perhaps this will be too 'clinical.'"

← I HAVE DECIDED TO USE THIS COLOUR FOR ALL INTERIOR WALLS.

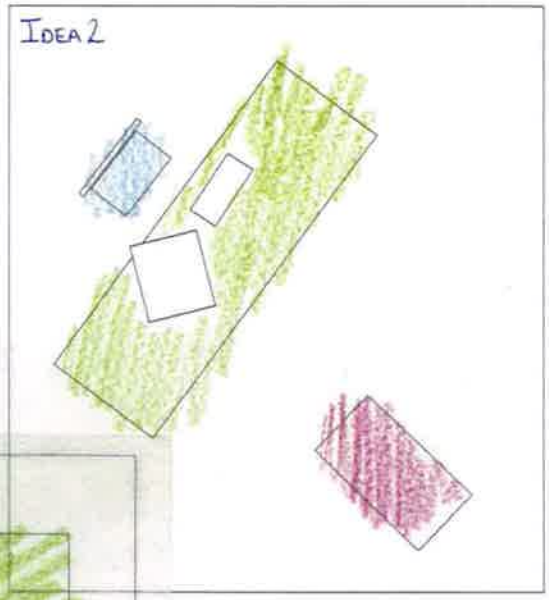
Layout Development.

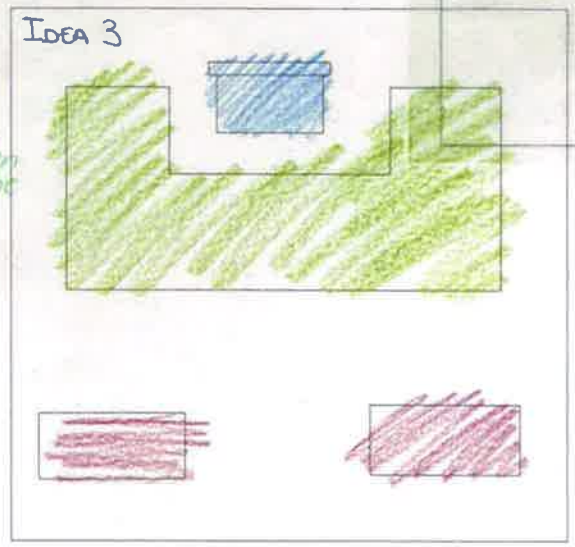


← Client View
"I think this layout is my favourite as I can look out but not have the sun directly in my face."

↑ I HAVE DECIDED TO USE THIS LAYOUT BECAUSE IT WAS MY CLIENT'S FAVOURITE.

KEY
- DESK
- AMP
- CHAIR

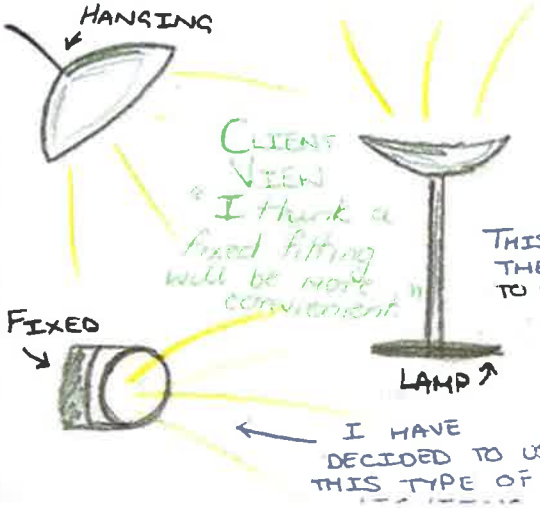




Client View
"I think this is merely a repetition of the previous design, though I prefer the other desk."

Client View
"I wouldn't want to be in the direct sunlight, and I don't think there is enough room for me to practise guitar."

Lighting Development.



Client View
"I think a fixed fitting will be more convenient."

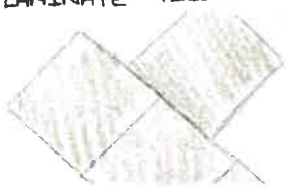
← I HAVE DECIDED TO USE THIS TYPE OF

Floor Development

Client View
← "I think wooden flooring would be most appropriate."

↑ THIS IS THE OPTION I PLAN TO USE.

LAMINATE TILES



FINAL DESIGN

2D INITIAL IDEAS

HERE ARE SEVERAL DESIGNS THAT I WISH TO USE FOR THE GRAPHICS ON MY 2D BOOKLET.

MEETS SPEC? YES

GRASS

I THINK THIS IS A NEUTRAL DESIGN.

IT REPRESENTS NATURE AND SUSTAINABILITY

MEETS SPEC? YES

THIS IS THE DESIGN I WILL USE FOR THE INTERIOR.

CLIENT VIEW "I'M NOT SURE THIS IS SUITABLE."

CLIENT VIEW "I THINK THIS IS MY FAVOURITE DESIGN. I'D LOVE TO SEE THIS USED."

