

Q1. Why has this foundation been chosen?

The foundation chosen for this assignment is a Raft foundation due to the following factors:

The subsoil is a firm clay and this has the potential to cause subsidence and heave. A raft foundation can spread the load over a larger area and reduce the impact of the above problems.

Due to the fact that clay soils shrink or expand with changing moisture content there is an additional problem if there are any trees nearby or if they have recently been removed. The change in moisture content will affect the ground that the house will be built upon. (NHBC Standards, Chapter 4.2: Building near trees)

It is suggested that the depth of the foundation is built down to at least 1000mm to avoid the above problems as well as ground frost and any services that need to be put in(BS 8103, page 37)

Q3. Advantages and disadvantages of trussed rafters.

Benefit

Trussed rafter roofs provide more economic solutions than traditional methods for the following reasons:

Roof structures are erected quickly.

Trusses are generally narrower giving a more economical use of the timber.

Minimal skilled labour is required to erect them.

Standard designs require only external walls to be load-bearing, thereby eliminating intermediate supports.

Waste is minimized.

Handling and storage costs are reduced by manufacturing off site.

There need be no restrictions on lower floor layouts since the trusses can clear span on to external walls although greater spans and room widths can be achieved by utilising internal loadbearing walls.

Trussed rafters are computer designed and factory assembled units, resulting in better quality control.

Trussed rafters can be erected quickly, offering cost savings and providing a weathertight shell earlier.

Disadvantages:

The frames are constructed for a specific weight only. Any amendments to the roof etc would need to be inspected as they may not be able to carry the load.

The rafter may have unknowingly been damaged in transit and therefore unsafe to use.

What other method could be used?

Traditional rafters could be used. The downside is that a skilled labourer(s) would be required, increasing cost as well as the time it would take to make the roof.

Additional materials would also be required to create the roof.

Q4. Condensation – Condensation within domestic buildings is caused when an object falls below the dew point temperature and warm air comes into contact with it (condenses). This is why in houses, condensation tends to happen to windows or walls (usually external). (GR5,2015)

One method of reducing condensation could be triple glazing rather than double. Thicker walls and better insulation for homes have now made the windows colder compared to the rest of the house, triple could reduce the U value between the window and the rest of the house (albeit a small reduction compared to double glazing). Cost will be higher and the return in investment is around the same for double glazing (although not really suitable to replace an already built house, better suited to new a build). These are more often than not the coldest part of the room, also called cold bridges. Older double glazing can sometimes have condensation in between the glass, this is due to a damaged seal and air entering the void. How can this affect the fabric of the window? If condensation is internal, they could enter any damaged seals and create the problem above. The gases between the glass panes will disappear and will reduce the insulation effect and increase the U Value.

The increase in modern appliances which generate moisture has increased e.g. tumble driers, kettles, washing machines etc. With central heating, the rooms are warmer and so can contain more water, once the colder months arrive, this leads to moisture collecting on the windows and walls.

Condensation in insulation will affect its usability. Some fabrics e.g. Rockwool™ are useless once moisture permeates them. This in turn will lower the wall/roof U value, and could fall below the building regulations.

Condensation can cause certain damp or mould problems. This would be a risk to the occupier's health.

It can also affect the wooden structures/ plasterboard, concrete, insulation such as:

- Rotting timber
- Damp in ceilings and walls
- Rising damp from cold floors
- Where air has restricted movement
- Insulation will fail if moisture enters it.
- Plaster Beetles

How to reduce condensation?

- Install windows with vents, this will allow cooler air to enter the room and diffuse the moisture.
- Open windows when showering/bathing/cooking.
- Dry clothing outside
- Use a de-humidifier (although this can be quite costly to run)

- Install an extractor fan in the bathroom/Kitchen area.
- Wipe away condensation from the windows.
- Insulate as much as possible.

Condensation in the roof space:

Water vapour can be formed when materials dry out in a new build.

If the warm air can't escape from windows or vents, it looks for the next coldest spot which is usually the roof. It cools and then forms condensation.

In pitched roofs, bldg. regs and NHBC require vent slots to be built in along two opposite eaves so that air can flow across the roof space. (Approved document F, Pg 49)

References:

BRE, (2002) 262 Thermal insulation: avoiding risks. London: CRC Ltd.

