Bats, Pads & ZEDs

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Green Building Encyclopaedia

SHU Sharc CPD 20/11/2024

Bats & Birds, Roosts & Nests Low to Zero Energy Developments

Design, Construction & Guidance Publication

Workshop

Invitation

- Habitat Regs. & Code for Sustainable Homes
- Complimentary and conflicting requirements
- Architects, development control & constructors
- Need definitive guidance to safe solutions

Working together

- bat world and construction industry
- Working together to find common ground,
- to do some future gazing
- into methods of construction
- that will survive next few decades
- find ways to accommodate bats and birds
- without compromising performance of future buildings too much if at all

Future Guide

- *"Biodiversity for Low and Zero Carbon Buildings"*
- will do just that
- for bat and bird species for which buildings are important
- swifts, swallows, house martins, house sparrow, starlings, barn owls and peregrine falcons

Behind the scenes

- analysis of existing information
- critique of available products
- review of materials
- appropriate format for potential readers.

Scope

- Analysis
  - Communication
  - Dimensions
  - Products
- Future Gazing
  - Construction Types
  - Bat & Bird accommodation

Analysis

Communications

- Architects can't read
  - They think with pencil and paper in hand
  - Cannot read more then a paragraph at a time
  - Without a cartoon or drawing to get to the next paragraph
  - So guide must be illustrated
  - A picture per paragraph a paragraph per picture
  - No need to read anything
  - Flow diagrams, Charts, tables

Communications

- Batties v Architects
  - You know what your talking about
  - We know what we are talking about
  - But risk we don't get a word of each others
  - We read enough to learn new jargon
  - We talk Jargon all the time
  - To make ourselves sound intelligent or important but alienate and confuse
  - Jargon Busters needed in both directions

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Jargon Buster

- To introduce terminology used by each party to create a level playing field
- Written by each side for each other
  - future building methods
  - simplified building physics & performance
  - Wildlife, habitat, birds, bats, roosts
- 10 A4 pages

BCT PUBLICATION JARGON BUSTER

AIR BARRIER
An air barrier comprises materials and/or components, which are air impervious or virtually so, separating conditioned spaces (heated, cooled or humidity controlled, usually inside), from unconditioned spaces (unheated, un-cooled, humidity uncontrolled, usually outside).
(based on SEDA Scottish Environmental Design Association definition)

AIR EXFILTRATION
The uncontrolled outward leakage of indoor air through cracks, discontinuities and other unintentional openings in the building envelope.
(SEDA Scottish Environmental Design Association)
In winter the air is likely to be heated and heated air exfiltration will result in uncontrolled heat loss and potential interstitial condensation risk.
(GreenSpec ’09 & EBS ‘09)

AIR INFILTRATION
The uncontrolled inward leakage of outdoor air through cracks, discontinuities and other unintentional openings in the building envelope.
(SEDA Scottish Environmental Design Association)
In winter the air is likely to be cold and cold air infiltration will result in uncontrolled draughts, leading to thermal discomfort and condensation risk.
(GreenSpec ’09 & EBS ‘09)

AIR LEAKAGE PATH
A route by which air enters or leaves a building or flows through a component.
(based on SEDA Airtightness Guide definition)
The air leakage path may not pass directly through an element but can also pass long its length or across its area, leaks in the external envelop can manifest themselves in more than one location and in any junction of external or internal construction.
Plasterboard is an example of an air-leaky construction where air moves between walls and plasterboard and leaks out of electrical switches and sockets, around skirting, etc.

Holes through the building fabric through which air can pass, that can destroy the integrity of the fabric’s acoustic, fire, thermal, wind, weather, water and air tightness performance.

College knowledge

- Architect know what they know
- They leaned it 10, 20 , 30, 40 years ago
- Architects have a lot to learn about changes in low energy building design
- This guide and the jargon buster gives us an opportunity to update them

Future Gazing

- 1600 construction methods listed by BRE
- 900 more listed by GreenSpec in MyGreenSpec
- Select types of construction likely to succeed into the Low to Zero Carbon building age
- 10 methods of construction selected
- 70 materials, cladding & finish permutations
- That can also accommodate bats & birds
- Decide where in the construction they go
- And make it competent construction

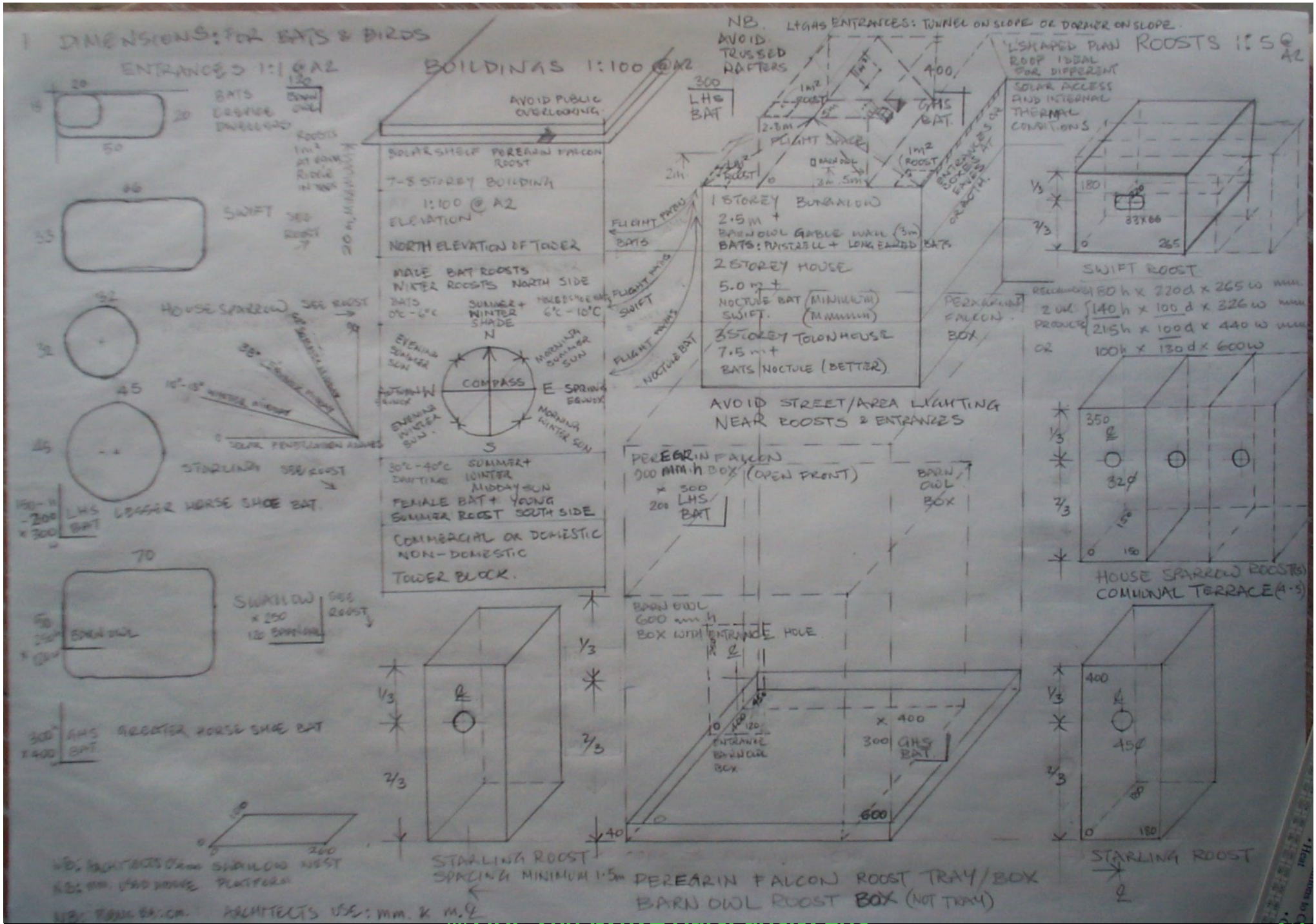
		Method of construction	Materials	Facings/Linings	General Contractor	Self-build Self-manage	Specialist Applicator	Green Builder	Simplicity	Familiarity to wider Construction industry	MMC Modern method of construction?	Off-site fabrications?	Improvement on common method	Potential popularity in future	Potential longevity	Good U values possible Dimensions dictate	Exploits any potential thermal mass	Exploits any potential moisture mass	Needs solar shading	Needs weather protection
New Build		Box outside	Any	Any	Yes	Yes	No	Yes	Yes	No				Yes		Yes	Yes		Yes	?
New Build		Box within construction	Any	Any	Yes	Yes	?	Yes	No	No				Yes		?	?			No
New Build		Box inside building	Any	Any	Yes	Yes	?	Yes	No	No				Yes		No	No		No	No
New Build	1	SOLID MASONRY WALL																		
New Build	1A	SOLID MASONRY WALL	Brick																	
New Build	1A	SOLID MASONRY WALL	Brick	External Insulation Render	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Retrofit	Yes	Yes	Yes	No	No	No
New Build	1A	SOLID MASONRY WALL	Brick	Internal insulated plaster	Yes	Yes	No	No	Yes	Yes	No	No	No	Retrofit	No	Some	No	No	No	No
New Build	1A	SOLID MASONRY WALL	Brick	Tile hanging on insulation	Yes	Yes	No	No	Yes	Yes	No	No	No	Retrofit	Yes	Yes	Yes	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or Air																	
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	External Insulation Render	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	Internal insulated lining	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	Some	No	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	Tile hanging on insulation	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block																	
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	External Insulation Render	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Render	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Some	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Internal insulated lining	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Some	No	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Tile hanging on insulation	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
New Build	1D	SOLID MASONRY WALL	Pumice lime block	Any	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No
New Build	1E	SOLID MASONRY WALL	Wood cement block concrete fill	Any	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No
New Build	1F	SOLID MASONRY WALL	Hemp-lime block	Any	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1G	SOLID MASONRY WALL	Unfired clay/straw block	Any	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1H	SOLID MASONRY WALL	Unfired clay/gypsum block	Any	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1I	SOLID MASONRY WALL	Papercrete block	Any	Yes	Yes	?	Yes	Yes	No	No	No	No	Yes	Yes	Yes	?	?	No	No
New Build	1J	SOLID MASONRY WALL	Recycled glass block	Any	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
New Build	1K	Insulated concrete formwork																		
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork																	
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork	Insitu concrete fill	Yes	Yes	No	No	Yes	No	No	No	?	Yes	No	Yes	No	No	No	No
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork	Eco concrete fill	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	No
	3	CAVITY WALL																		
New Build	3A	CAVITY WALL	Unfilled cavity		Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
New Build	3B	CAVITY WALL	Full fill insulated cavity																	
New Build	3B	CAVITY WALL	Full fill insulated cavity	Brick outer block inner	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	?	Yes	Yes	No	No	No
New Build	3B	CAVITY WALL	Full fill insulated cavity	Brick outer cellular clay inner	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	?	Yes	Yes	No	No	No
New Build	3C	CAVITY WALL	Partial fill insulated cavity																	
New Build	3C	CAVITY WALL	Partial fill insulated cavity	Brick outer block inner	Yes	Yes	No	No	No	?	No	No	No	Yes	No	Yes	Yes	No	No	No
New Build	3C	CAVITY WALL	Partial fill insulated cavity	Brick outer cellular clay inner	Yes	Yes	No	No	No	?	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No

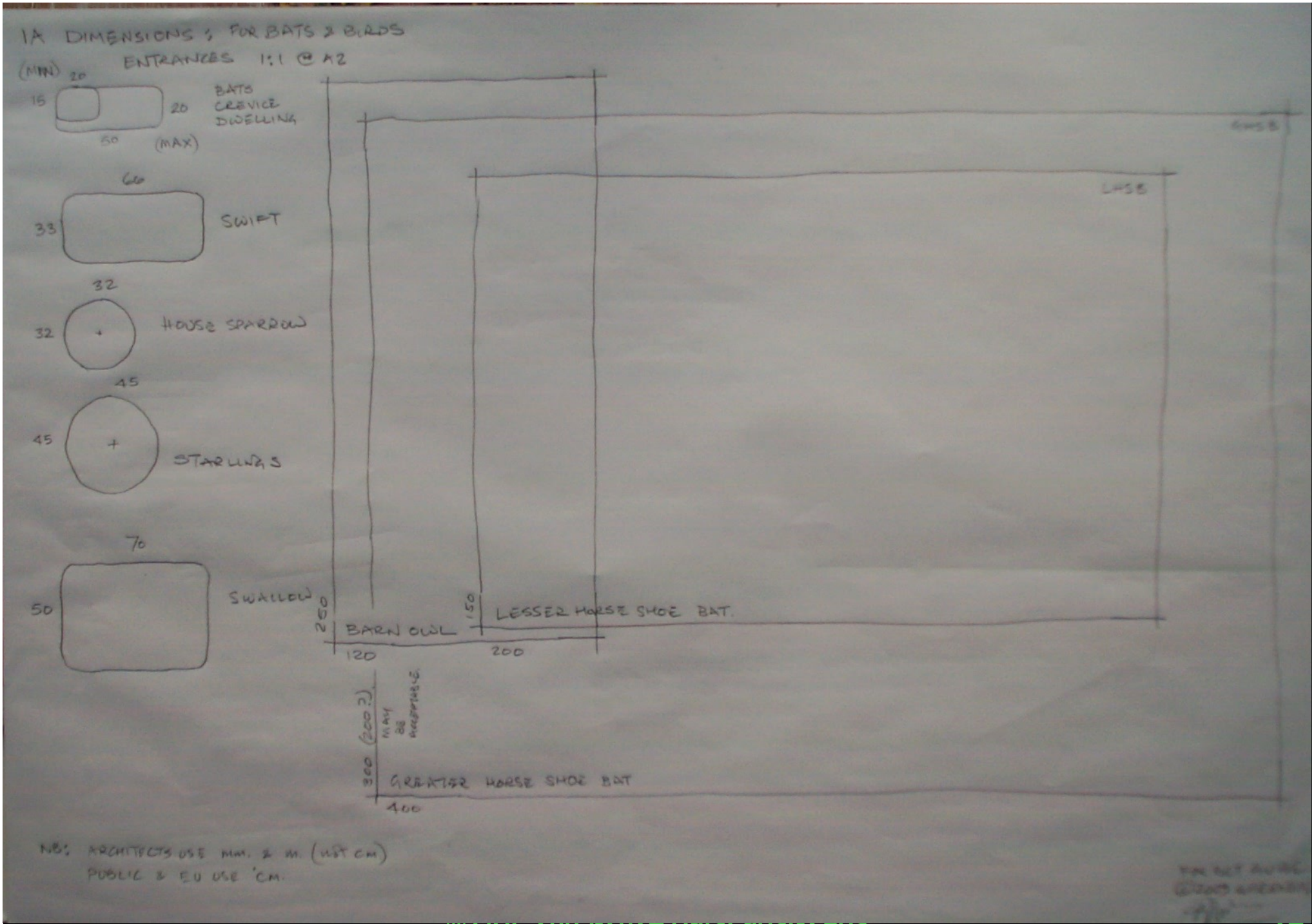
Dimensions: Bats & Birds

- Entrances
- Entrance: locations, heights
- Flight spaces in and out
- Roost locations
- Roost/box sizes
- Roost arrangement

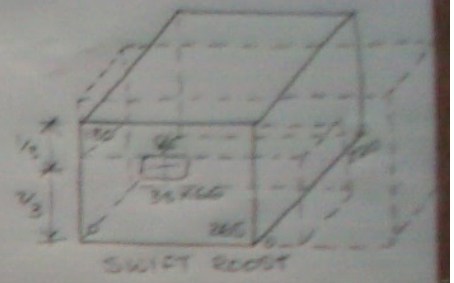
General outline of roosting and nesting requirements

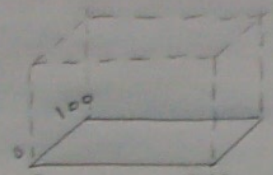
	Access dimensions	Roost dimensions	Height of entry	Aspect of roost	Temperature ° C		Materials and other comments
					Summer	Winter	
Crevice dwelling bats	15-20 h x 20- 50 mm l (like tiny letterboxes!)	Any size as long as some components of the area are crevices in the region of 20 – 30 x mm width of gap. Greater total areas of something like 1 metre square would be useful for nursery (summer) roosts. Male roosts are smaller numbers of bats or even individual bats.	2 - 7 m (except noctule over 5 m)	Summer nursery roosts most south or west aspect for solar heating. Male roosts and winter hibernation roosts on northerly aspect.	30-40 daytime.	0-6	• Rough (for grip) • Non-toxic • No risk of entanglement • Suitable thermal properties (reducing 24 hr fluctuations)
Bats needing a flying area	15-20 h x 20- 50 l mm.	2.8 h x 5 m x 5 m not trussed. incorporate roost cervices dimensions as above,	Over 2 m	The crevice roosting provision within the roost to be located on the south or west side for solar heating. The flight area not as important.	30-40	0-6	
Horseshoe bats	Lesser horseshoes 300 l x 200 h mm. Greater horseshoes 400 l x 300 h mm.	2.8 h x 5 m x 5 m not trussed to allow flight.	Over 2 m	The roost is most likely going to be in a roof space and this should have an orientation that allows a south-facing solar gain or better still an l-shape to allow temperature-range choice.	30-40	6-10	
Swifts	65 w x 33 h mm	180 h x 265 w x 220 d mm. or 600 x 130 x 100 h mm.	Over 5 m Preferably integral to the building but where this is not possible external under the eaves. It is important to have several potential nest site for	Out of direct sunlight away from windows	No requirements that I am aware of expect to avoid direct sun that would lead to over-heating.		Concrete, masonry or marine ply. In establishing a new colony, playing recorded swift calls may attract them.
House sparrow	32mm hole	350 h x 150 w x 150 d mm.	Ideally within the structure at soffit/eaves	Out of direct sun. Easterly best.			