ALTHOUGH THIS WOULD LOOK AESTHETICALLY PLEASING, IT DOES NOT MATCH CRITERIA

MEETS SPEC? NO

CLIENT VIEW "NO I DON'T LIKE THIS."

MEETS SPEC? NO

CLIENT VIEW "I LIKE THE IDEAS OF WIND TURBINES"

THESE DESIGNS COULD BE USED COLLECTIVELY. ALTHOUGH INTERESTING I DON'T THINK THEY COULD WORK IN THIS CASE.

WIND TURBINES MEETS SPEC? NO

THIS IS THE DESIGN I WILL USE FOR THE FRONT PAGE.

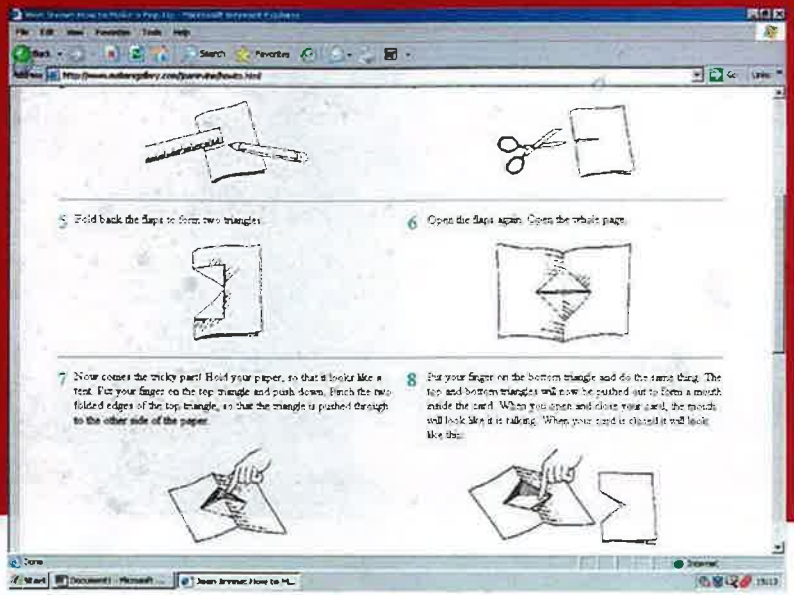
CLIENT VIEW "TOO DULL AND NOT ORIGINAL ENOUGH."

MEETS SPEC? YES

CLIENT VIEW "COULD BE USED BUT IT IS AN AWKWARD SHAPE"

THIS IS A GOOD OPTION AS A RENEWABLE SOURCE IS WATER.

2D DEVELOPMENT



"I'm not sure if three of the turbines will work. Again it is too complex."

INSTEAD OF HAVING THE INFORMATION ON THE CARD, I THOUGHT IT WOULD BE MORE INTERESTING TO HAVE IT ON ONE OF THE TURBINE BLADES. THE INFO. WILL BE FOLDED SO THAT IT FITS NEATLY ON THE BLADE AND IS HIDDEN.

THREE BLADES INSTEAD OF FOUR AS THERE IS THREE BITS OF INFORMATION.

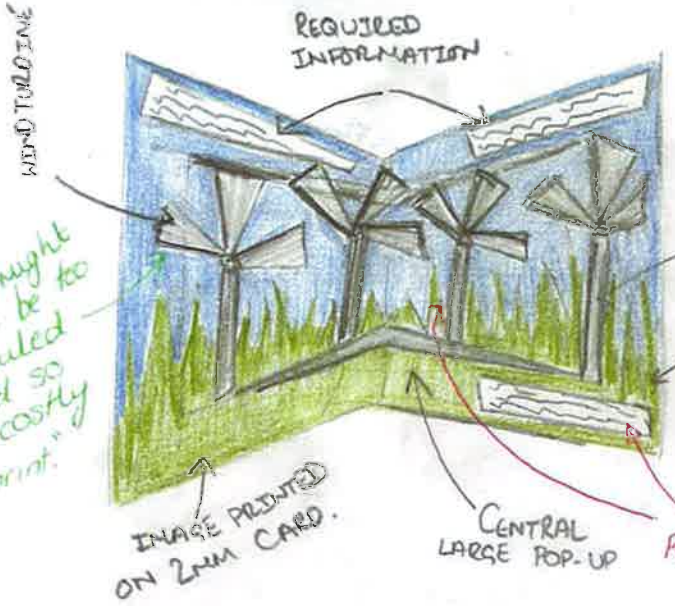
"The addition of the 3D wind turbines is much more to my liking."

MEETS SPECIFICATION POINTS: 1, 4

INSTEAD OF BEING PRINTED, THE TURBINES COULD BE 3D. THIS WOULD ENHANCE THE IDEA.

CLIENT VIEW

"Yeah, I like the direction this is going."



CLIENT VIEW

"I like the concept but it might be too complex for batch production."

"It might also be detailed and so too costly to print."