GREAT BRITAIN. Approved Document L2 – Air permeability requirements for buildings, 2006. London: The Stationery Office. Building Regulations Part L

Domestic ventilation compliance guide 2010 edition – Section 5 New Dwellings

See page 49 of Guide F. GREAT BRITAIN. Approved Document F – Ventilation, 2003. London: The Stationery Office.

NHBC Standards, Chapter 4.2: *Building near trees*

BS 1202: Part 3: 1974

CI/SfB (47) Ne5 May 1999 Natural Slate Guide

BS8103 Part 3

BS 5534: 1997, Code of practice for slating and tiling, Part 1: Design.

BRE Digest 346: Parts 1 to 7 and BS 6399: Part 2: 1990, Code of practice for wind loads, which replaces BS CP3: Chapter 5: Part 2: 1972.

BRE Good Repair guide, GR 5 Revised 2015, Diagnose the cause of dampness. GREAT BRITAIN.

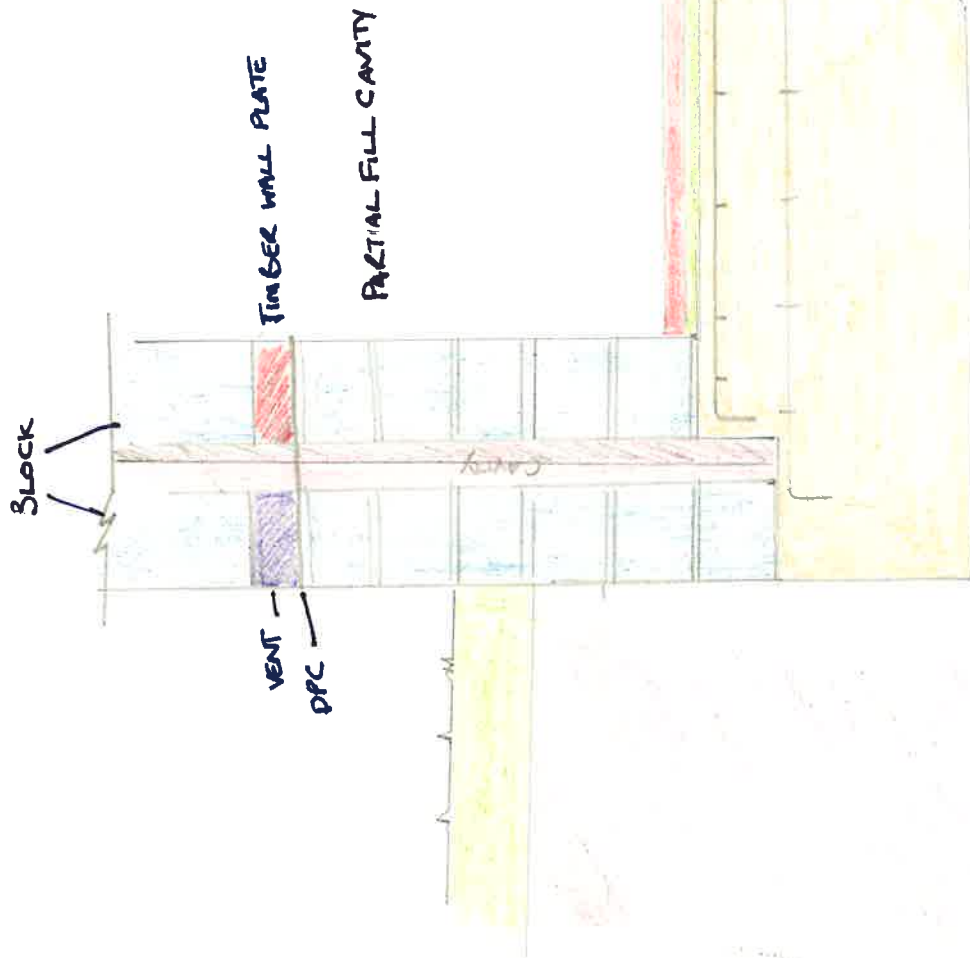
Approved Document L1 – Conservation of fuel and power in dwellings, 2006. London: The Stationery Office.