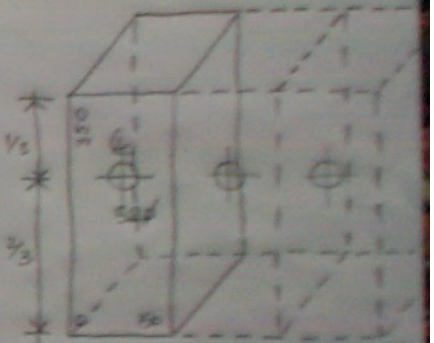


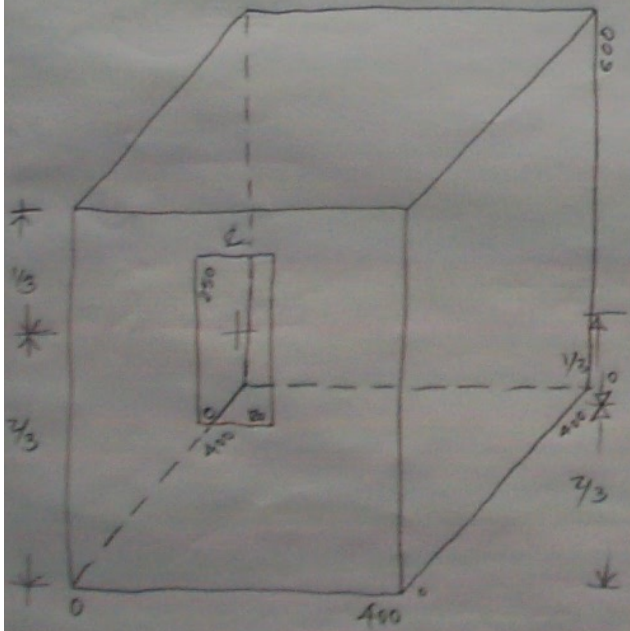


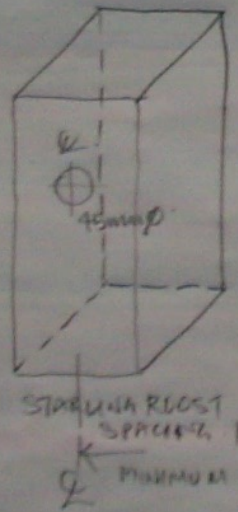
18 DIMENSIONS: FOR BATS & BIRDS
ROOSTS NESTS & PLATFORMS & BOXES 1:5 @ A2
INTERNAL DIMENSIONS

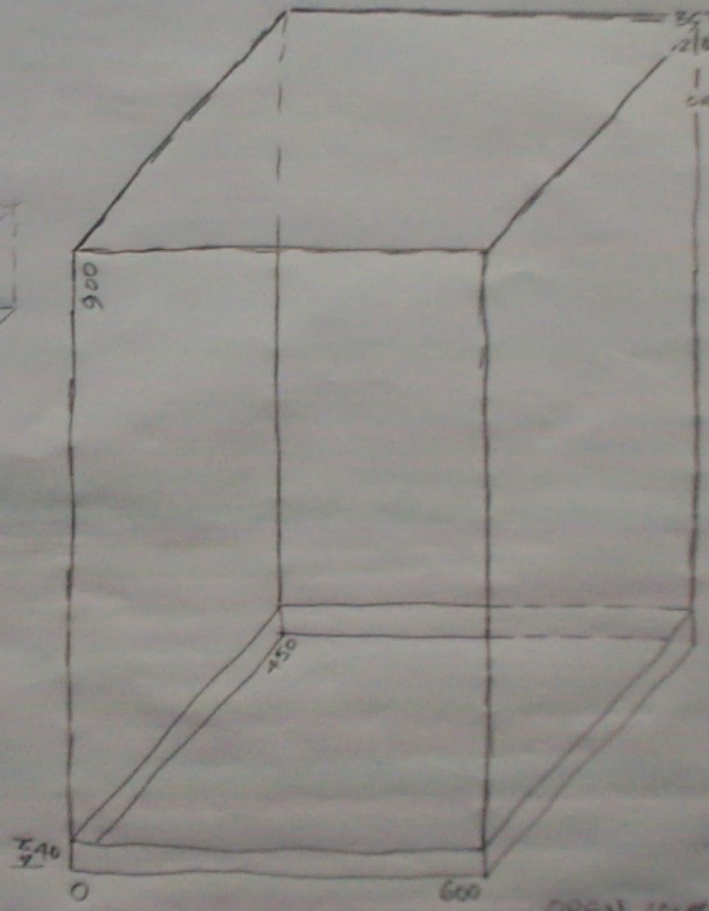


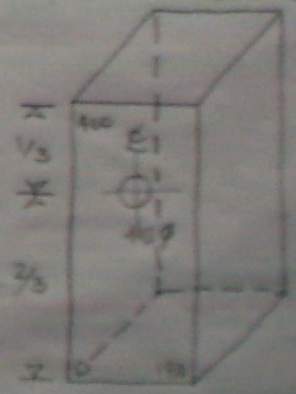


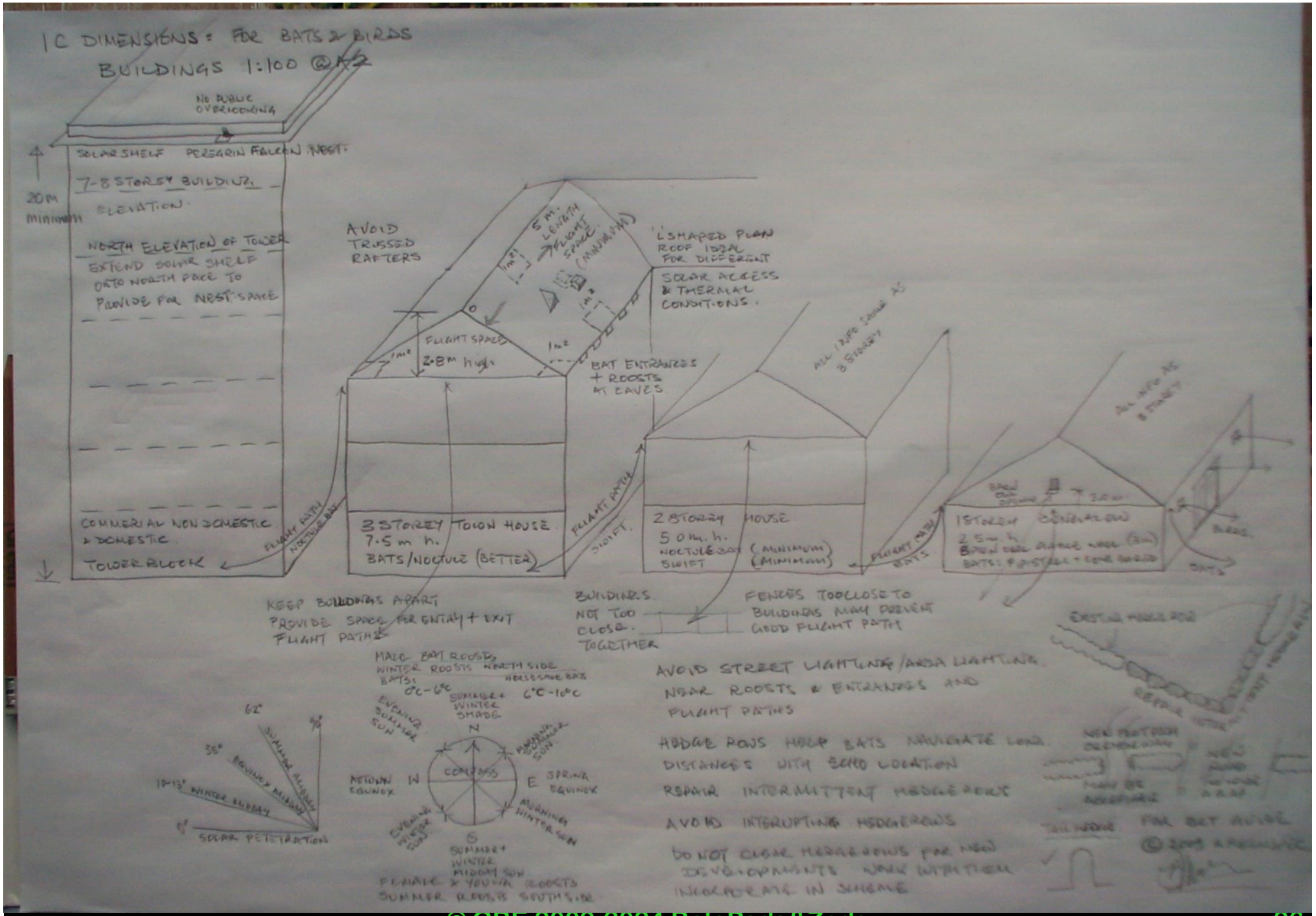










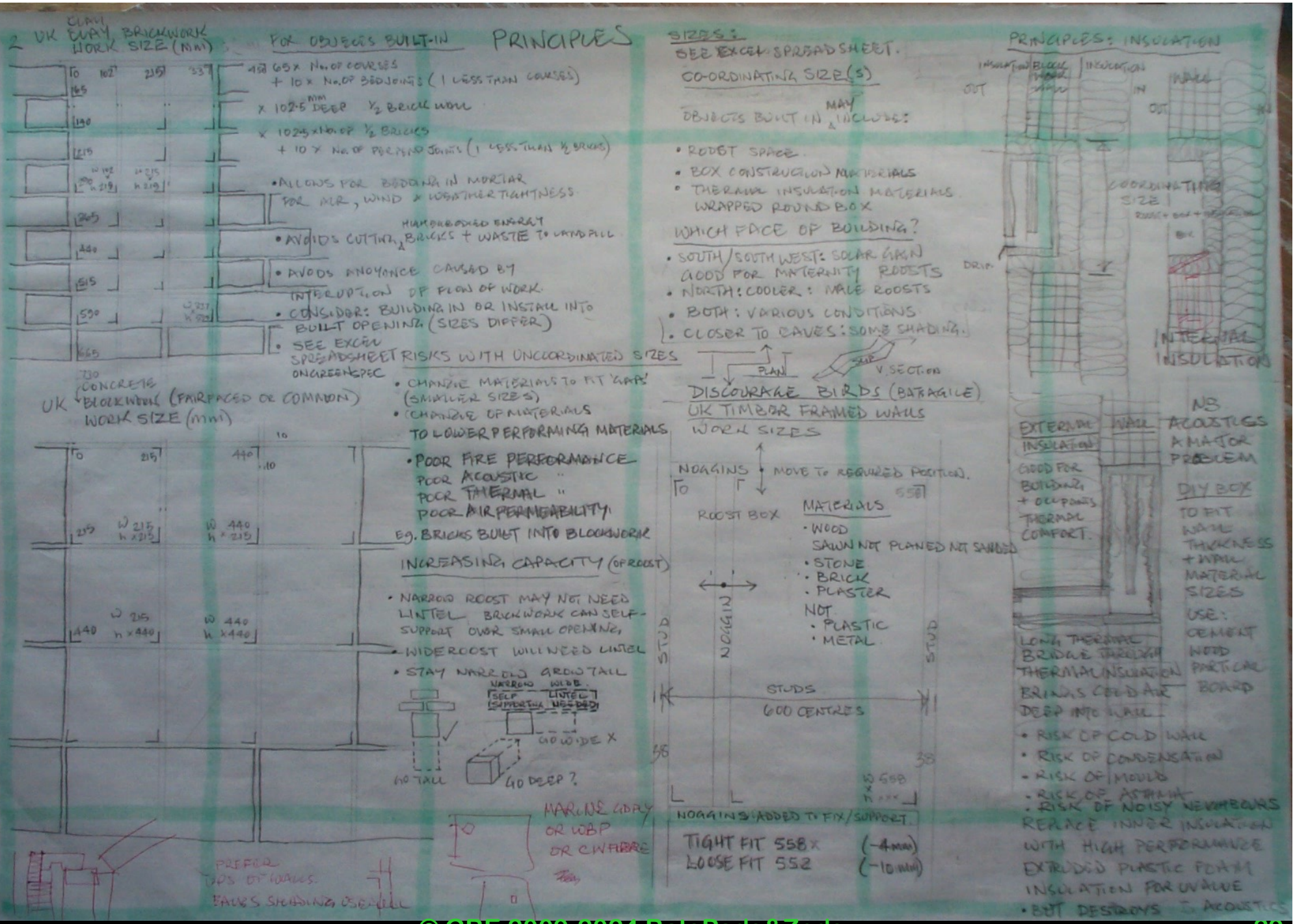


Interconnectivity

- Eaves Triangles
- Ridge Triangles
- Connecting tunnels
- Ability to move from warm to cooler places
- Parent s move from maternity roost
- and go into tauper

Dimensions: Construction

- **Construction types:**
  - Standard dimensions, work sizes, departures
- **Principles**
  - Avoid disruption of work flow
  - Use standard sizes, co-ordinating sizes
  - Risks with un co-ordinated sizes
  - Sizes for: Build-in or into built openings
- **Increasing roost/nest capacity**
- **Orientation and elevation**
- **Solar access and shading**
- **Position relative to thermal/acoustic insulation**