2D PLANNING

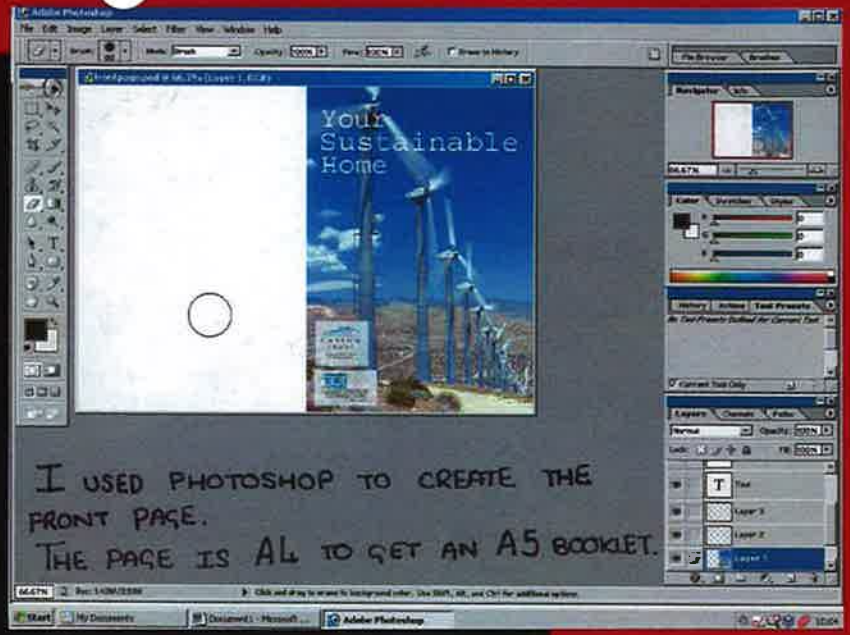
I HAVE DECIDED TO USE A TURBINE ~~FOR~~ AS A CENTRAL POP UP INSIDE THE BOOKLET

THESE BLADES WILL ALL HAVE INFORMATION ATTACHED TO THEM ON PAPER.

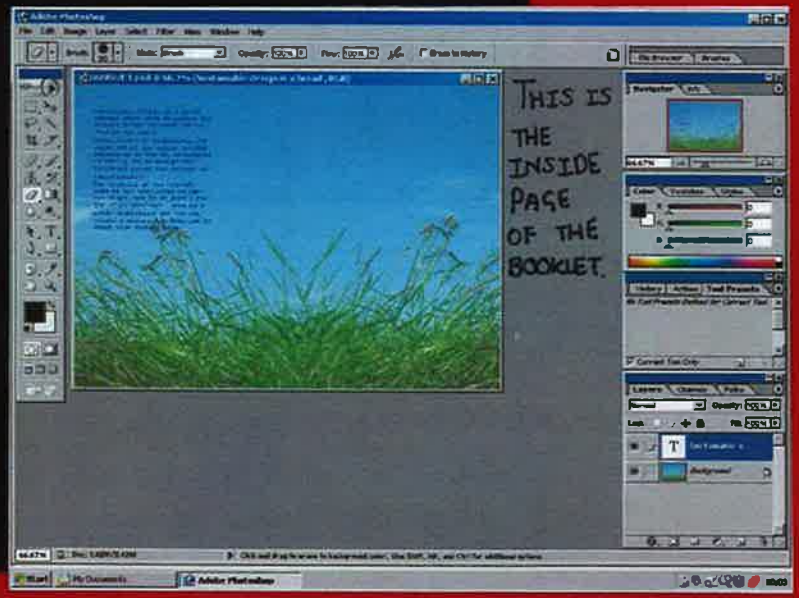
PAPER WITH THE WRITING ON STUCK TO BLADE. FOLDS UP AND DOWN.