BS 8103-1:2011 *Structural design of low-rise buildings Part 1: Code of practice for stability, site investigation, foundations, precast concrete floors and ground floor slabs for housing (Page 37)*

Building Regulations F2: 1995 and BS 5250: 1989 (1995), *Code of practice for control of condensation in buildings.*

BS 9250:2007 - Code of practice for design of the airtightness of ceilings in pitched roofs

RAFT FOUNDATION

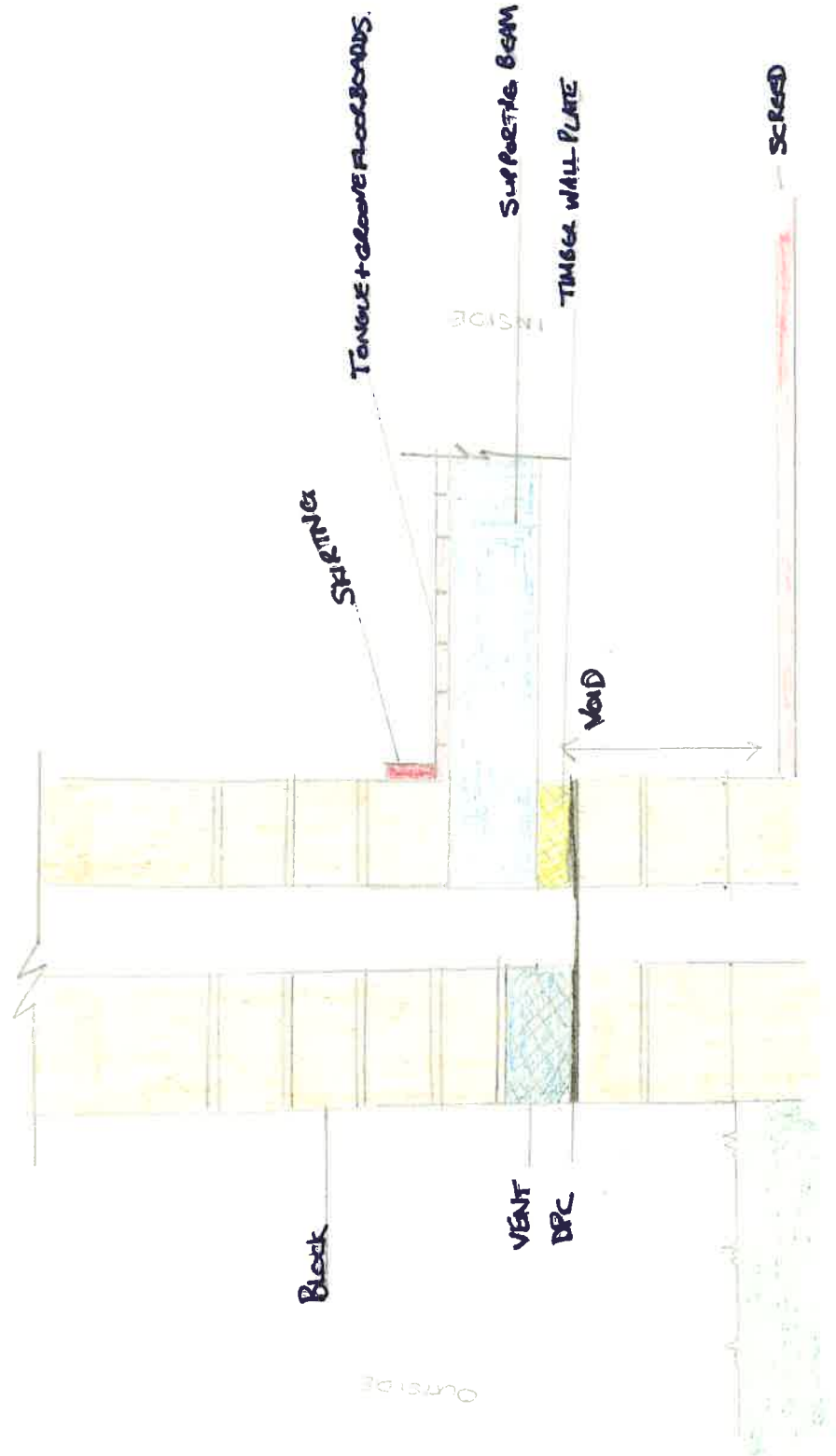


NOTES

VENT: MIN OF 1500mm² PER M
 RUN OF THE WALL.
 DPC: 150mm MINIMUM ABOVE
 GROUND LEVEL.
 DEPTH OF RAFT FOUNDATION TO
 BE A MINIMUM OF 1000mm.