Tables

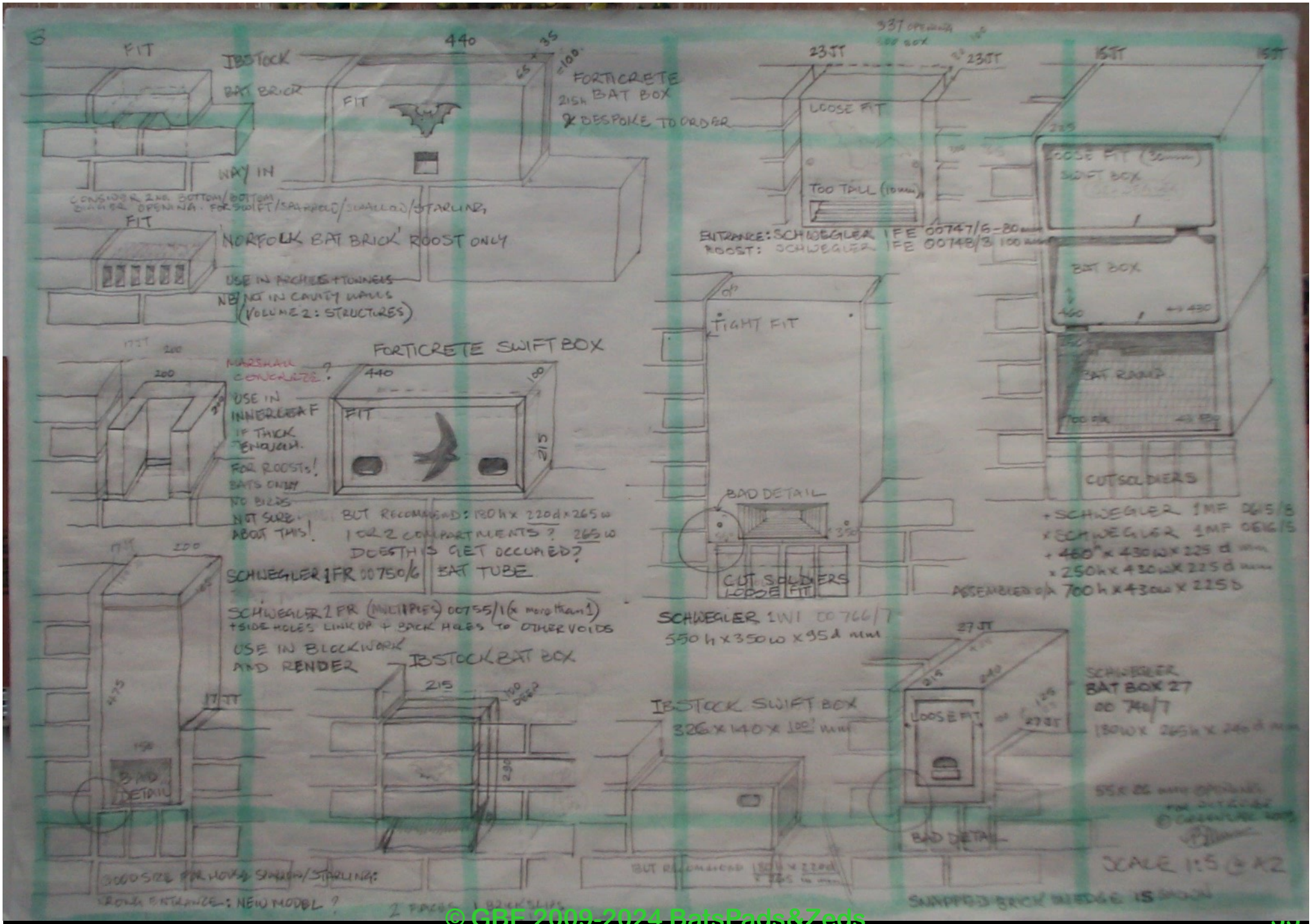
- Tables of masonry
  - Was on (www.scribd.com/brianspecman) no longer
  - Bricks: UK metric, UK modular, UK Imperial
  - Blocks: UK metric, Thin Joint block
  - Blocks: German coursing & 1 mm. joint
  - Build–in size:
    - Brick/block with 2 joints openings
  - Into built opening
    - With variable tolerances
  - Build-in with insulation wrap around
    - Any thickness
- Timber frame, trimming and noggins

	Walling element height (mm.)	Walling element width (along wall length) (mm.) NB. Half or whole units	Wall thickness (number of half bricks or whole block widths)	Wall thickness (mm.) NB. Half or whole units	Bed Joint (mm.)	Perpend Joint (mm.)	Tolerances deducted once (mm.)	Insulation on all sides: thickness (mm.)	Bat box wall thickness (mm.)	
UK metric brick	65	102.5	%%%	102.5	10	10	3	25	20	
Number of units in wall length						1				2
Choose from drop down menu:						122.5				235
UK metric brick							74.5			
UK imperial brick		Mortared in		Dry fit		Mortared in	Dry fit	Bat/bird void	Bat/bird void	Mortared in
UK modular brick	10					w x h x t (mm.)	w x h x t (mm.)	w x d x h (mm.)	w x d x h (mm.)	w x h x t (mm.)
UK block	65	65			Mortared in	102.5 x 65 x 102.5		62.5 x 62.5 x 25		235 x 65
UK thin joint block	10			57	Dry fit		74.5 x 57 x 102.5		34.5 x 62.5 x 17	
UK cellular clay block	65	140			Mortared in	102.5 x 140 x 102.5		62.5 x 62.5 x 100		235 x 140
EU cellular clay block	10			132	Dry fit		74.5 x 132		34.5 x 62.5 x 92	
	65	215			Mortared in	102.5 x 215 x 102.5		62.5 x 62.5 x 175		235 x 215
	10			207	Dry fit		74.5 x 207		34.5 x 62.5 x 167	
	65	290			Mortared in	102.5 x 290 x 102.5		62.5 x 62.5 x 250		235 x 290
	10			282	Dry fit		74.5 x 282		34.5 x 62.5 x 242	
	65	365			Mortared in	102.5 x 365 x 102.5		62.5 x 62.5 x 325		235 x 365
	10			357	Dry fit		74.5 x 357		34.5 x 62.5 x 317	
	65	440			Mortared in	102.5 x 440 x 102.5		62.5 x 62.5 x 400		235 x 440
	10			432	Dry fit		74.5 x 432		34.5 x 62.5 x 392	
	65	515			Mortared in	102.5 x 515 x 102.5		62.5 x 62.5 x 475		235 x 515
	10			507	Dry fit		74.5 x 507		34.5 x 62.5 x 467	
	65	590			Mortared in	102.5 x 590		62.5 x 62.5 x 550		235 x 590
	10			582	Dry fit		74.5 x 582		34.5 x 62.5 x 542	
	65	665			Mortared in			62.5 x 62.5 x 625		235 x 665
	10			657	Dry fit		74.5 x 657		34.5 x 62.5 x 617	

	Walling element height (mm.)	Walling element width (along wall length) (mm.) NB. Half or whole units			Bed Joint (mm.)	Perpend Joint (mm.)		Insulation on all sides: thickness (mm.)	Bat box wall thickness (mm.)	
UK imperial brick	?	?			?	?				
				Wall thickness (mm.)			Tolerances deducted once			

Dimensions: Bat & Bird Boxes

- **Manufactured products for building in**
  - Ignoring surface mounted (not normally a problem)
    - **Except Architects get precious about their details**
  - Entrances
  - Bat boxes for building in
  - Bat ramps
  - Swift boxes for building in
  - Roosts
  - Bat tubes
- **Sizes in relation to construction**
  - Important to Architect
- **Sizes in relation to occupants**
  - Important to occupant
  - Post Occupancy Evaluation? Dr Dolittle needed?



Product Specifications

- Extracted notes from
  - Literature
  - Websites
- Rewritten as specifications
- No longer available from www.greenspec.co.uk
- Wish to create product pages on GBE
- https://GreenBuildingEncyclopaedia.uk
- Wish to add to Green Building Calculator carbon calculator and eventually a specification assembly tool

N80 BIODIVERSITY ENHANCEMENT/MITIGATION SYSTEMS
To be read with Preliminaries/General Conditions A10-A55

F30 ACCESSORIES TO BRICK/BLOCK/STONE WALLING.
To be read with Preliminaries/General Conditions A10-A55

____ CONCRETE EAVES/VERGE SYSTEM
Reference Drawing(s): _____
Location: _____
Roof configuration:
- Mono ridge
- Pitched roof with gables: Eaves and verges
- Pitched roof with eaves: Eaves only
- Pitched roofs with hips: Eaves only

Background:
- Cavity wall construction
- Solid wall construction

Cavity:
- Total cavity: ___ mm.
- Insulation thickness: ___ mm.
- Residual cavity: ____ mm.
- At eaves/verges: cavity reduced by 100 mm. by projecting eaves/verge blocks into cavity

Blocks: To BS 6073-1
Type:
- Solid
- Hollow with bird aperture in face
- Hollow with bat aperture in base

Manufacturer: RoofBLOCK Limited, 6 Almoner's Field, Cullum Road, Bury St Edmunds IP33 2TS, UK
T/F 028 9181 8285
Manufacturer: RoofBLOCK Limited, 5 Bramble Wood, Newtownards BT23 8WZ, IRELAND
T/F 048 9181 8285
E sales@roofblock.co.uk W www.roofblock.co.uk
Product Reference:
- RoofBLOCK masonry roof overhang system
- RoofBLOCK masonry roof overhang system with bird box adaption

Product Critique

- Compare the product with:
  - Bat requirements
  - Building/Builder requirements
  - Energy requirements
    - Condensation risks, fire, thermal performance
  - Acoustic requirements
    - Noisy neighbours: high risk of failure
- Usually a shortfall in some respect
  - Some in many respects

BAT & BIRD BOX PRODUCT CRITIQUE

GENERALLY:

DIMENSIONS:

If made in the UK it may fit with UK standard size construction products (not always)
If made in Germany it may fit with German standard size construction products (or be face fixed)
If made in Germany and imported to the UK it is unlikely to work with UK standard size construction products.
And on the whole they don't.

Despite EU and ISO standards UK and Germany have different standards sizes
The Metric brick size was introduced in the 1970's
We got bored with them by the 1980's

If made by a brick manufacturer most likely to fit brick sizes
If made by a stone or reconstructed stone manufacturer most likely to fit stone/block sizes
If made by a bat enthusiast likely to fit bats.
Norfolk Bat Brick is the exception: it fits bats and bricks

Width out of co-ordination: increase widths of purpend joint in brickwork either side, and/or above and below to fit.
Height out of co-ordination: turn bricks on edge underneath or on end and cut soldier course to length.
Depth out of co-ordination: Likely to cause thermal bridges through U value envelop
Width and height: out of co-ordination do not use brickwork use blockwork and render it to hide the mess.
Width, height and depth out of co-ordination: consider a different method of construction or a different bat box

Most bat boxes will accommodate many bats in a colony
Do bats come in standard size colonies?
Does the size of a bat box put an artificial barrier on colony sizes?
To modify the box size will just modify the number of bats the box can accommodate
Modifying box size lets it co-ordinate with construction

PRODUCT CRITIQUE

Product 1

Material Critique

- **Compare the materials with:**
  - Bat requirements
    - **Climbing and hanging**
    - **Thermal mass**
    - **Non-toxic**
  - Building requirements
    - **Durability & preservative avoidance**
  - Energy requirements
    - **Thermal mass & Thermal insulation**
  - Acoustic requirements
- **Suggest a new material**

BAT & BIRD BOX MATERIAL CRITIQUE

MATERIALS:

Clay facing brick:

- Good points:
  - Frost resistant
  - Strong
  - Thermal mass
- Bad points
  - absorbent so will smell of urine in time
  - High embodied energy

Cement based concrete:

- Good points
  - cement is impervious to moisture,
  - strong,
  - durable
  - thermal mass
- Bad points
  - High embodied energy
  - High embodied carbon
  - Alkali do not use aluminium fasteners

Cement and wood chip fibre concrete

- Manufacturer’s recipe
  - Copyright? Schwegler Wood-Concrete
  - Make in UK under licence?
- Good points
  - thermal mass
  - Added moisture mass
  - Medium carbon sequestration
  - Vapour permeable
  - Easy to mould to any shape

GreenSpec
www.greenspec.co.uk
CAP'EM
www.capem.eu

Biodiversity:Bats Workshop/Round table Discussions

100% Design

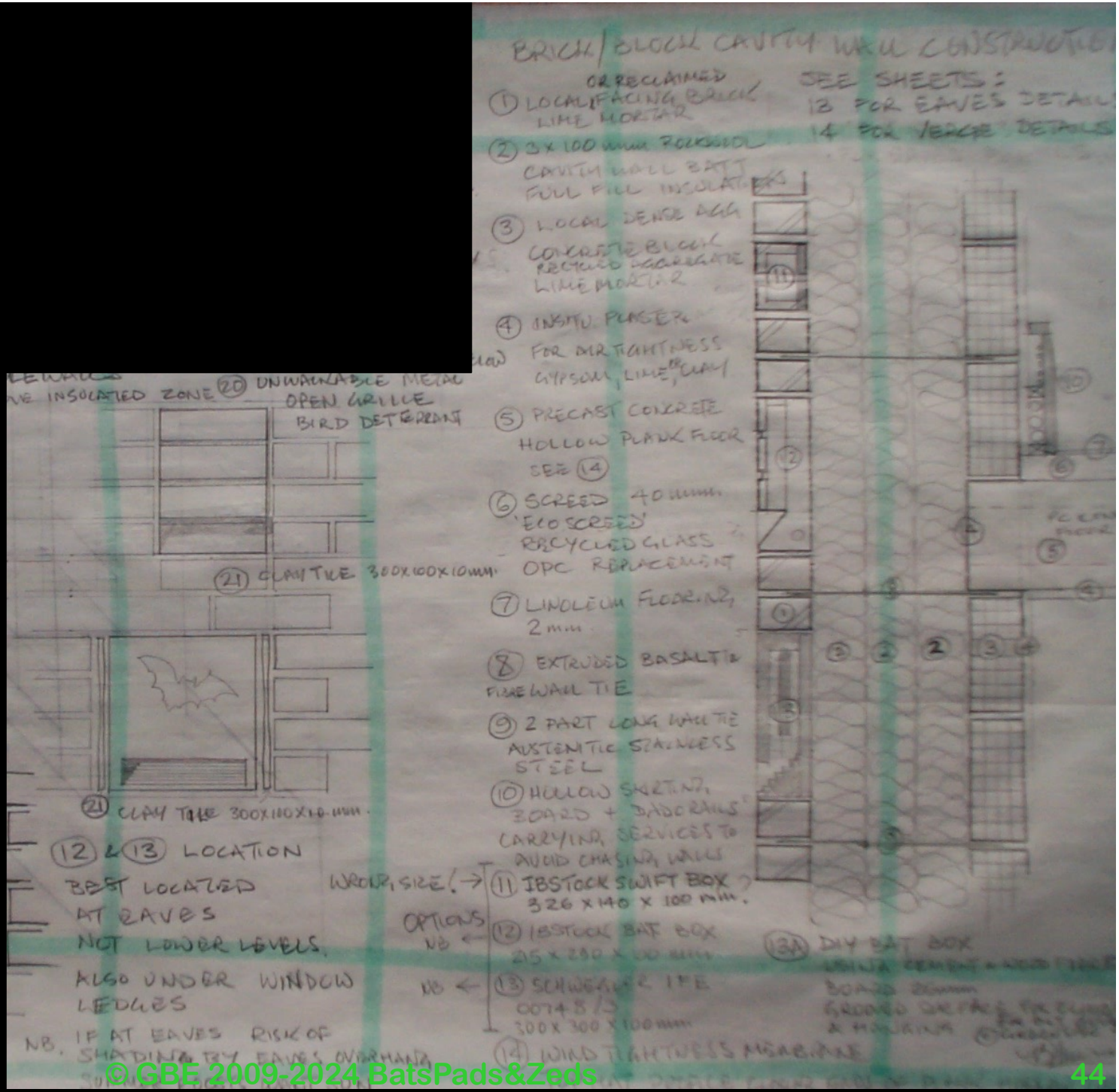
24th September 2010

1

Construction Solutions

Cavity wall construction

- Brick and block leaves
- NHBC still insisting on cavities
- We will persist and we will make them work some how despite carbon targets
- 300 mm. full fill cavity insulation
- Long ties or 2 part ties
- Bat boxes built into brick outer leaf



Solid masonry wall

- Blockwork inner wall
- Many block materials
- External insulation & render/cladding
- Cantilevered solar shelf
- Thermal break avoiding thermal bridges
- Base for Peregrine Falcon tray/nest

(1A) & (1) BLOCKWORK OPTIONS

1.1 DENSE AGGREGATE
1.2 LIGHT AGGREGATE
1.3 AERATED AUTOCLAVED
1.4 CELLULAR CLAY (FIRED)
1.5 HEMPCRETE (HEMP-LIME)
1.6 LIME POMICE CELLULAR
1.7 CEMENT-WOOD FIBRE
1.8 UNFIRED CLAY (NLB?)
1.9 UNFIRED CLAY + STRAW (NLB?)
NOT CHEAP? 1.10 RECYCLED GLASS SAND & RESIN
IMMINENT! 1.11 PAPER CRETE
WRAP MADNESS → AVOID! 1.12 UNFIRED CLAY + GYPSUM
AIRLEAKY → AVOID! 1.13 BREEZE BLOCK
NLB = NON-LOADBEARING
IMMINENT! 1.14 WOOD SHAVINGS/CEMENT
1.15 PAPER/PLANT BASED RESIN?

(16) DRAIN SPOUT
(17) GYPSUM & WOOD FIBRE BOARD 'DRY SCREED' BOARDS
(18) PEREGRIN FALCON

(1) 200 mm BLOCKWORK
(1A) 140 mm BLOCK LAID ON SIDE 215 mm WALL
(2) 200 mm INSITO REINFORCED CONCRETE FLOOR
(3) 200 mm CANTILEVER SHELF
(4) SCREED TO 1:40 FALL

NB. NORTH ELEVATION

20m ABOVE G.L.