PLAN

NET FOR CENTRAL PART OF WIND TURBINE

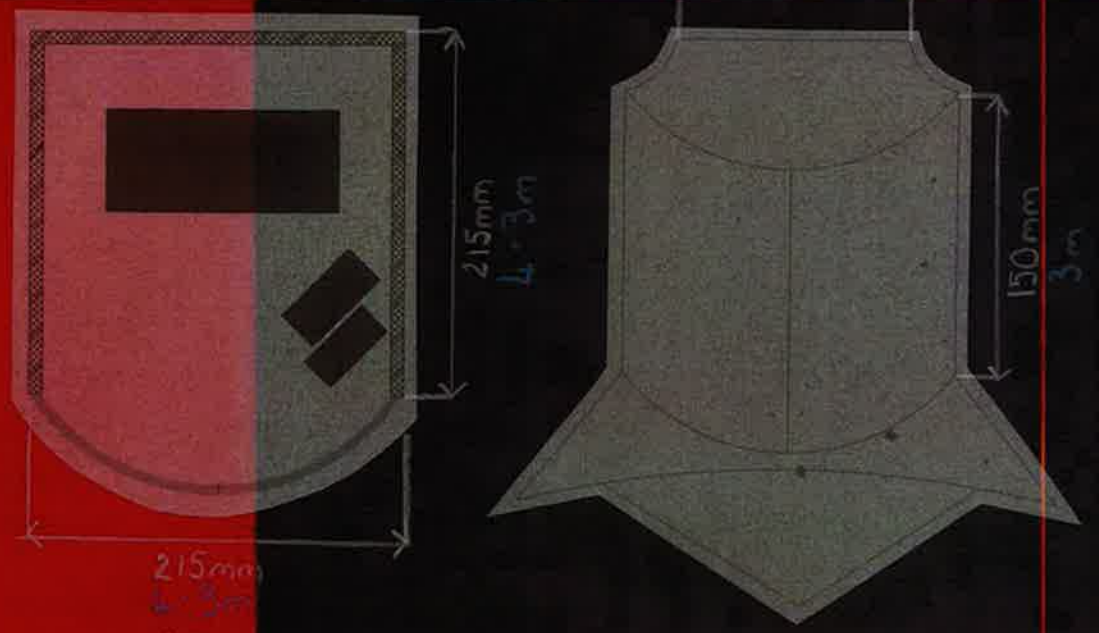


I USED PHOTOSHOP TO CREATE THE FRONT PAGE.
THE PAGE IS A4 TO GET AN A5 BOOKLET.



THIS IS THE INSIDE PAGE OF THE BOOKLET.

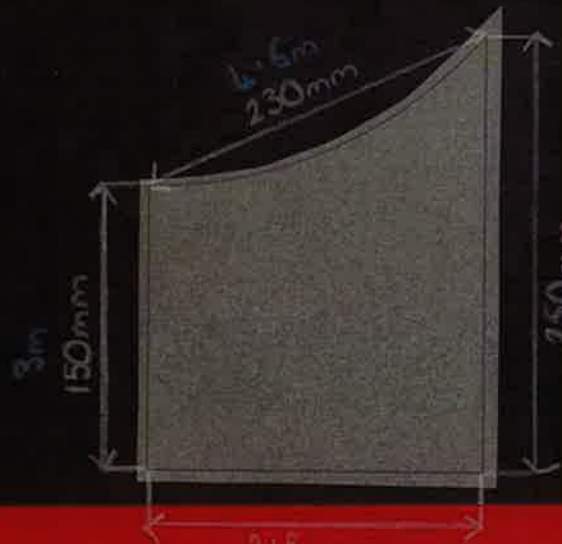
WORKING DRAWING



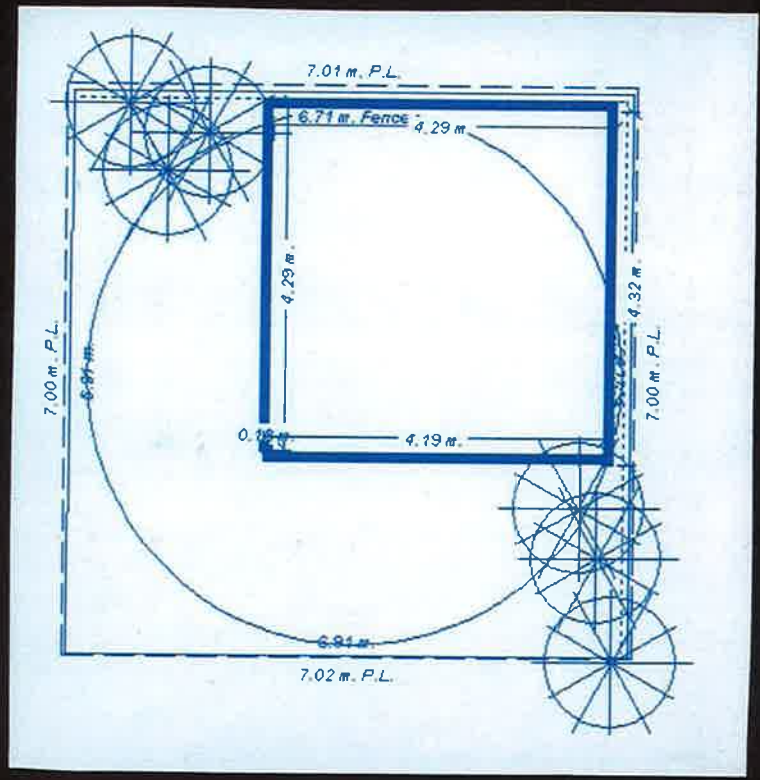
SCALE : 1 : 20

MODEL SIZE (mm)

BUILDING SIZE (M)