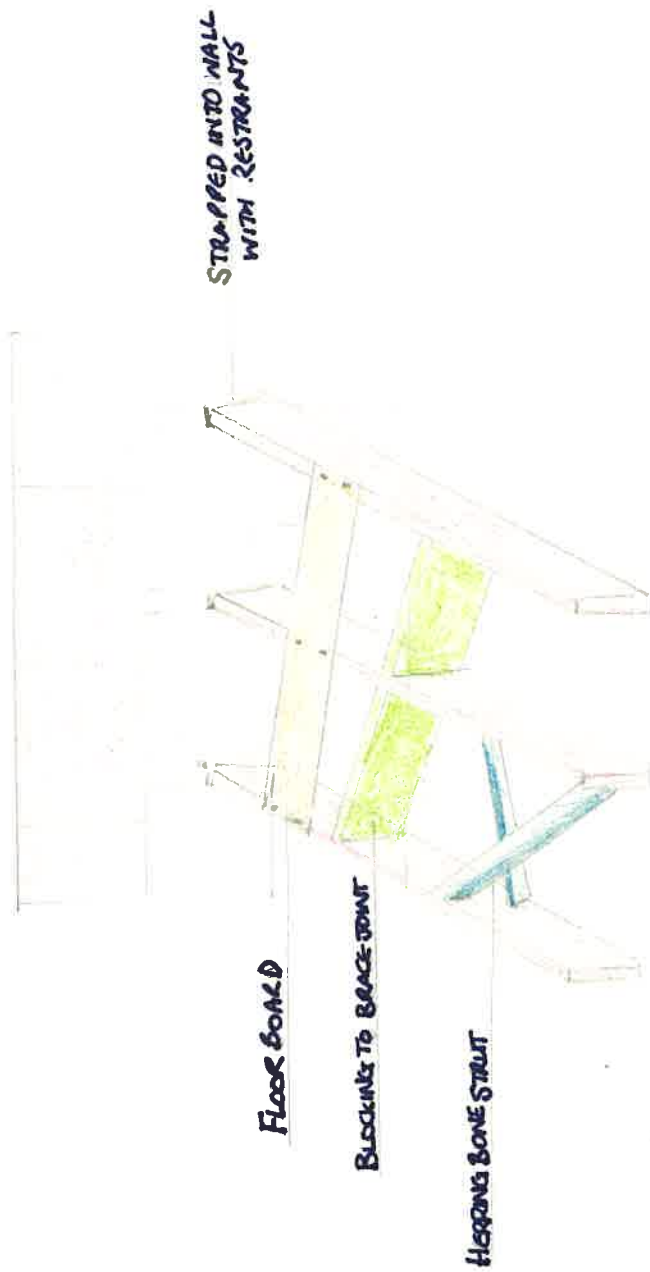
EMILIE DRISCOLL
 1811497
 SKETCH 1
 NOT TO SCALE