(6) SCHÖCK ISOKORB TYPE K THERMAL BREAK & REINFORCEMENT CONTINUITY
(5) 2 No. 100 mm DENSE THERMAL INSULATION
(7) MINERAL BASED THIN RENDER 2 LAYERS REINFORCED
(8) 450 x 600 x 40 mm TRAY STAINLESS STEEL WITH WALL UPSTAND 450 mm
(9) WATER PROOF MEMBRANE WITH UPSTAND
(10) PRESSED METAL FASCIA/COPING/DRIP
(11) PLASTER FINISH
(13) DOT & DAB DRY LINING METHOD
(14) DRY LINING

CONCRETE FRAMED 1:5 SECTIONS @ A2
SOLAR SHADING SHELF

360mm

SEE MATERIAL OPTIONS 1.1 - 1.15

Cellular clay block solid wall

- German technology
- German dimensions
  - Avoid interface clashes
  - Bat boxes not made to these dimensions
- German bat and swift boxes installed into formed opening
- ‘U’ value maintained and insulation wrapped around the boxes

6

EXTRUDED CELLULAR CLAY BLOCK WALLING 2/2

①+⑤ OPTIONS:

① 365 w x 250 h x 248 l mm EXTRUDED CELLULAR FIRED CLAY BLOCKS WALLING

⑩ 1mm CEMENT/CLAY/ADHESIVE BEDJOINT.

⑩A DRY [illegible] INTERLOCKING PERPEND (AIR LEAKY)

② DENSE WOOD FIBRE BOARD THERMAL/ACOUSTIC INSULATION 25 mm. (NO SUBSTITUTION)

②B DITTO BETWEEN 50x50 & 50x75 mm SOFTWOOD BATTENS & CROSS BATTENS (TO MINIMISE THERMAL BRIDGES)

③ MINERAL BASED THIN RENDER SYSTEM 2 LAYER (AIR TIGHT) REINFORCEMENT LAYER BETWEEN

④ NOT USED.

⑤ TROUGH LINTEL CELLULAR FIRED CLAY 50 mm WALL

⑥ REINFORCEMENT RODS

⑦ ECO CONCRETE
LESS OP CEMENT
MORE GGBS CEMENT.
GROUND GRANULATED BLAST FURNACE SLAG CEMENT.
LESS VIRGIN AGGREGATES
MORE RECYCLED AGGREGATES

⑧ SCHWEGLER BIRD/BAT 2CX
460 h x 430 w x 225 d mm

⑨ SCHWEGLER BAT RAMP
250 h x 430 w x 225 d mm

⑧+⑨ ASSEMBLED
700 h x 430 w x 225 d mm

⑪ AIRTIGHT JOINTING TAPE

⑫ AIRTIGHT CLAY/LIME/GYPSUM PARGE COAT 5-8 mm.

⑬ DOT & DAB BONDING DRYLINING

⑭ 40 mm CLAY BOARD (REED REINFORCED)

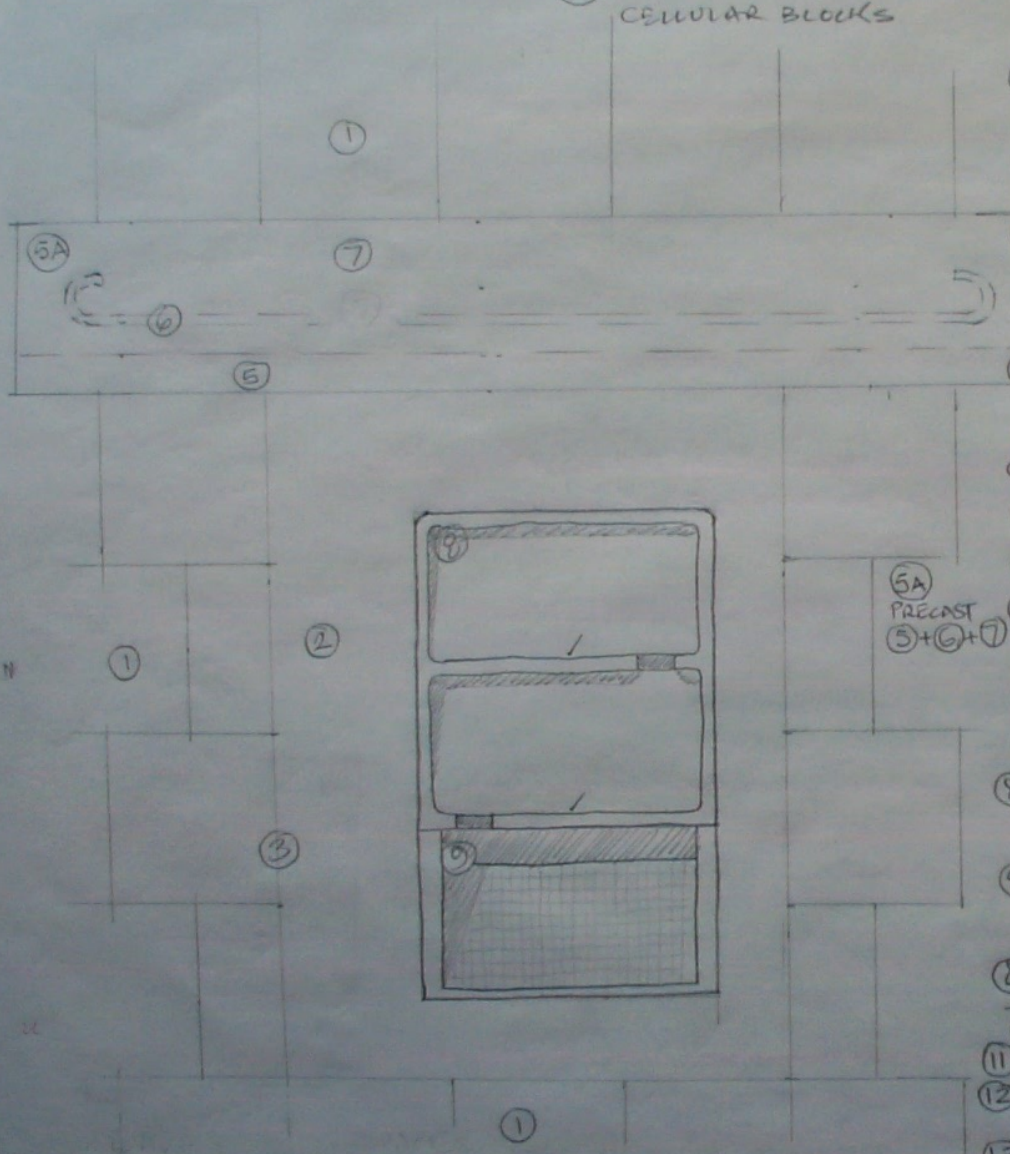
⑮ PLASTERBOARD/GYPSUM WOOD FIBRE

⑯ CLAY SKIM/FINISH 2mm

⑰ GYPSUM SKIM 2 mm

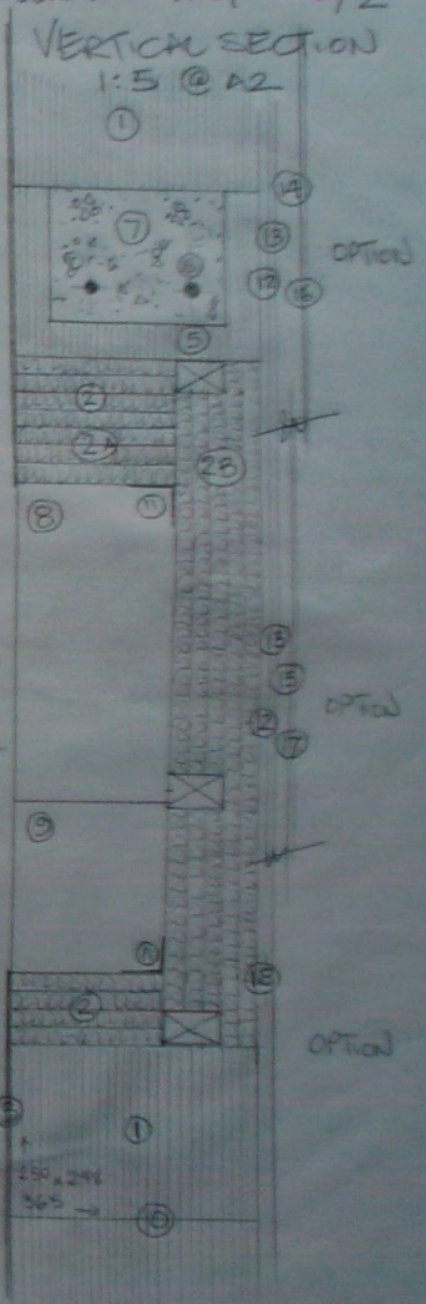
[illegible] R (AIR TIGHT)

①.① LIME PUMICE EXTRUDED CELLULAR BLOCKS



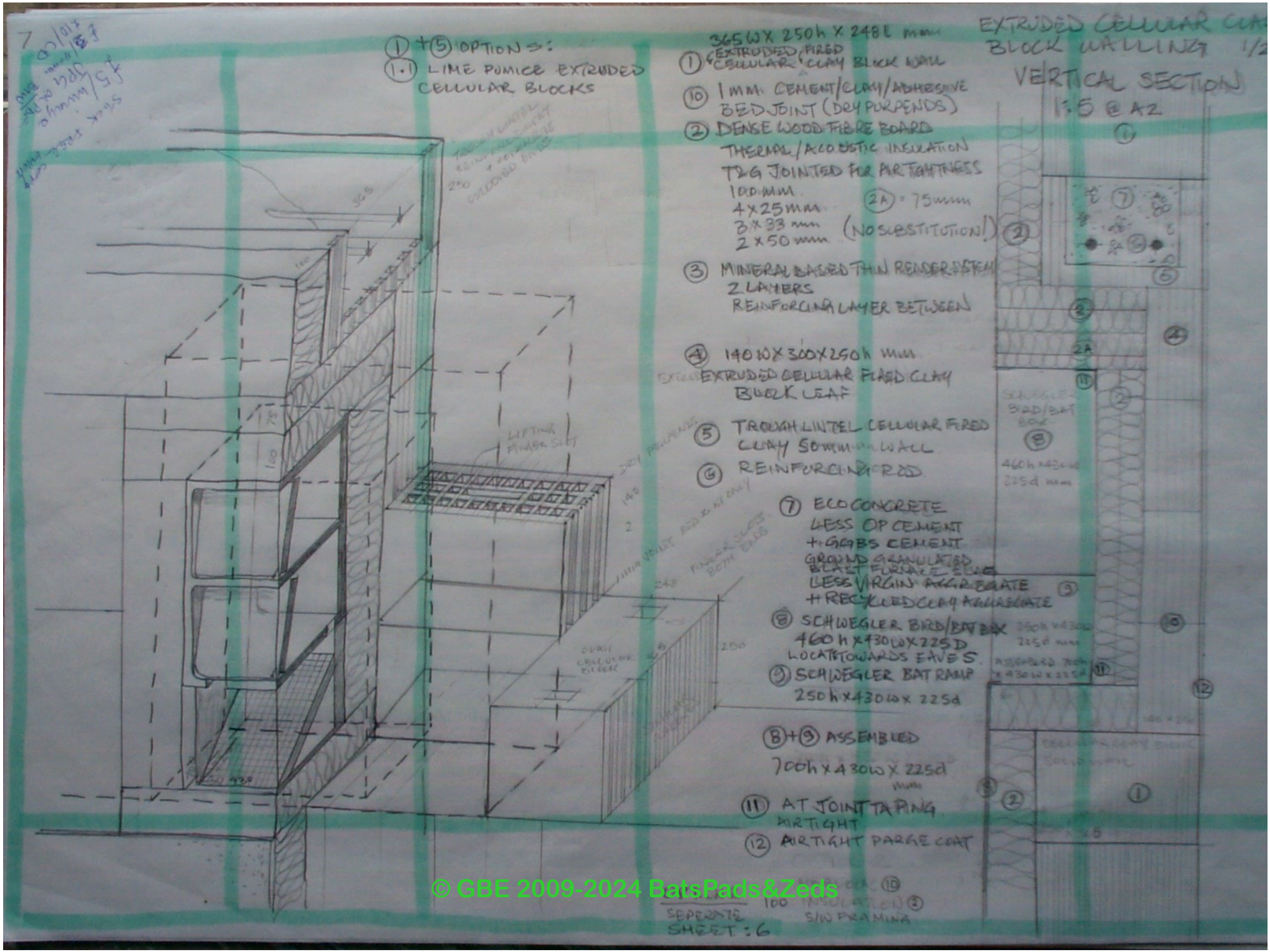
OPTION 1
SEPERATE SHEET: 7

VERTICAL SECTION 1:5 @ A2



Cellular clay block and rendered external insulation

- As previous with added insulation to outside face of wall
- Insulation wrapped around Bat/bird box



Timber stud frame with external insulation & rainscreen cladding

- Normal stud framing (thermal bridge)
- ‘Tea cosy’ insulation outside of frame
- Dense wood fibre insulation
- Decrement delay to solar radiation
- Bat boxes in cladding zone
- Rainscreen cladding
- Multi-storey labyrinth bat boxes

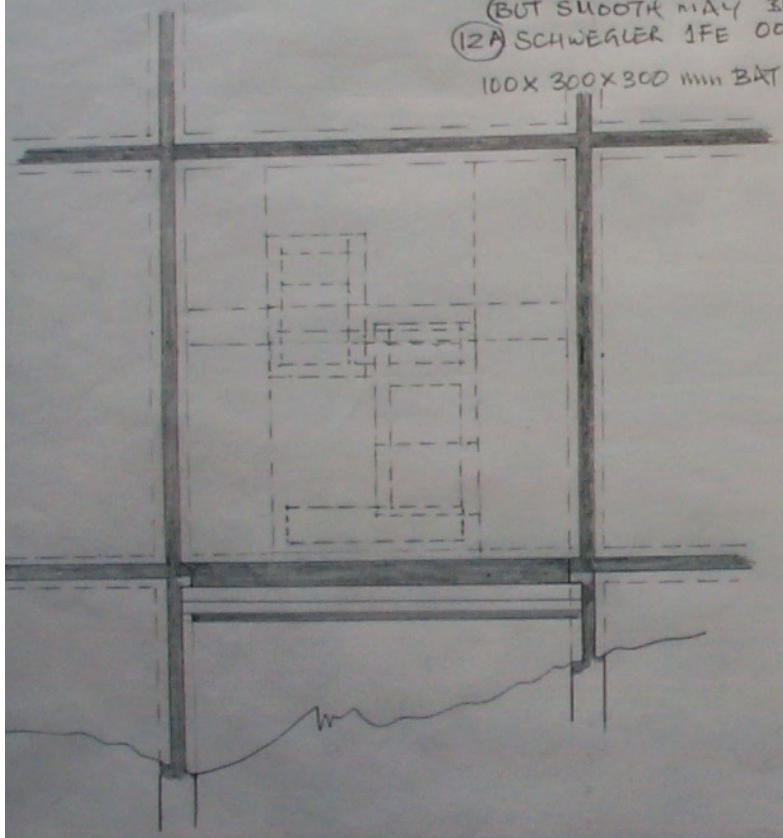
8

(12) SCHWEGLER 1FE 00747/6
80 X 300 X 300 mm. BAT BOX/ENTRANCE
WOOD-CONCRETE

(13) CEMENT-WOOD PARTICAL BOARD
ROUGHENED SURFACE FOR CLIMBING
HANGING.

(14) CEMENT-WOOD PARTICAL BOARD
TUNNEL BETWEEN ROOSTS
ROUGHENED SURFACE FOR CLIMBING
(BUT SMOOTH MAY BE OK)

(12A) SCHWEGLER 1FE 00748/3
100 X 300 X 300 mm BAT ROOST



RAINSCREEN CLADDING
ELEVATION 1:5 @A2.

(1) SOFTWOOD STUD FRAMING
RECLAIMED, LOCALLY GROWN
OR FSC TEMPORATE
140 X 38 mm @ 600mm CENTRES

(2) DENSE WOOD FIBRE BOARD
THERMAL/ACOUSTIC INSULATION
LAPPED T & G JOINTED; EXTERNAL TO STUD
AVOIDS THERMAL BRIDGES
THROUGH INSULATION
8 NO X 25 mm. 200 mm. 2/A

(3) WIND TIGHTNESS LAYER
Eg. 'ProClima Solitex WA'
LAPPED + SEALED JOINTS

(4) SOFTWOOD BATTENS
50 X 50 mm @ 600 mm CENTRES

(5) SOFTWOOD NOGGINS
DURABLE SPECIES TO AVOID
(6)+(4)+(5) PRESERVATIVE TREATMENT.