GARDEN PLAN



PRODUCTION PLAN

Time (Weeks)	1	2	3	4	5	6	7	8	9	10
Task	• Mark out and Cut shape of walls and roof • Cut wooden panels for sides and attach	• Paint interior walls • Cut entrance steps and doorway • Fix flooring and interior decking	• Construct basic building • Make interior components	• Construct model for opening doors • Paint and sieve doors • Cut doors • Hinge and attach door handles	• Paint and cut sides for roof • Attach tiles on roof	• Create and attach guttering and pottering system	• Plan, cut and attach solar panel	• Cut, drill and paint panels for fence • Paint fence and attach to base board	• Lay grass • Make trees and bushes • Attach all to base board	• Create booklet
Quality Control	• Ensure all angles and lengths are identical for all sides • Ensure that the blade of the hacksaw is the correct thickness and is sharp to ensure a clean precise cut • Ensure all panels are of the same width • Ensure they are the same distance apart from each other	• Paint in interior walls is consistent • Ensure that steps are symmetrical and straight • Flooring to be attached precisely and accurately	• Make sure the joints of the walls are tight fitting and straight • Ensure the interior components are level and are of the correct scale as the building	• The surface of the curved part of the model is smooth and symmetrical • The acrylic is the correct temperature for bending before bending so it is a smooth curve • The doors are cut precisely and accurately down the middle • Door handles are attached straight and are at the same height	• Ensure all the sides are identical in size and are of the same material • Each tile is attached straight	• The guttering system is central on the roof	• Ensure all parts to the solar panel fit perfectly • Solar panel is attached straight on the roof	• Each panel is the same length • The paint is applied evenly	• Trees and bushes are all the correct scale • Grass covers the entire base board	• Printer has sufficient ink in the printer • Knife for blade is sharp
Tools/Materials	• Pencil • Protractor • Ruler • Hacksaw • UHU glue	• Acrylic paint (pale yellow) • Paint brush • Pencil • Ruler • Protractor • Compass • Hacksaw • UHU glue	• Glue gun • Glue stick • Clamps • Ruler • Pencil • Copex saw	• Metal bending machine • Power drill • Sieves • Oven • Jigsaw saw • 2mm drill bit • 6mm drill bit	• 2D design • Laser cutter • UHU glue	• Bun saw • Glue gun • glue	• 2D design • Laser cutter • Acrylic glue	• Copex saw • Acrylic paint (grey) • Glue gun	• Double-sided tape • Scissors • Glue gun	• Photoshop • Ink jet printer • Double-sided tape • Knives for cutting card
Health and Safety	• Ensure that fingers are an appropriate distance away from the saw when cutting • If glue is toxic, wear a protective mask	• Ensure that fingers are an appropriate distance away from saw • Ensure accurate ventilation is used when using the paint as once it has tonic fumes	• Ensure accurate ventilation is used while using the glue gun • Attention required when using the copex saw	• Protective gloves are used when using the oven and handling the hot acrylic	• Ensure the fingers from the laser cutter are properly retracted during use	• Accurate ventilation used when gluing • Fingers are an appropriate distance away when cutting	• Ensure fumes from the laser cutter are properly extracted during use	• Attention required when using the saw • Accurate ventilation for glue and paint fumes	• Scissors are used in a safe and secure manner	• Use a safety ruler when using the knife

PRODUCT MANUFACTURE

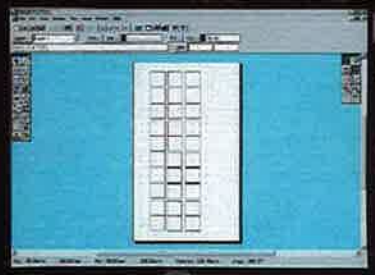
DOOR PRODUCTION.