SUSPENDED TIMBER FLOOR



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SKETCH 2
NOT TO SCALE

FIRST FLOOR AND CEILING



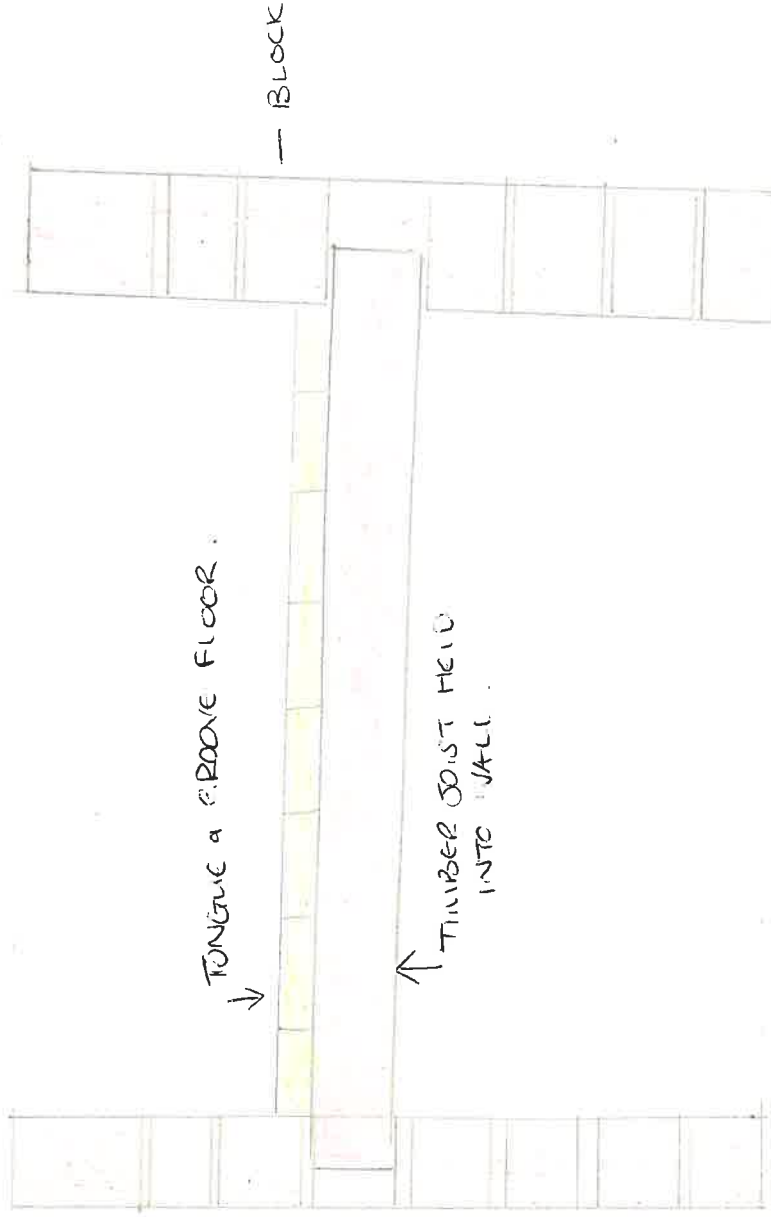
EMILIE DEISCOLL

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SKETCH 3