(6) CLADDING RAILS/BATTENS
SOFTWOOD/HARDWOOD OR
METAL

(7) RAINSCREEN CLADDING.
OPEN JOINTS VENTILATED
CAVITY, PRESSURE EQUALISED
MANY MATERIAL CHOICES
SYSTEMS ON MARKET

(8) CAVITY FIRE BARRIER
GALVANIZED MILD STEEL ANGLE
SOFTWOOD OR SHEATHED ROCKWOOL

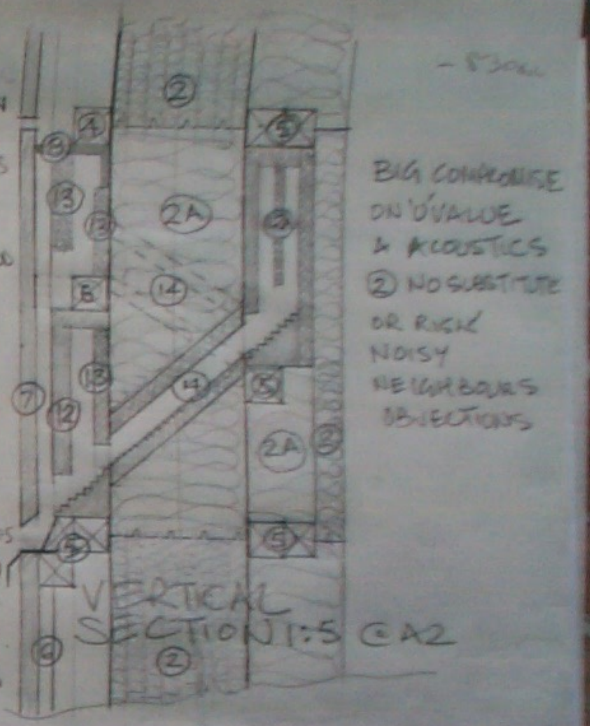
(2A) CELLULOSE FIBRE THERMAL
INSULATION (EASY TO CUT TO
SHAPE & TO FIT ODDSHAPED
CAVITY)

(9) AIRTIGHTNESS LAYER
LAPPED + SEALED JOINTS
Eg. 'ProClima DB+'

(10) DRYLINING CLAYBOARD 40 mm

(11) SKIM FINISH CLAY 2 mm.

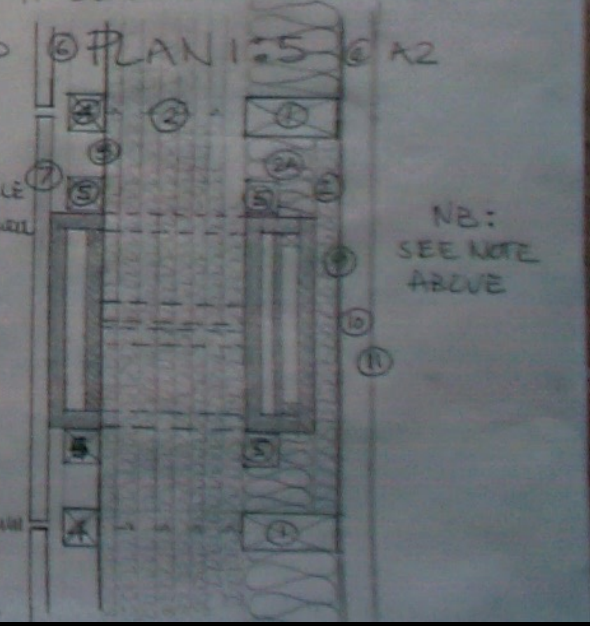
(15) PRESSED METAL CAP/SILL



BIG COMPROMISE ON U VALUE & ACOUSTICS
② NO SUBSTITUTE OR RISK NOISY NEIGHBOURS OBJECTIONS

VERTICAL SECTION 1:5 @A2

TIMBER FRAME CONSTRUCTION
TIMBER STUD FRAMING

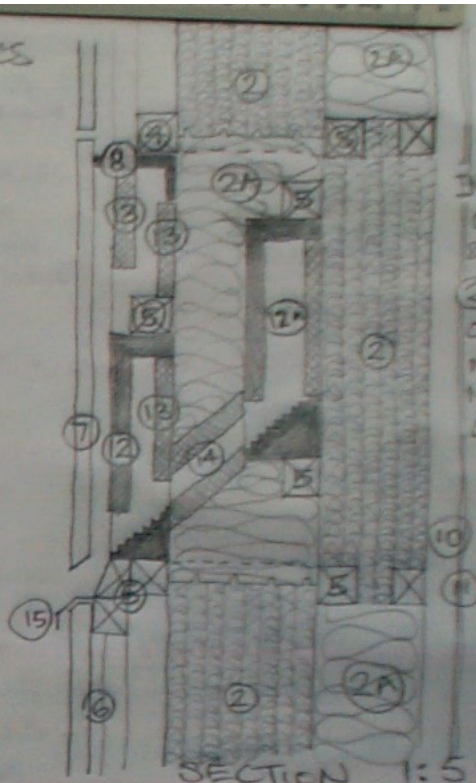


PLAN 1:5 @A2

NB: SEE NOTE ABOVE

A

SEE SHEET 8 FOR NOTES



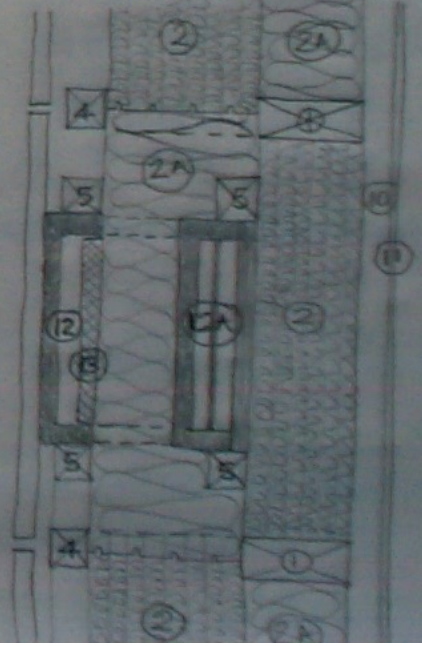
IMPROVEMENT ON U VALUE & ACOUSTICS

② NO SUBSTITUTE OR RISK OF NOISY NEIGHBOURS OBJECTIONS

SECTION 1:5 @ A2

TIMBER FRAMED CONSTRUCTION

PLAN 1:5 @ A2

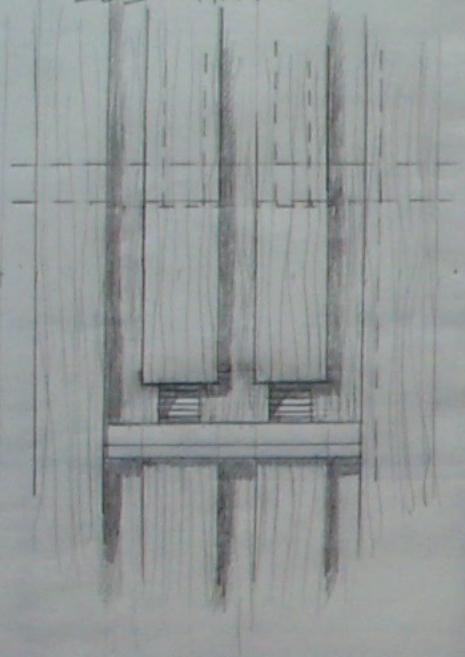


I-Stud timber frame & ISPs

- I-studs accommodate insulation
- Bat boxes in cladding zone
- Weatherboarding: Board on board
- ISPS Insulated Structural Panel system

TIMBER FRAME CONSTRUCTION
I-STUDS FOR MORE INSULATION
ISPS INSULATED STRUCTURAL PANEL SYSTEM

ELEVATION 1:5 @A2



ISPS

3No. ①, +②+③+④
+ INT LINING (
+⑭ BETWEEN ABUTTING PANELS & ASSEMBLE ONSITE ADD
④ +⑤+⑩+⑪
⑨+⑥+⑦+⑧
⑤+④ TO OVERLAP PANEL JOINTS +SEAL LAPS

③/③A CAN BE PRE OR POST INSTALLED

⑬ LOCATE CLOSE TO EAVES.

① 'MASONITE' I-STUD@600mmC EXCEL INDUSTRIES IN UK 300X50 mm LENGTH TO SUIT MANY OTHER SIZES AVAILABLE

② 'BREATHING' SHEATHING BOARD 25mm T&G JOINTED WITH OR WITHOUT RACKING STRENGTH WOOD FIBRE BOARD

③ 'HOMATHERM' 3X100 mm DENSE CELLULOSE FIBRE RECYCLED MAGAZINES THERMAL/ACOUSTIC INSULATION

④ RECYCLED PAPER/CELLULOSE AIR TIGHTNESS LAYER
Eg. 'PRO CLIMA DB+' NATURAL GLUED JOINTS

⑤ WIND TIGHTNESS LAYER
Eg. 'PRO CLIMA SOLITEX WA'

⑥ COUNTER-BATTENS 50X50mm @ 600 CENTRES FSC SW

⑦ BATTEN FOR WEATHERBOARDING, 25X50 mm. DURABLE HARDWOOD

⑧ DURABCE HARDWOOD RECLAIMED, LOCAL GROWN OR FSC TEMPORATE SPECIES WEATHER BOARDING, BOARDONBOARD

⑨ 30X30 mm SERVICE ZONE BATTENS + SERVICES FSC + INSULATION TO FILL VOIDS

⑩ DRYLINING, REED REINFORCED CLAY BOARD 40mm.

⑪ CLAY FINISH

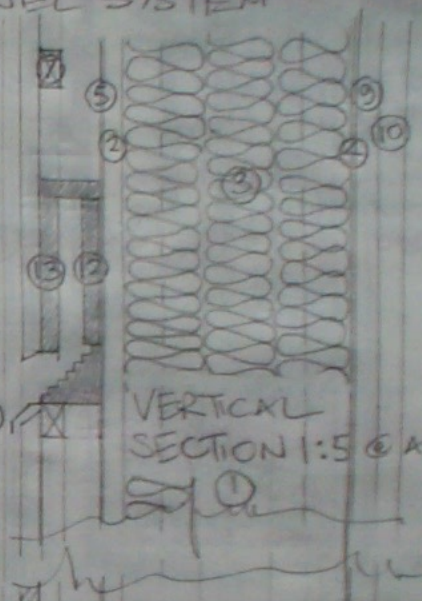
⑫ CEMENT/WOOD PARTICLE BOARD 25mm GROOVED FOR CLIMBING HANGING

⑬ SCHWEGLER 1FE 00747/6 80X300X300 mm CONCRETE-WOOD BAT BOX.

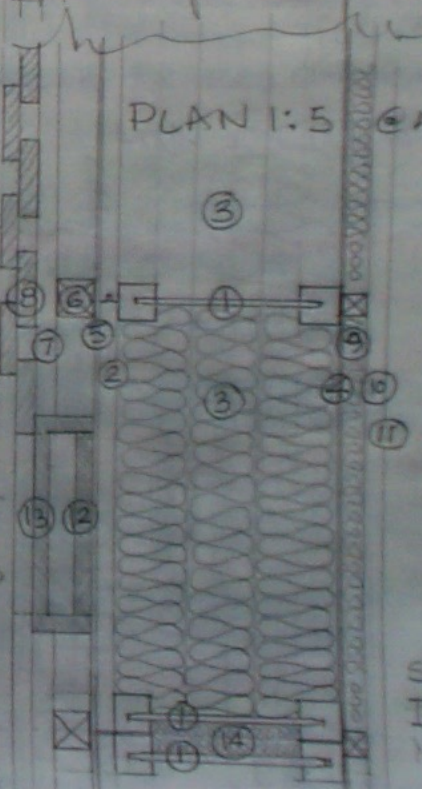
⑭ DENSE WOOD FIBRE BOARD INSULATION BETWEEN ISPS

⑮ PRESSED METAL DRIP OR HW

③A ALTERNATIVES: DRY OR DAMP SPRAY OR BLOWN IN INSULATION



VERTICAL SECTION 1:5 @A2



PLAN 1:5 @A2

See ISPS NOTES

SIPS Structural Insulated Panel System

- High performance plastic insulation
  - Good in winter, not good in summer
- No cutting: Integrity maintained
- Allegedly airtight:
  - recent experience suggests otherwise
- Wind tight and air tight taped joints
- Pressure battened joints
- Bat box in cladding zone

① 250mm OVERALL

① SIPS PANEL NON-RENEWABLE FOAMED-IN INSULATION OR LAMINATED ASSEMBLY
+ADHESIVE?
+OSB OR OTHER TIMBER PANEL BOTH FACES
FSC CERTIFIED. TIMBER PANEL
VAPOUR +AIRTIGHT PANEL

② INTERLOCKING JOINT.
TIGHT FIT. IDEALLY/
AIRTIGHT IDEALLY/(PROBABLY NOT)
SEE ③+⑧ & ④+⑨

③ PRESSURE BATTEN 50×50mm SOFTWOOD (DURABLE FSC)
TO SECURE WINDTIGHT SEAL ⑧

④ PRESSURE BATTEN 50×50mm. SOFTWOOD (INTERNAL) FSC
SECURE AIRTIGHT SEAL ⑨

⑤ DRYLINING PLASTERBOARD 12.5mm. GYPSUM +SKIM/TAPED JOINTS

⑦+⑥ CLADDING (NUMEROUS)
Eg WEATHERBOARDING, FSC HARDWOOD

⑧ WINDTIGHTNESS TAPE TO JOINTS

⑨ AIRTIGHTNESS TAPE TO JOINTS

⑩ NOGGINS SOFTWOOD FSC 50×50mm.

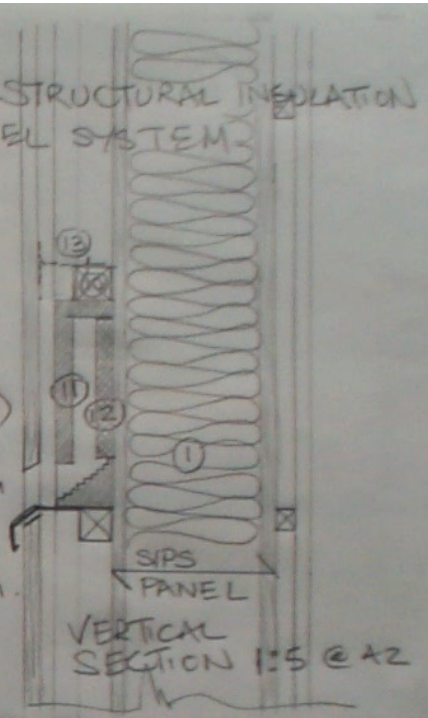
⑪ SCHWEGLER 1FE 00747/6
80×300×300mm BAT BOX.

⑫ WOOD-CONCRETE CEMENT-WOOD PARTICLE BOARD
ROUGHENED SURFACE FOR CLIMBING/HANGING.

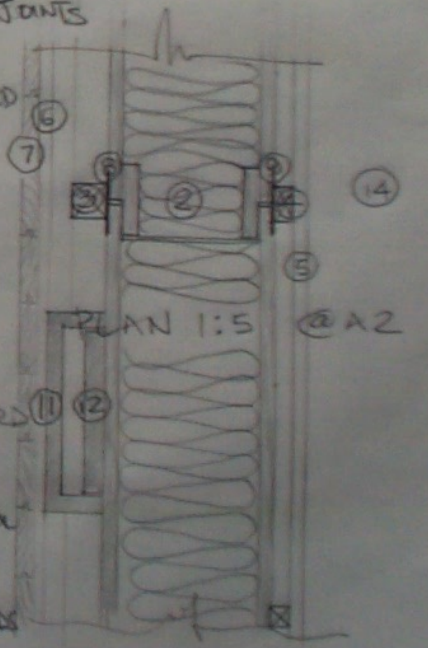
⑬ INSECT MESH/PERFORATED METAL

⑭ DONT TRY TO MAKE AIRTIGHT WITH SEALANT GUN AFTERWARDS
LITTLE HOPE.