2. ATTACH METAL TO MDF BASE

3. HEAT ACTRLIC AND BEND OVER MOULD.

1. CURVE METAL USING

ROOF PRODUCTION

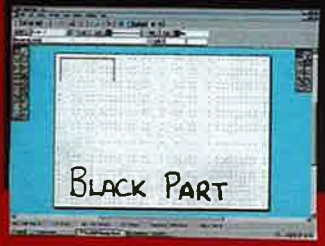


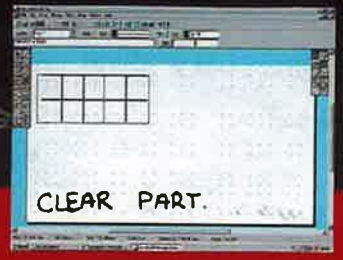
1. DESIGNED ON 2D TILES FOR ROOF

2. CUT OUT USING LASER CUTTER.

SOLAR PANEL

1. DESIGNED ON 2D DESIGN.
2. CUT OUT ON LASER.





	Building		Model	
Part	**Material**	**Size(m)**	**Material**	**Size(mm)**
Base	N/A	4.3x4.3	4mm MDF	215x215
Left side wall	Cedar Panels sourced from managed farm	(to fit 4.3x4.3 size)	3mm Plywood	150x215x250
Right side wall	Cedar Panels sourced from managed farm	(to fit 4.3x4.3 size)	3mm Plywood	150x215x250
Back wall	Cedar Panels sourced from managed farm	(to fit 4.3x5.0 size)	3mm Plywood	215x250
Front door	Glass	4.5x3.0	3mm Clear Acrylic	225x150
Roof	Small bracing timbers	(to fit)	3mm Flexi-Plywood	215x215
Front steps	Concrete	4.3x1.4	3mm Plywood	215x70
Base for Garden	N/A	N/A	6mm MDF	400x400
Fence	N/A	N/A	3mm MDF	400x100
Components				
Flooring	Wooden panels taken from trees behind site	(to fit)	Lollypop sticks	N/A
Left side wall	N/A	N/A	3mm Plywood	(150-250)x10
Right side wall	N/A	N/A	3mm Plywood	(150-250)x10
Handles	Mat stained copper brass	0.4	Copper wire	20
Tiles	Reclaimed slate tiles	0.4x0.4 (approx)	2mm HIPS	20x20
Solar Panel	N/A	2.2x0.9	2mm Clear Acrylic 2mm Black Acrylic 2mm Grey Acrylic	20x20 110x45 110x45
Fence panels	N/A	N/A	Lollypop sticks	100x10
Grass	N/A	N/A	Paper Grass	400x400
Tree	N/A	N/A	Stick from tree Foliage	220

ESTING AGAINST SPE.

Specification Point	Definite answer (yes/no)	Opinion Based	Photographic evidence or otherwise	How to Test
The building should be identified as sustainable.	✓			Identify ways in which a building is sustainable and do a check list against the concepts of this building.
The space must be a maximum of 4.3x4.3m	✓		✓	Measure space inside model and multiply that by 20 as this is the scale factor I used. Take photographic evidence.
An entrance space should be applied to the building.	✓		✓	A photo should be taken of the entrance as evidence for this.
There should be plenty of window space.		✓		Ask Mr Moss whether he feels that there is enough window space.
Preferably the building should have two straight sides.	✓		✓	A photo should be taken of the model to identify this.
Aesthetically the building must blend in with the garden.		✓		Ask Mr Moss whether he feels that the building blends in with the garden.
The building should be representative of the following colours: green, white and brown.	✓		✓	A photo should be taken to identify the retrospective colours.
Accurate Ventilation should be used.	✓			Identify what accurate ventilation is, and take photographic evidence.
Naturally sourced materials should be used.	✓		✓	Take photographic evidence to show where it is used.
Materials should come from a maintained site.		✓		Ask Mr Moss where he plans to retrieve his materials from.
Some materials should come from a local site.		✓		Ask Mr Moss where he plans to retrieve his materials from.
Wood should try to be used somewhere on the building.	✓		✓	Take photographic evidence to show where it is used.
A desk should be provided in the space that can accommodate a computer.	✓			Measure the interior and multiply by 20, as this was the scale factor used, to identify whether a desk can fit in it.
A chair should be provided in the space.			✓	Take photographic evidence to prove that a chair can be provided in the space.
In the space there should be room allocated for a guitar and amp.	✓			Measure the interior and multiply by 20, as this was the scale factor used, to identify whether they can fit in it.
The space must contain one room.	✓		✓	Take photographic evidence to prove this.
The space should provide plenty of natural light.		✓	✓	Test, using a light source, the amount of light that enters the building to decipher whether this is sufficient.
For the autumn and winter months and the later night that Mr Moss will be using the space, extra lighting inside the building should be provided.	✓		✓	Take photographic evidence of the extra lighting used inside the building.

RESULTS

Specification Point	Definite answer (yes/no)	Opinion Based	Photographic evidence or otherwise	How to Test
The booklet must contain clear and concise information explaining to the reader how to make a house sustainable.		✓		Ask Mr Moss his opinion on the readability of the information gathered.
It must be suitable for batch production.	✓		✓	Evaluate the processes used for creating it and decided whether it is suitable or not.
Aesthetically it must be representative of Everett Charles Technology and the Carbon Trust	✓		✓	Take photographic evidence to prove whether this has been achieved.
It also must reflect its contents aesthetically.	✓		✓	Take photographic evidence to prove whether this has been achieved.

Testing for sustainability:
The evidence for this was found whilst carrying out the research part of this project
Ways in which a building can be sustainable-

How a building can be sustainable	Has this been done?
Cut down heating loss through accurate ventilation	No-no real ventilation system has been implemented.
Use of materials from a natural source.	Yes-the wooden panels on the sides of the building would be made from cedar wood, the wooden flooring would also be from a natural source.
Materials from a maintained site.	Yes-the intention would be that some of the materials for the panelling would come from a maintained site in Sweden; there would also be the intention that the slate used for the roof would be reclaimed from specialist, maintained company.
Materials from local area.	Yes-the intention would be that the interior flooring would come from trees sourced from a local forest.