NOT TO SCALE

FIRST FLOOR AND CEILING

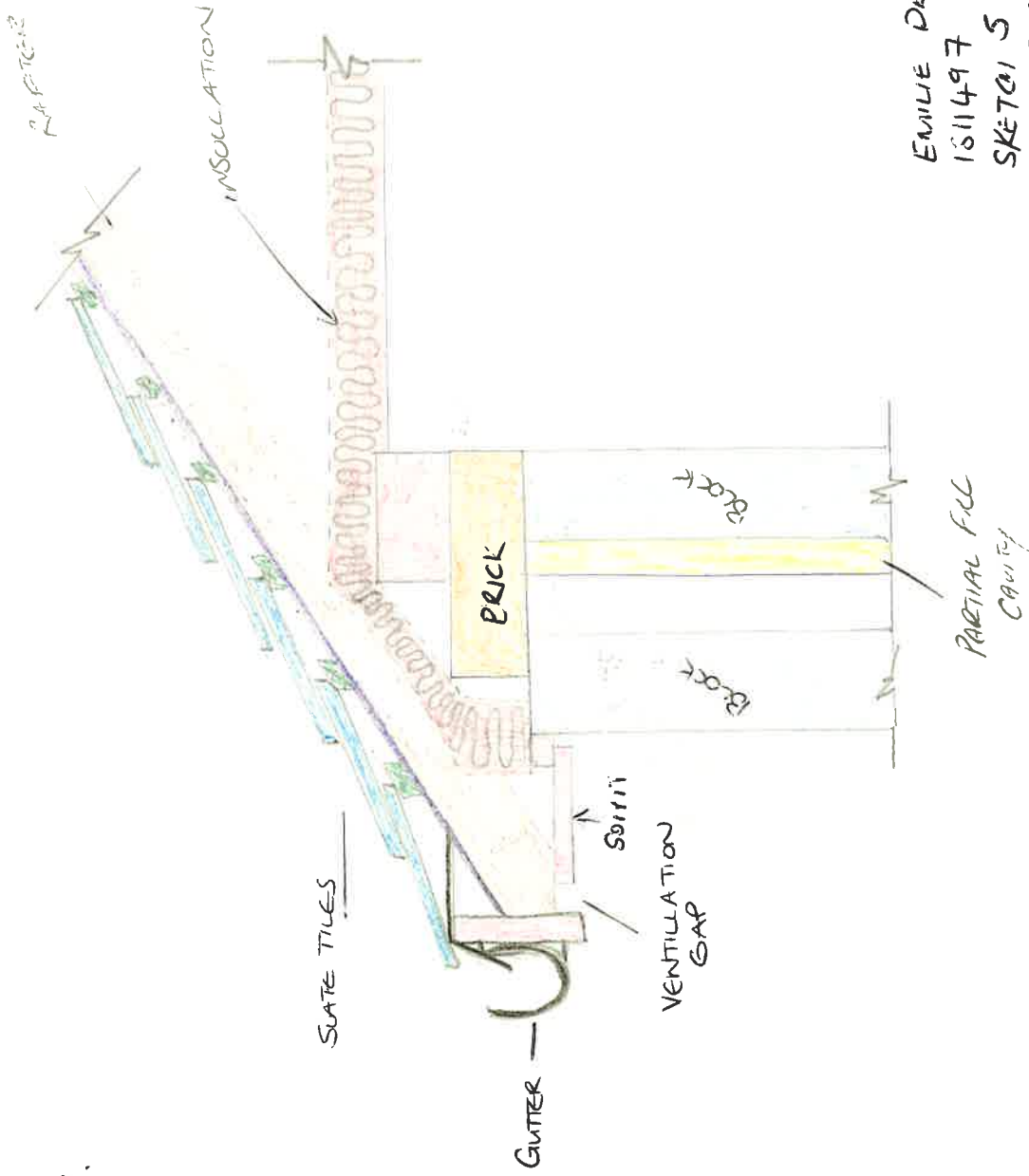


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SKETCH 4
NOT TO SCALE

ROOF DETAIL

NOTES:

ALL ROOF MATERIALS SHOULD
COMPLY WITH BLDG RECS 2010: REG 7.