SIPS STRUCTURAL INSULATION PANEL SYSTEM:



VERTICAL SECTION 1:5 @A2



PLAN 1:5 @A2

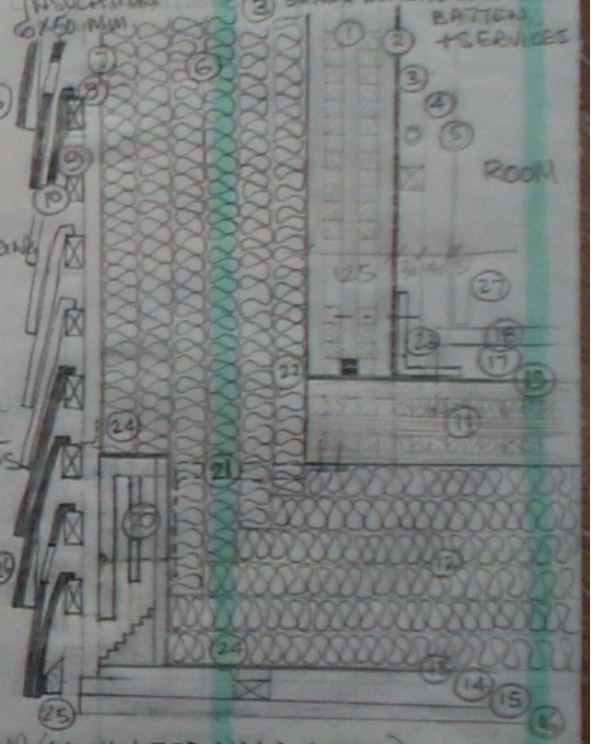
Cross laminated panels & external insulation

- Structural loadbearing solid wood panels
- Plantation thinnings
- Airtight panels
- External insulation
- Bat boxes in cladding zone
- Plain tile hanging
- Bat Access-tile sets
- Bats in tile batten zone

(7) WIND TIGHTNESS VAPOUR PERMEABLE UNDERLAY
(8) COUNTERBATTENS
(9) BATTENS 56X25
(10) TILE HANGING OR WEATHER BOARDING
(11) CLP FLOOR 125 mm AS (1)
(12) AS (6)
(13) AS (7)
(14) AS (8)
(15) AS (9) FOR WEATHERBOARDING
(16) 25 mm HARDWOOD WEATHERBOARDING DURABLE SPECIES NO FINISH
(17) 50mm DENSE WOOD FIBRE THERMAL/ACOUSTIC INSULATION BOARDS T&G JOINTED
(18) HW/SW T&G BOARD
(19) MOISTURE BARRIER
(19A) ATL AS (2) LAPPED + TAPED
(20) BAT BOX SCHWEGLER 1FE 00748/3 100X300X300
(21) GMS FIXING STRIP (GALVANIZED MILD STEEL)
(22) COMPRIBAND 25X125 mm PRECOMPRESSED SELF-ADHESIVE IN CHANNEL IN (1)
(23) GMS ANGLE CLEATS + SCREWS
(24) INSECT MESH TO ISOLATE AIR SPACES (FINE NYLON)
(25) TILTING FILLET FOR BOTTOM OF TILING, ANGLES + ACCESS
(26) BAT ACCESS TILE SET PIPISTRELLS WILL LIKE THIS
(27) FSC SOFTWOOD

(GROUND FLOOR (22))

(1) CROSS LAMINATED PANELS 125 mm SMOOTH PLYWOOD CORE 25 mm SOFTWOOD BATTENS 56X25 1 OR MORE LAYERS EACH SIDE
(2) ATL AIRTIGHTNESS LAYER
(3) 30X30 mm S/W SERVICE BATTEN + SERVICES
(4) 40 mm CLAY BOARD REINFORCED WITH REEDS
(4A) PLASTERBOARD
(5) CLAY SKIM/FINISH
(6) DENSE WOOD FIBRE THERMAL/ACOUSTIC INSULATION 6X50 mm



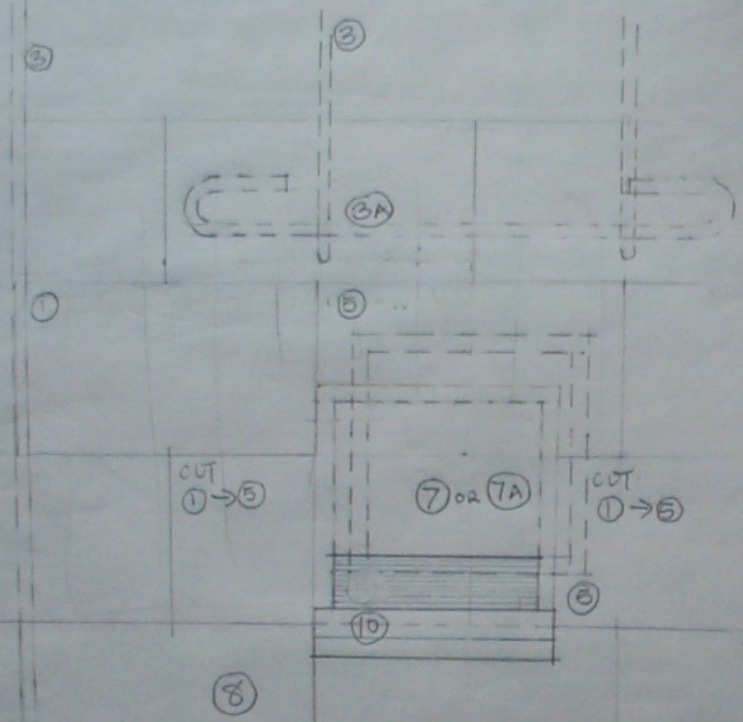
1 OR 2 STOREY CARPORT/ PASSAGE WAY

CROSS LAMINATED PANEL SYSTEM

1:5 VERTICAL SECTION
@ A2 (PLAN SIMILAR)

ICF Insulated Concrete Formwork

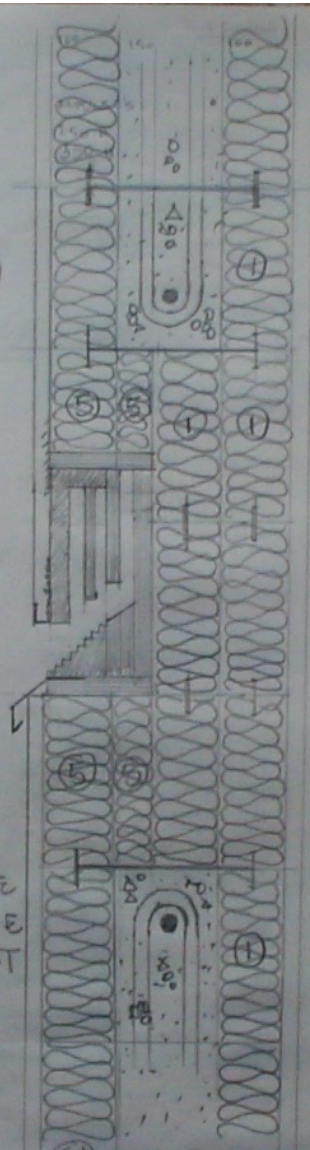
- Expanded polystyrene formwork and concrete infill
- Popular with self-build
- Unpopular with:
  - Eco world
  - low energy world
- Thermal Insulating: some, not enough
- Thermal mass: no buried inside wall insulation
- Decrement delay: very short
- Acoustic Insulation: some, not enough
- Cast box in?
- Or saw cut polystyrene generating loads of microplastics



① & ⑤ (BOTH) WITH NO ④

BIG ACOUSTIC COMPROMISE
BIG 'U' VALUE COMPROMISE
NO THERMAL DECREMENT
HIGH RISK OF NOISY NEIGHBOURS OBJECTION

NB: AVOID THIS CONSTRUCTION.



⑥A WOOD FIBRE CEMENT BOARD 25mm. GROOVED SURFACE FOR CLIMBING/HANGING

⑦A DIY BAT BOX USING ⑥A

① PROPRIETARY ICF INSULATING CONCRETE FORMWORK (STRUCTURAL) EXPANDED POLYSTYRENE THICKNESS TO SUIT U VALUE

② PROPRIETARY TIES
SOME: PLASTIC TIES
SOME: METAL REINFORCEMENT CAGE

③ REINFORCEMENT RODS VERTICAL IN WALL

③A REINFORCEMENT RODS HORIZONTAL OVER OPENINGS

④ FLOCONCRETE
LESS OP CEMENT NB 30
+ GGBS (GROUND GRANULATED BLAST FURNACE SLAG)
LESS VIRGIN AGGREGATE
+ RECYCLED AGGREGATE

⑤ EITHER
OPP CUTS OF ① OR
50mm EXP POLYSTYRENE LAYERS INSULATION FACE

⑥ WBP PLYWOOD 25mm. FORMING SPACE IN WALL & FORMING BAT ROOST SLOPING BOTTOM TO ENCOURAGE URINE + GUANO TO EXIT. GROOVED SURFACES FOR CLIMBING/HANGING

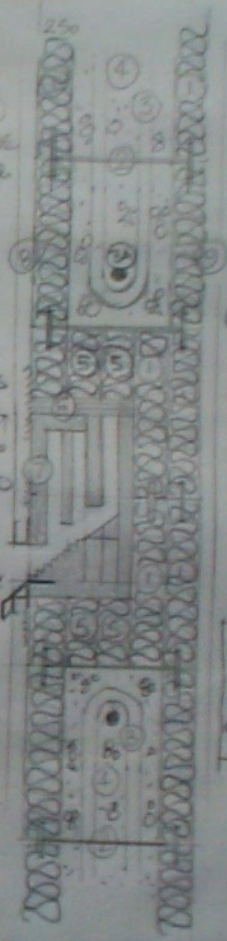
⑦ SCHWEGLER IFE 00 24716 300 X 300 X 50mm.

⑧ EXT. RENDER 20mm

⑨ INT. PLASTER (CLAY) TO REGULATE MOISTURE

⑩ DRIP FORMATION. PPC GMS

⑪ REINFORCEMENT MESH



① + ⑤
BIG ACOUSTIC COMPROMISE + 'U' VALUE COMPROMISE
NOISY NEIGHBOUR OBJECTIONS LIKELY
NB: AVOID THIS CONSTRUCTION

VERTICAL SECTION
1:5 @ A2

Diaphragm Walls

- In past: used brick walls to sports halls
- Hemp lime blocks to beer warehouse
  - So well insulated does not need chilling
- Brick outer leaf at low level
- Insitu hemp-lime insulation in cavity

(3) TO MINIMISE CUTTING WASTE, DIAPHRAM WALL TO BE ½ OR 1 BLOCK LENGTH. (LOCAL CUTTING ROUND (9))

[redacted]

(1) RECLAIMED LOCAL FACING BRICK LIME MORTAR 102 x 215 x 65 mm.

(2) 100 mm HEMP-LIME BLOCK OUTER LEAF AT UPPER LEVEL LIME MORTAR RAKED JOINT FOR RENDER

(3) 100 mm. HEMP-LIME BLOCK INNER LEAF & DIAPHRAM WALLS

(4) DAMP PROOF COURSE BETWEEN DIAPHRAM WALLS & OUTER LEAF.

(5) THERMAL INSULATION CAVITY FILL HEMP-LIME LOW DENSITY MIX INSITU FILL FROM ABOVE AS WALL PROGRESSES (300 mm)

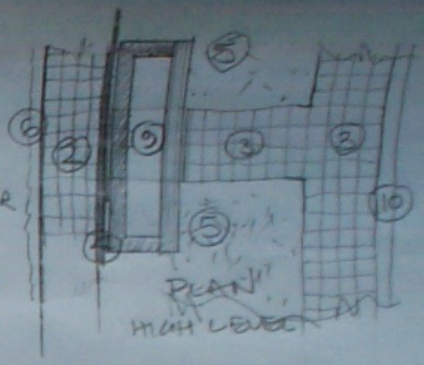
(6) LIME RENDER (EXTERNAL)

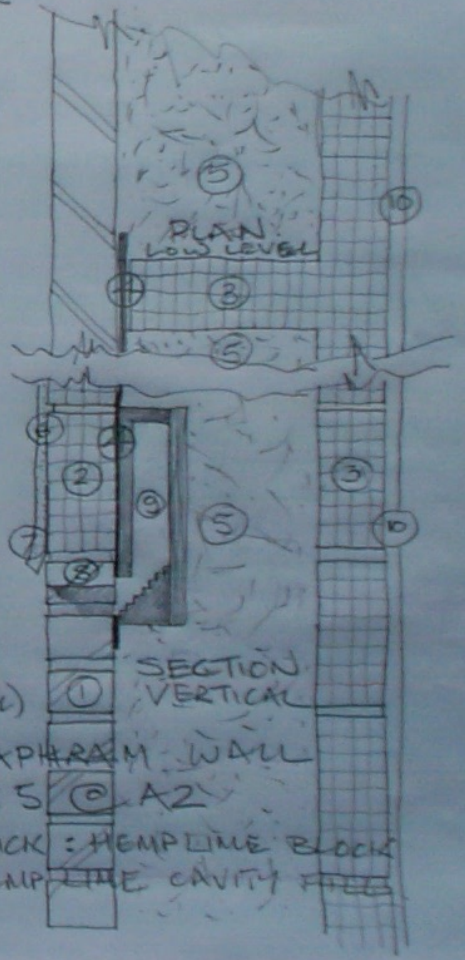
(7) AUSTENITIC STAINLESS STEEL RENDER BELL STOP BAR

(8) IBSTOCK BAT BRICK. (ACCESS)

(9) SCHWEGLER IFE 00748/3 300 x 300 x 100 mm. BEARING IN DIAPHRAM WALLS (5) REDUCED TO 200 mm LOCALLY. (4) LARGER SHEET LOCALLY APATURE FOR BAT ACCESS. POSITIONED AT HIGH LEVEL (IDEALLY. FOR BAT USE) IN RENDER WILL NEED ACCESS TRIMMED BY STOP BEADS SEE (7)

(10) CLAY OR LIME PLASTER (INTERNAL) FOR AIRTIGHTNESS





DIAPHRAM WALL
1:5 @ A2
BRICK : HEMP LIME BLOCK
HEMP LIME CAVITY FILL

Hemp-lime Insitu spray

- Solid wall
- Buried timber frame
- Backing formwork
- Like sprayed concrete
  - lime in place of cement
  - hemp shive in place of aggregate
  - hempcrete
- Average U value, great performance
  - Buried bat box compromise small % of wall

SEE SHEET:
13 EAVES
15 EAVES

① SOFTWOOD STUD FRAMING RECLAIMED/LOCALLY GROWN OR FSC TEMPORATE SOURCE 140 X 38 mm @ 600 mm CENTERS

② PERMANENT FORMWORK MOISTURE TOLERANT. MOISTURE PERMEABLE

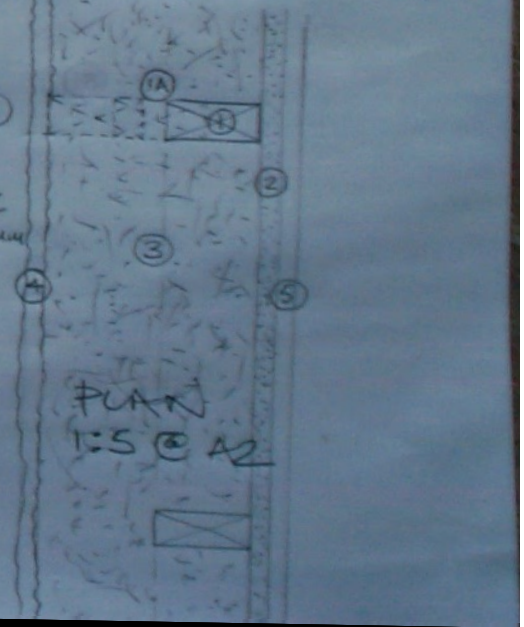
③ INSITO SPRAYED HEMP-LIME MIX SPRAYED AGAINS ② UNTIL REQUIRED THICKNESS OF WALL ACHIEVED. SURFACE FLATTENED & KEYED FOR ④ Eg. 300 mm.

④ LIME OR HEMP-LIME RENDER (EXTERNALLY) (NOT CEMENT)

⑤ LIME OR CLAY PLASTER (INTERNALLY) (NOT CEMENT)

③A AS ③ TO ROOF BETWEEN RAFTERS SURFACE SMOOTHED FOR ⑨, ⑩, ⑪ ETC

INSITO SPRAYED HEMP-LIME. ON/INTO TIMBER FRAME
1:5 @ A2



⑥ TEMPORARY FORMWORK OR
⑥A PERMENANT FORMWORK SIMILAR TO ②

⑦ INSITO CAST HEMP-LIME MIX POURED IN & TAMPED INTO PLACE

④A AS ④ APPLIED TO ⑥A Eg. 300 mm

⑤A AS ⑤ APPLIED TO ⑥A

⑧ SOFTWOOD RAFTER FRAMING RECLAIMED/LOCALLY GROWN OR FSC TEMPORATE SOURCE Eg. 140 X 38 mm @ 600 mm CENTRES

⑨ FSC SOFTWOOD COUNTER BATTENS

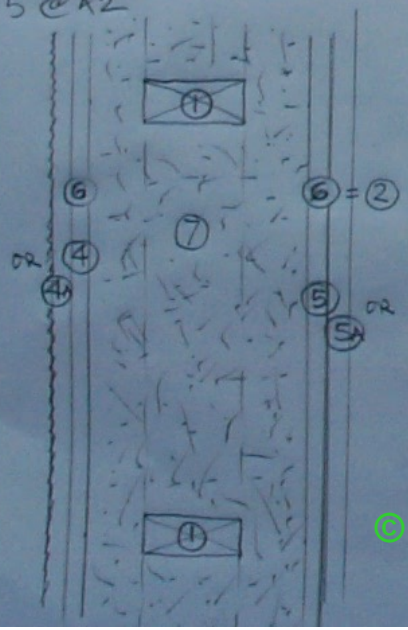
⑩ WINDTIGHT MOISTURE PERMEABLE TILING UNDERLAY.