Testing against spec-client interview

1. Do you feel there is enough window space?
   "Hmm, well I think it would be a good idea to add more windows to open it up again. I think on the left hand side to get the evening sun."
2. Do you think this design blends in with your garden?
   "Yeah definitely. It's simplistic and fits well in the space available."
3. Where do you plan to retrieve your materials from to build this?
   "I'll have to ask around. I know that there's a managed site for wood in Sweden that I've used once before, but I'm not sure they can do a larger scale project, but that's always an option. I've also asked the owner of the woods that are behind my garden and asked permission to use some of the trees for the flooring for this project, which he's reluctantly granted me. I had to promise to replant 5 more to compensate which I don't have a problem with."
4. Do you think that the information in the booklet is easy to read?
   "Well I understood every word, so yes I think it's fine."

Accurate ventilation in a building is when the temperature in the building is maintained unless it is actively changed by a human. It also means that the air is continually moved around by fans and extraction.

This design does not have the capabilities for any of that, therefore it is not accurately ventilated.

In industry, this booklet would initially be printed using an offset printer as this would be the most effective method due to its regularity and its ease to change the design printed. The card would then be dye-cut for the pop-up sections as this could be easily automated. The turbine would be dye-cut or laser cut and attached using a self-adhesive.

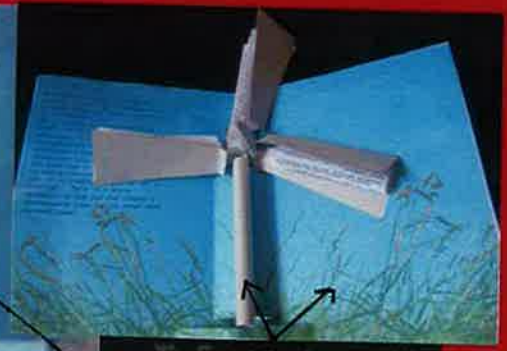
To assess this process, I believe it could easily be adapted to batch production as all the methods proposed can be adapted to an automated process.

RESULTS

UNDER MAX SIZE OF L.S.A.

THIS IS 21cm long
= 20 x 21 = 420 (4.2m)

HERE I DID A TEST USING A TORCH TO SEE HOW MUCH LIGHT ENTERS IT. I FEEL IT IS SUFFICIENT.



THE WIND TURBINE AND GRASS REPRESENT SUSTAINABILITY.

THIS IS THE CARBON TRUST LOGO AND THE ECT LOGO ON FRONT COVER.

ENTRANCE SHOWN

GREEN, WHITE, BROWN COLOURS USED.

TWO STRAIGHT SIDES

THIS IS EXTRA LIGHTING.

THIS IS THE ONLY ROOM IN THE BUILDING

DESK AND CHAIR BOTH FIT IN INTERIOR

BOTH ARE TO SCALE

AMP IS SHOWN IN SPACE. IT IS TO SCALE.

WOOD HAS BEEN USED HERE WHICH IS A NATURALLY SOURCED MATERIAL.

CLIENT INTERVIEW

To fully evaluate whether this final outcome was successful or not, a thorough interview must be carried out with the client, as the idea of the project was to focus clearly around his needs.

1. Overall what do you think about the aesthetical qualities of this design?
   "Yeah I really like it. I particularly like the curved glass doors. I think they work really well. It's simple but blends well with its surroundings .I really think that the wooden panels work well."

2. The reasoning for this design is to give you a separate space to be able to work effectively both with your music and with Everett Charles Technology, do you think that this design has achieved that?
   "Most certainly. I can really see myself working in this space on a daily basis. I love the interior work. It really reflects the interior in my house .It has quite relaxing colours too, as I don't want to work too hard all of this time! I think that it would be nice for my wife and daughter to work in as well if they wanted to. Also, I mean I already have a studio in the attic, but I think I could adapt this space to suit the needs of my music production as well which would be fantastic."

3. In terms of the sustainability of this design, do you think that this design is suitable for the requirements set by Everett Charles Technology?
   "I presume so but I'd need to take it to my boss to see what he says. By the looks of things though I don't think they would have a problem with it. I think there's a good use of materials and new environmentally friendly technologies."

4. Do you think that this design will be easy to replicate in its realistic form?
   "Definitely. Like I said, it's quite simplistic and so I think it would definitely be easy to reproduce, though I'd have to find really good builders to do the job. I think the difficult parts would be the doors and the roof, but I'm sure I can find good specialists that will be able to do them well for me."

5. If anything, what would you change about the design?
   "The only obvious thing I can see is that, now when I look at it, I think it would be a good idea to add more windows. Perhaps on the left hand side so you'd get the evening sun. It would really open it up."