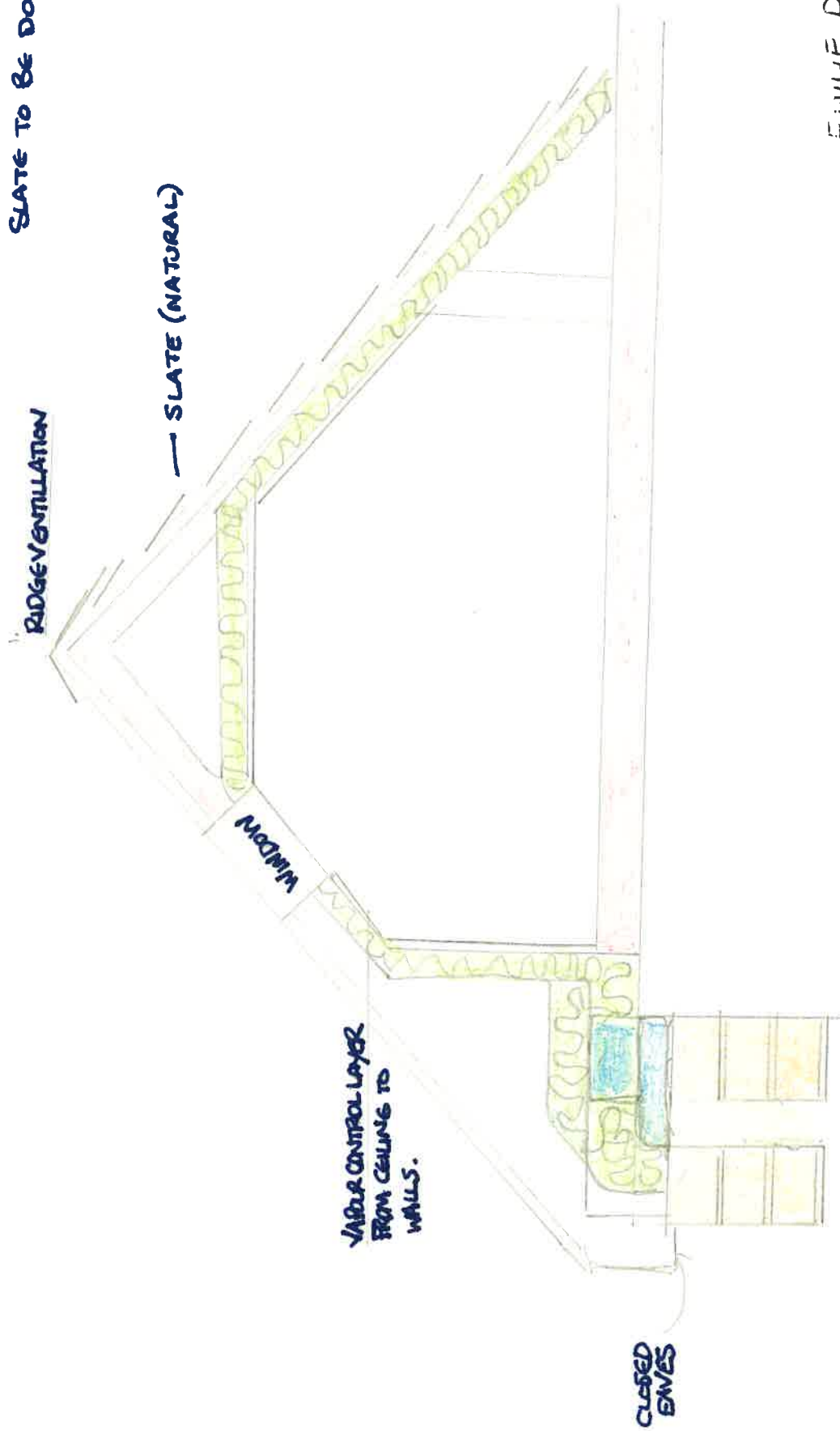


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SKETCH 5
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'ROOM IN A ROOF' TRUSSED RAFTER

• Ridge ventilation to LEAVE GAP of 5mm

SLATE TO BE DOUBLE LAP



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SKETCH

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HEADLAPS FOR TILES

NOTES

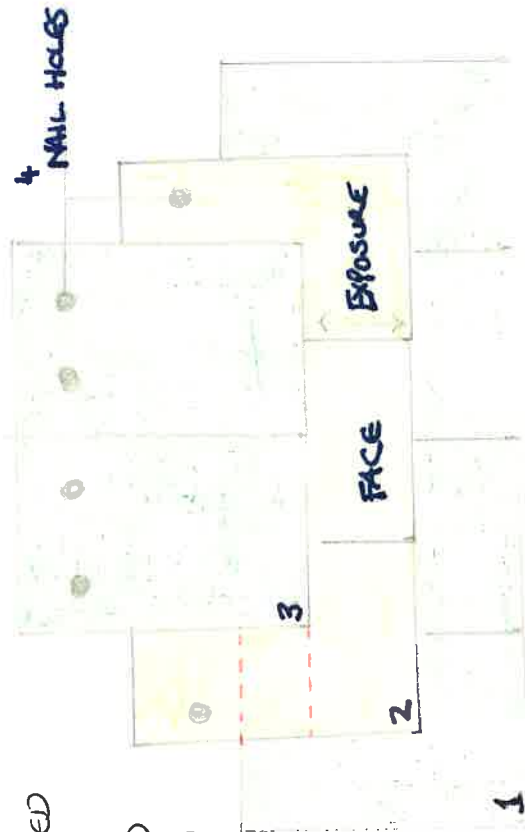
1. HEADLAP: 76mm (see BS5534 Table 9, Pg 52)

2. NAILS SHOULD BE ALUMINIUM ALLOY (BS1202) OR COPPER (BS1202) OR STAINLESS STEEL.

LONGER NAILS SHOULD BE USED AT THE EAVES.

THE LAP IS CALCULATED BY TAKING INTO ACCOUNT THE WIND UPLIFT, AND WIND LOADS. ALSO TAKE INTO ACCOUNT EXPOSURE TO RAIN AND ROOF PITCH. (NATURAL SLATE GUIDE, Pg 4)

BS5534 AND BS6399



USE PRE DRILLED
HOLED SLATE

DOUBLE LAPPED
(BS5534, Pg 51)

SIDE LAP NO
LESS THAN
69mm

(BS5534, Pg 53)

NATURAL SLATE SHOULD COMPLY WITH BS12326-1

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SKETCH 7

NOT TO SCALE

VENTILATION TRANSFER.