⑪ TILING BATTENS FSC SOFTWOOD

Hemp-lime insitu cast

- Temporary or permanent formwork
- Buried timber frame
- Insitu cast hemp-lime hempcrete
- Average U value, great performance
  - Buried bat box compromise small % of wall

INSITO CAST HEMP-LIME INTO FORMWORK AROUND TIMBER FRAME
1:5 @ A2



1 SOFTWOOD STUD FRAMING RECLAIMED/LOCALLY GROWN OR FSC TEMPORATE SOURCE 140 X 38 mm @ 600 mm CENTRES

2 PERMANENT FORMWORK MOISTURE TOLERANT. MOISTURE PERMEABLE

3 INSITO SPRAYED HEMP-LIME MIX SPRAYED AGAINST 2 UNTIL REQUIRED THICKNESS OF WALL ACHIEVED. SURFACE FLATTENED & KEYED FOR 4 E.g. 300 mm

3A AS 3 TO ROOF BETWEEN RAFTERS SURFACE SMOOTHED FOR 9, 10, 11 ETC

4 LIME OR HEMP-LIME RENDER (EXTERNALLY) (NOT CEME

5 LIME OR CLAY PLASTER (INTERNALLY) (NOT CEMENT)

1A ALTERNATIVE LOCATION FOR STUD FRAMING. INSITO ON/IN

1B DITTO.

6 TEMPORARY FORMWORK OR

6A PERMENANT FORMWORK SIMILAR TO 2 1B 1A 1

7 INSITO CAST HEMP-LIME MIX POURED IN & TAMPED INTO PLACE

4A AS 4 APPLIED TO 6A E.g. 300 mm

5A AS 5 APPLIED TO 6A

8 SOFTWOOD RAFTER FRAMING RECLAIMED/LOCALLY GROWN OR FSC TEMPORATE SOURCE E.g. 140 X 38 mm @ 600 mm CENTRES

9 FSC SOFTWOOD COUNTER BATTENS

10 WINDTIGHT MOISTURE PERMEABLE TILING UNDERLAY.

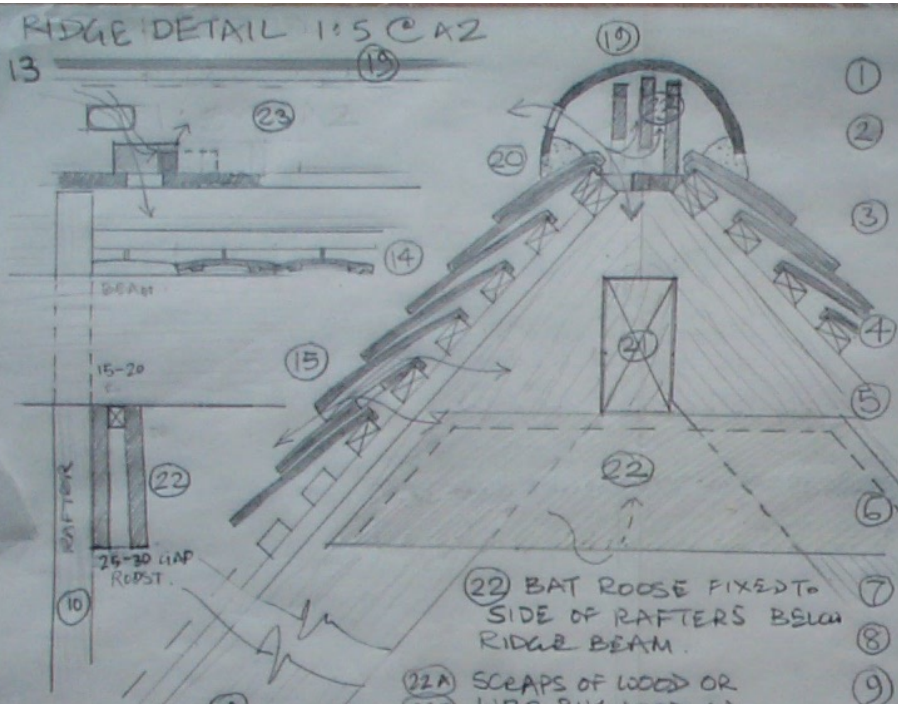
11 TILING BATTENS FSC SOFTWOOD

Pitched roofs

- Timber roof (not trussed rafter)
- Eaves and verge box system: Concrete
- Pitched roof tile access
  - Eaves triangle
  - Attic triangle
  - Interconnectivity?
- Ridge tile access
  - Ridge triangle
- Roosts in roof timbers and at eaves

RIDGE DETAIL 1:5 @ A2

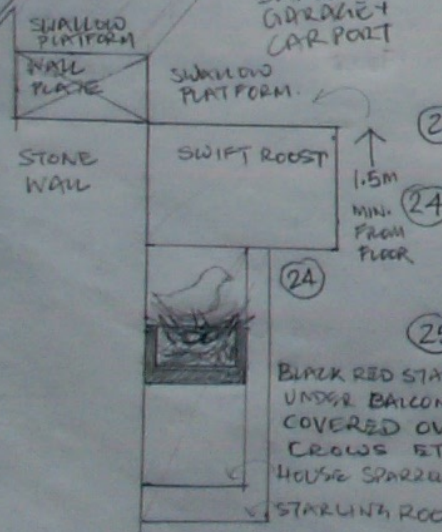
13



(22) BAT ROOST FIXED TO SIDE OF RAFTERS BELOW RIDGE BEAM.

ROOF TO:
- STABLES
- OUT BUILDING
- BARN + SHED
- GARAGE + CARPORT

(22A) SCRAPS OF WOOD OR
(22B) WBP PLYWOOD OR
(22C) CEMENT-WOOD PARTICLEBOARD ROUGHENED SURFACE FOR CLIMBING + HANGING
2 BOARDS SPACED APART
15-20 MINIMUM GAP
25-30 MAXIMUM GAP
BATTENS SW OR CWP



(23) RIDGE ROOST SIMILAR MATERIALS TO (22)

(24) POTENTIAL ROOST POSITIONS (NOT NECESSARILY ALL TOGETHER)

(25) VAPOUR CONTROL LAYER

BLACK RED START OPEN NEST BOX (LIKE ROBIN) UNDER BALCONY, EAVES, MEZZANINE FLOOR COVERED OVER (PROTECTION FROM MAGPIE, CROWS ETC.)

HOUSE SPARROW ROOSTS

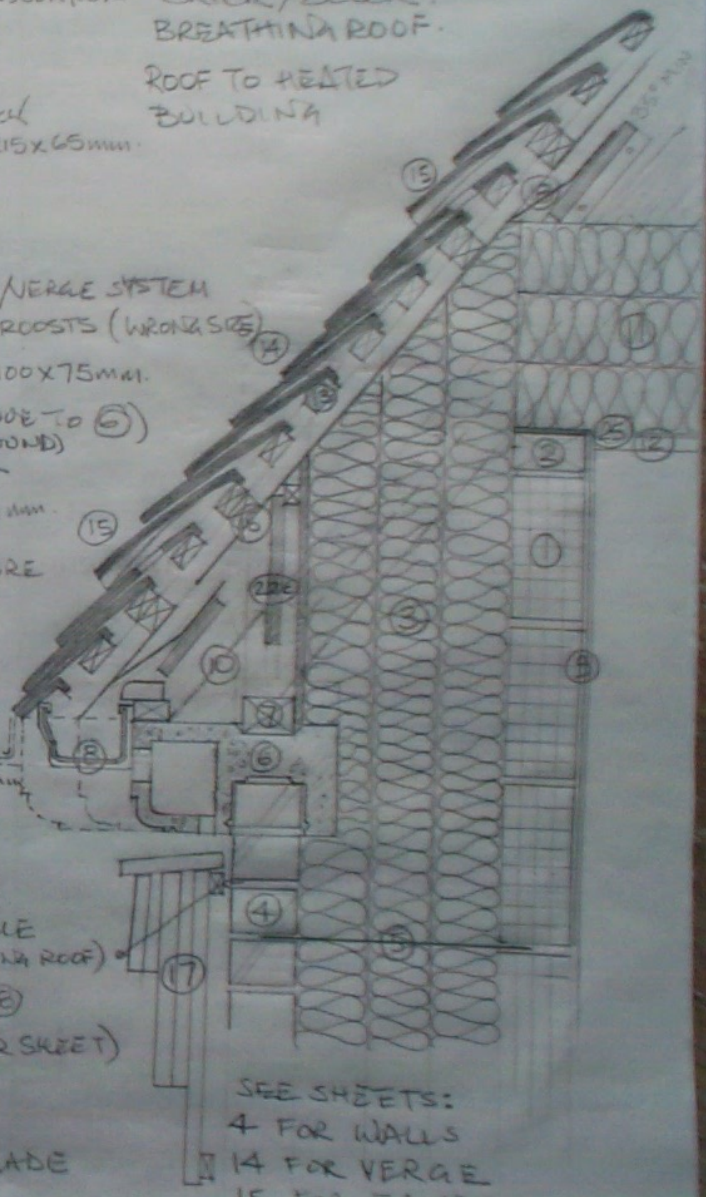
STARLING ROOST

1. BLOCK WORK INNER LEAF. 100mm. CELLULAR CLAY BLOCK
2. SOFTWOOD WALL PLATE 75x100 mm Ex WITH HOLDING DOWN STRAPS
3. FULL FILL CAVITY WALL INSULATION ROCK MINERAL WOOL 3x100 mm.
4. FIRED CLAY FACING BRICK OUTER LEAF 102 mm x 215 x 65 mm.
5. WALL TIE: OPTIONS EXTRUDED BASALT. 2 PART STAINLESS STEEL
6. CONCRETE HOLLOW EAVES/VERGE SYSTEM INCORPORATING BIRD OR BAT ROOSTS (WRONG SIDE)
7. SOFTWOOD WALL PLATE 100x75mm.
8. GUTTER (WRONG POSITION DUE TO 6) GALVANIZED STEEL (HALF ROUND)
9. PARGE COAT OR PLASTER
10. SOFTWOOD RAFTERS 200 mm. (AVOID TRUSSED RAFTERS)
11. 3x100 mm CELLULOSE FIBRE INSULATION
12. DRY LINING. CEILING.
13. ROOF TILING BATTENS SOFTWOOD (DURABLE SPECIES)
14. CLAY PLAIN ROOF TILING HAND MADE 265x160x10mm
15. BAT ACCESS TILE SET 18 mm GAP x 165 LONG GAP IN UNDERLAY BELOW
16. WIND TIGHT VAPOUR PERMEABLE ROOFING UNDERLAY (BREATHING ROOF) 'PRO CLIMA SOLITEX SA' SEE (18)
17. KENT BAT BOX (SEE OTHER SHEET)
18. GAP IN UNDERLAY (IDEALLY AN AIRLOCK)
19. CLAY RIDGE TILE HAND MADE
20. MORTAR BEDDING
21. [illegible]

EAVES DETAILS
1:5 @ A2

CAVITY WALL CONSTRUCTION BRICK/BLOCK. BREATHING ROOF.