Summary

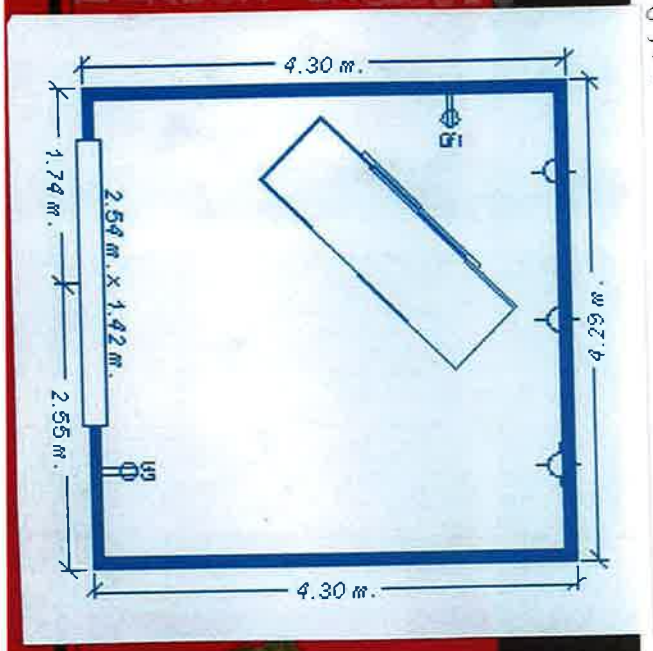
It terms of testing against the specification points, the design met with the majority of them, thus making the design successful in one respect. There was only one point that was significantly left out. This was specification point 8-Accurate ventilation should be applied. Once I identified what accurate ventilation was, it came to my attention that I had not applied this to the design at all. Although this was not a significantly important point, and does not affect the design of the model, it does mean that the design would not be functional in a real sense e.g. when the design is replicated in its actual sense. If the design is not changed then it would fail to work effectively.

There was another point that the client felt was not enturely effective. This was specification point 4-There should be plenty of window space. When asking him in both the client interview, and the questionnaire for my specification testing, Mr Moss suggested that more window space should be introduced so open up the room more. This is not a significant problem, and can be easily integrated within the design.

MODIFICATIONS

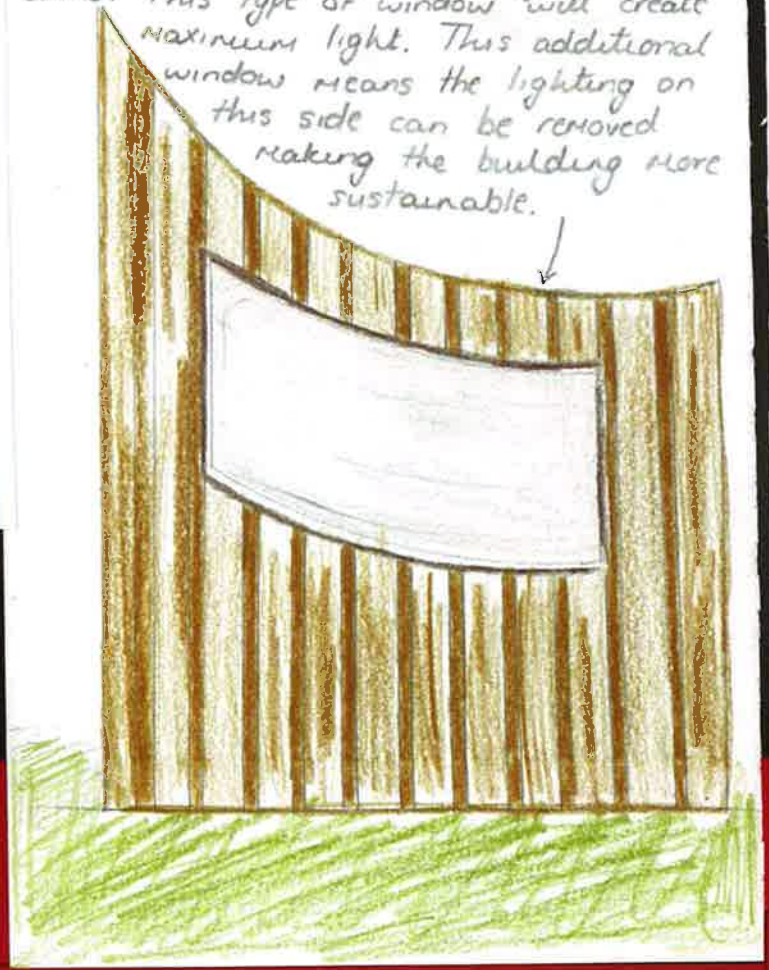
There are two modifications that became apparent whilst doing the testing and evaluation for this project. Firstly, accurate ventilation was not incorporated into the design, so that is definitely an adaptation that must be done. There was also the issue of window space brought up by my client whilst doing the client interview. I therefore think that including more window space would be a good way of adapting the design to suit my client's needs.

PLAN OF INTERIOR WITH WINDOW INCLUDED



SIDE VIEW.

This will be the side facing away from the corner. This type of window will create maximum light. This additional window means the lighting on this side can be removed making the building more sustainable.



VENTILATION

To create a good and sustainable ventilation system, what can be done is a system where, the hot air in the room rises and pushes the vents up so that the air is released.