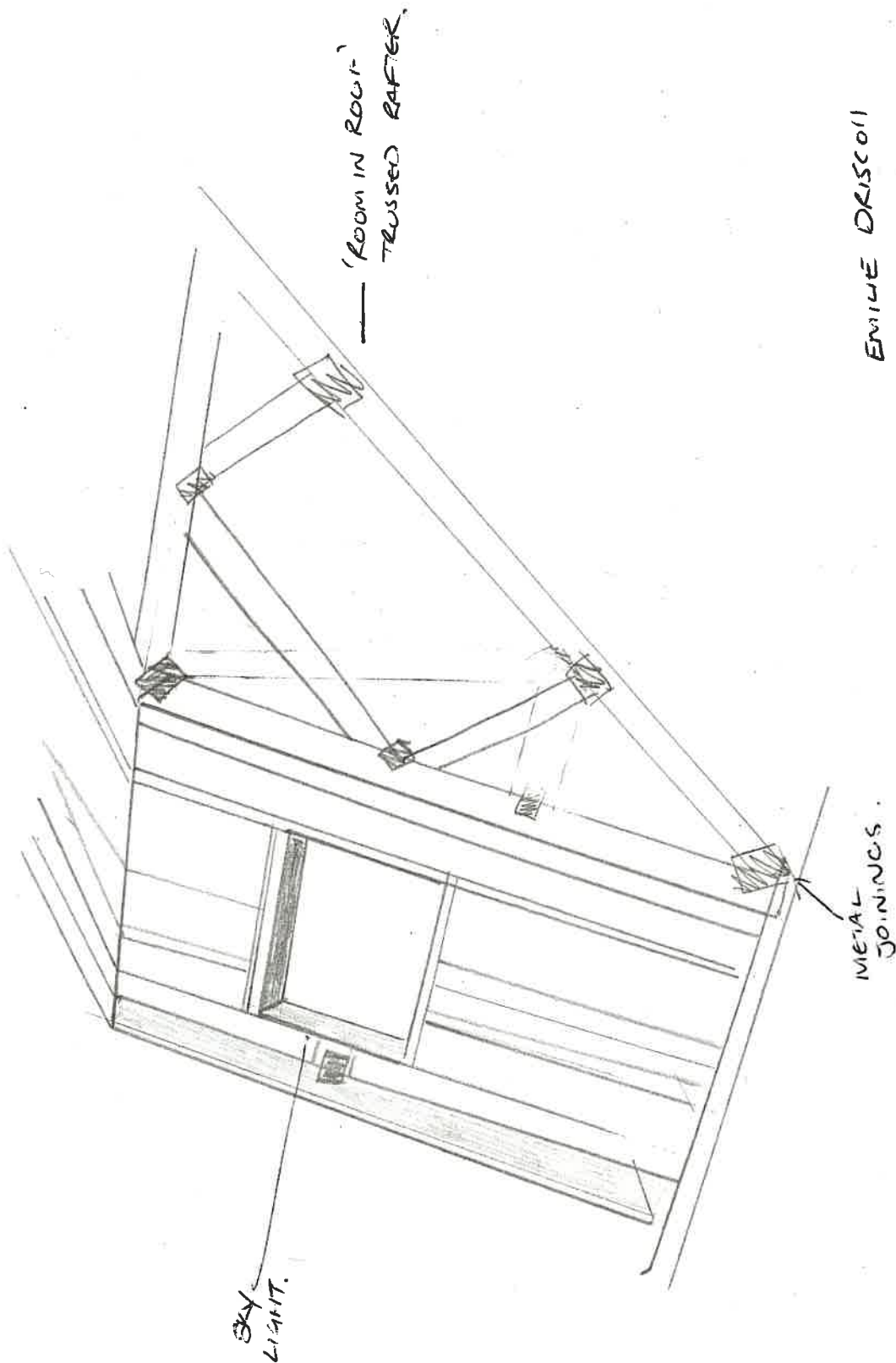
NOTES:

APPROVED DOCUMENT F. Page 26
DETAILS THE AIR TRANSFER
THROUGH THE HOME RATES.



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18/1497
SKETCH 8
NOT TO SCALE

SKYLIGHTS IN THE ROOF



EMILE DRISCOLL

1811497

SKETCH 9

NOT TO SCALE.