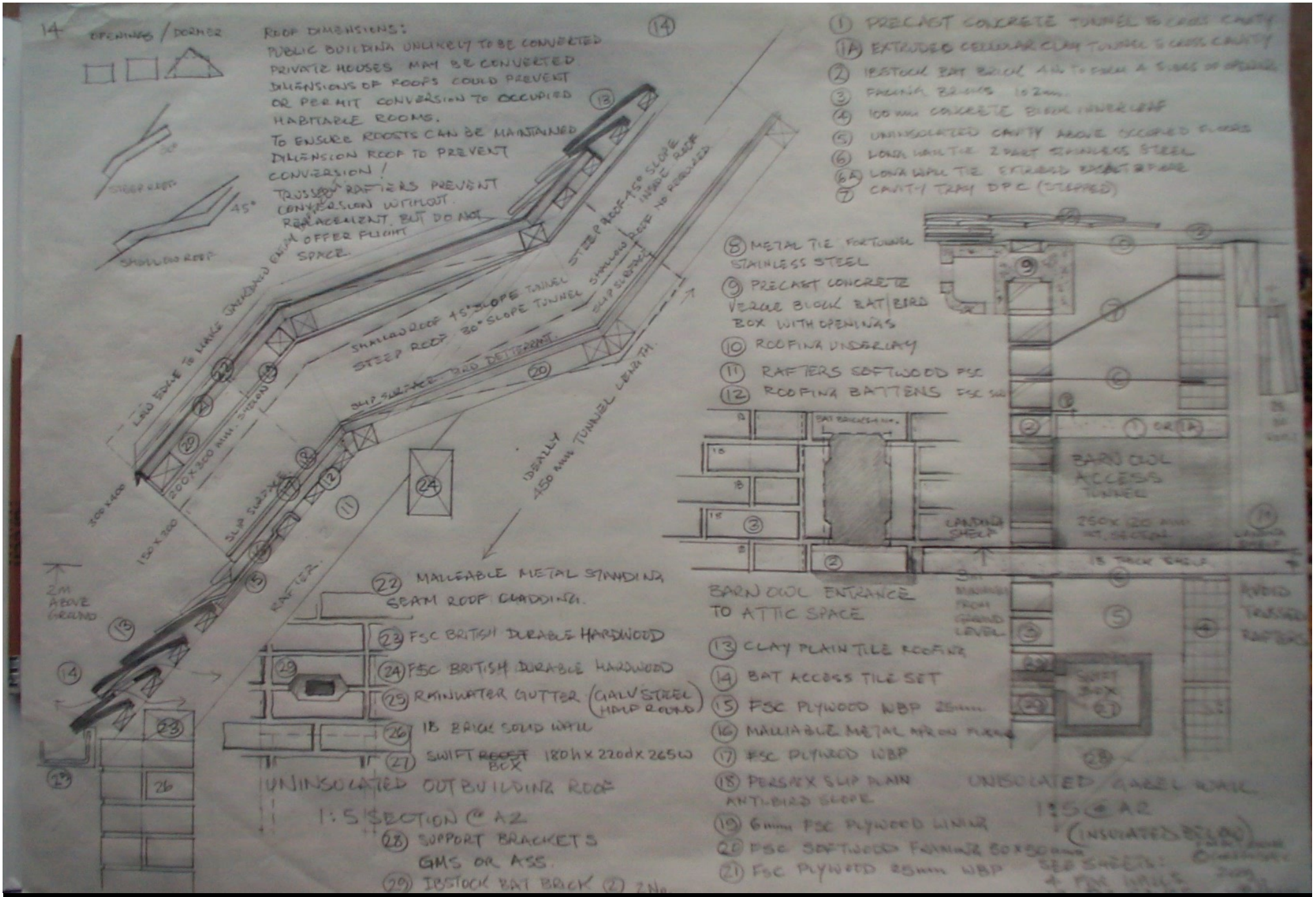
ROOF TO HEATED BUILDING



SEE SHEETS:
4 FOR WALLS
14 FOR VERGE
15 FOR EAVES

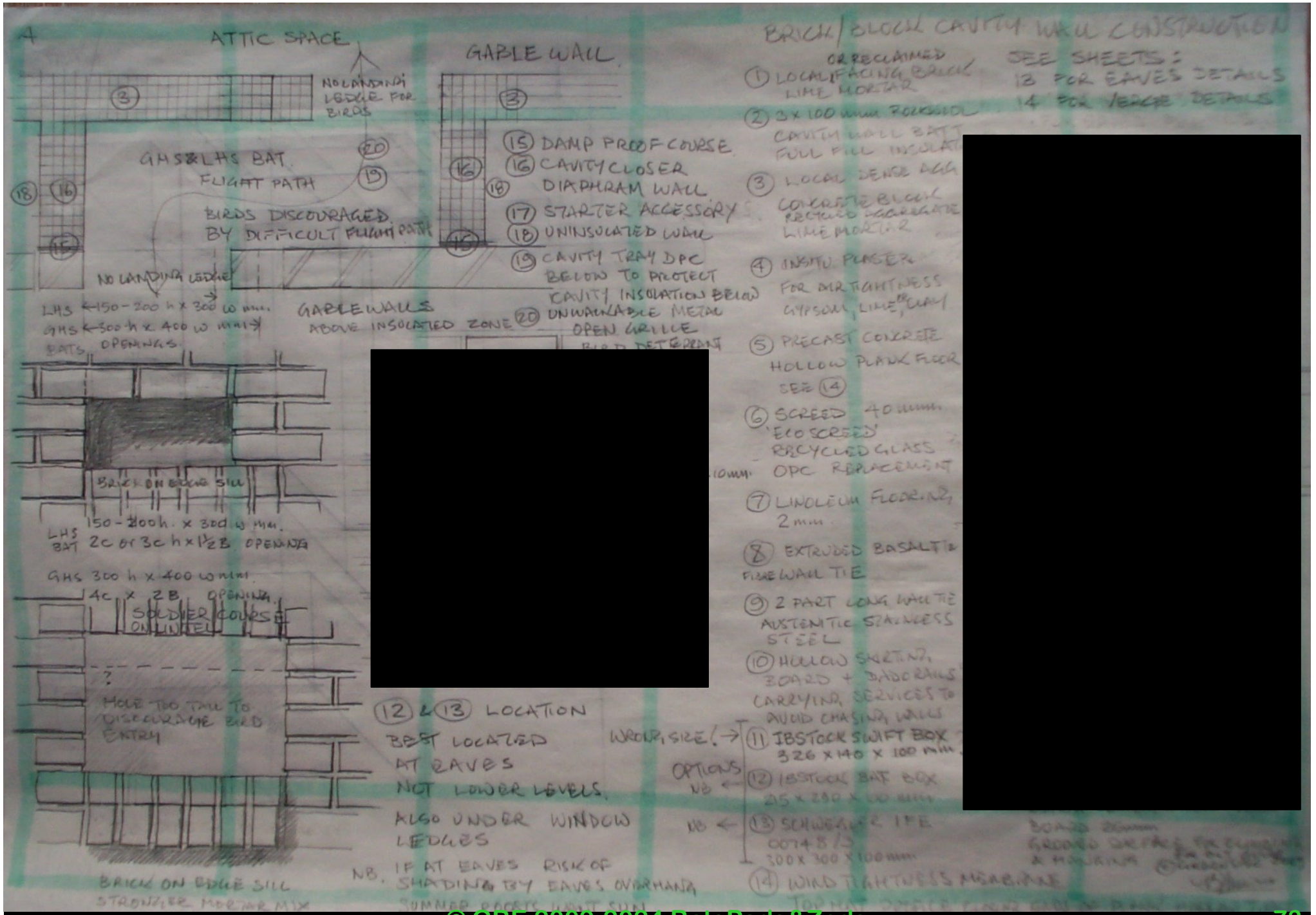
Pitched roofs

- Lesser Horse Shoe & Greater Horse Shoes access:
  - Tube through roof slopes
    - Rules complicated to apply
  - Dormer opening option if birds not an issue
- Gable walls
  - Barn Owl landing platform and access to attic
  - Swift access to box in uninsulated cavity



Pitched roof Gable Walls

- Lesser Horse Shoe & Greater Horse Shoe access:
  - Chicane to fly through
    - Some Bat species fly like butterflies
      - VTOL Jump jets of the bat world
    - Birds not so agile
  - No landing platform discourages birds



Pitched roof eaves/verges

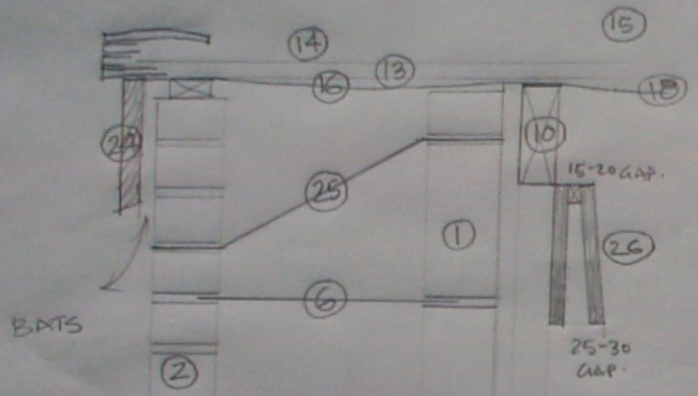
- Timber fascia and soffit
  - Gap for bats at wall
  - Gap for birds in soffit
  - Bat box in eaves triangle
  - Bat box showing below fascia
- Timber barge board with gaps

15

(24) BARGE BOARD FSC SOFTWOOD DURABLE SPECIES ON SW SPACERS (15-30 GAP)

(25) POLYETHYLENE CAVITY TRAY DPC.

(26) BAT ROOST FIXED TO SIDE OF RAFTERS SEE SHEET 13 (22)-(22C)



SEE SHEET 16

(23) OPTIONAL POSITI

(1) BLOCKWORK INNER LEAF 100 MM CELLULAR BLOCK

(2) SOFTWOOD WALL PLATE 75x100 mm FSC WITH HOLDING DOWN STRAPS

(3) FULL FILL CAVITY WALL INSULATION ROCK MINERAL WOOL 3X100 MM

(4) FIRED CLAY FACING BRICK OUTER LEAF 102 MM. X 215 X 65 mm.

(5) WALL TIES OPTIONS: EXTRUDED BASALT. 2 PART STAINLESS

(6) SOFTWOOD CEILIN

(7) SOFTWOOD TILTING

(8) GUTTER & BRACKETS GALVANIZED STEEL

(9) PARGE COAT OR P

(10) SOFTWOOD RAFTER 200 X 50 mm FSC

(11) 3X100 mm HEMP IN

(12) DRYLINING CEILIN

(13) SW FSC ROOF TILE BATTENS 25X50mm

(14) CLAY HAND MADE PLAIN ROOF TILES 265 X 160 X 10mm

(15) BAT ACCESS TILE 18 mm GAP X 165 mm GAP IN UNDERLAY

(16) ROOFING UNDERL

(18) GAP IN UNDERLAY

(17) 50mm AIR PASS

(19) 600 mm WIDE FS

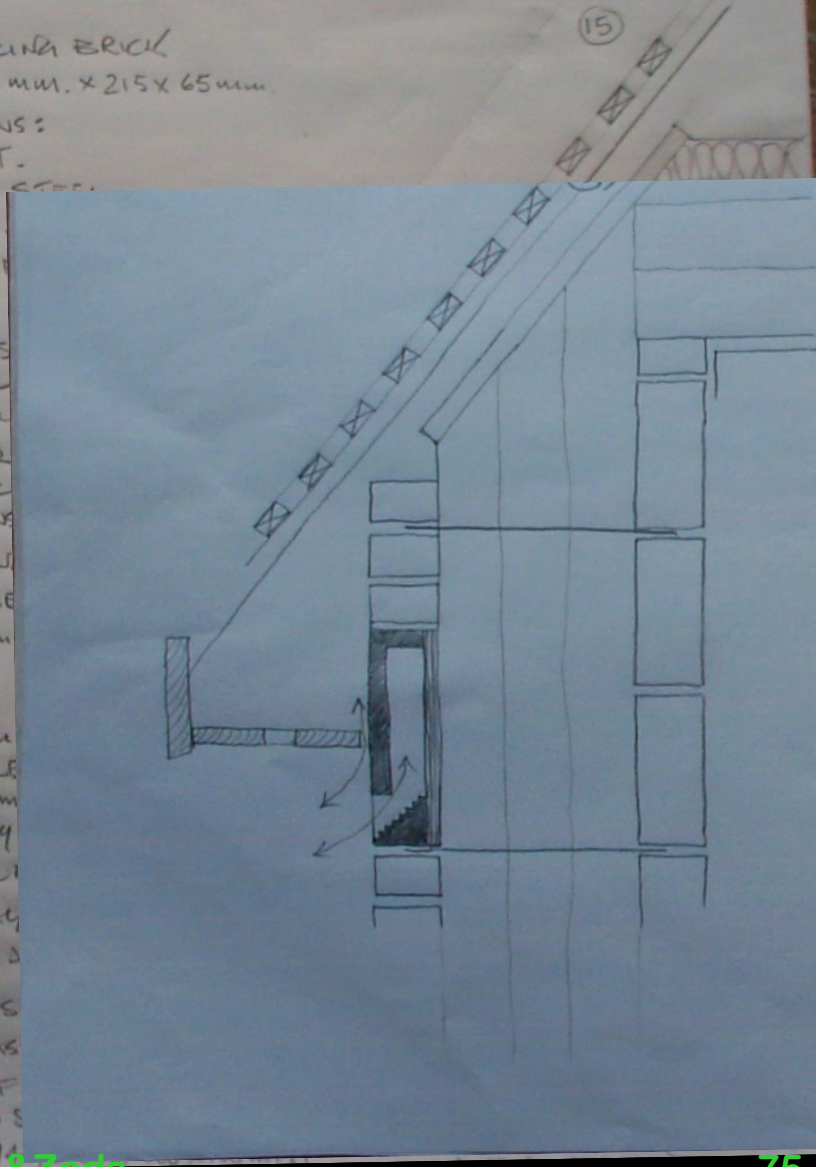
(20) RIGID HDPE FLAS

(21) FSC SOFTWOOD F

(22) FSC SOFTWOOD S

EAVES DETAIL
1:5 @ A2

CAVITY WALL CONSTRUCTION
BRICK/BLOCK
NONBREATHING ROOF.



The next steps

Sketches to Perspectives

- We met with the Publisher & Architects
- Architectural practice is converting 2D section sketches
- to CAD files and provide Architect friendly drawings
- Just like the AJ and Detail magazines

Working details

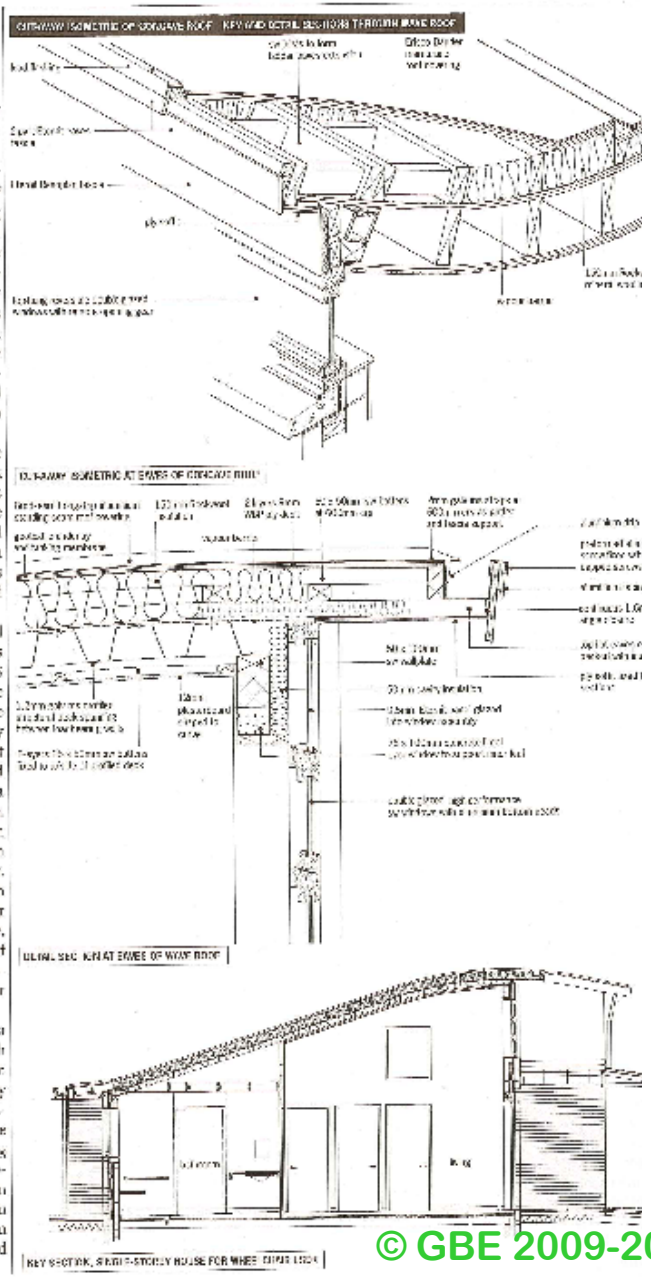
A HOUSING SCHEME WITH CURVED AND CONCAVE ROOFS

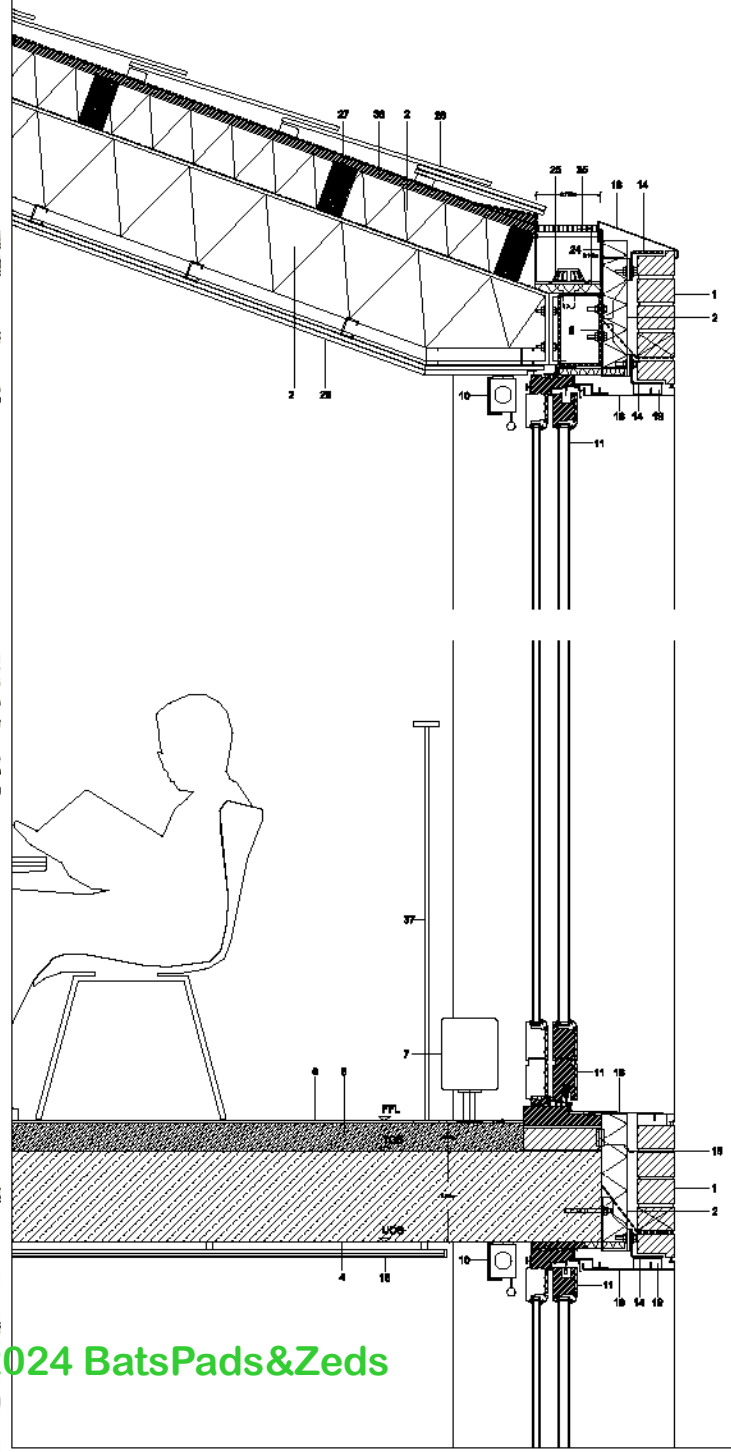
The housing scheme consists of one-, two- and three-storey houses grouped into 'city blocks'. They are constructed of masonry walls and curved roofs of aluminium sheet with standing seams. The roofs of the two- and three-storey mid-terrace houses follow a symmetrical curve. The 'tower' houses – three-storey houses which stand at the corners of the blocks to give them emphasis – have raised concave roofs. The two-bedroom single-storey houses, which are designed for wheelchair access, have a waved roof shape.

The 'tower' houses are constructed of blockwork rendered with Stolit, an acrylic render which does away with the need for weep-holes and movement joints, and provides an impervious skin which is beneficial when using fully-filled cavities.

The roof structure is a steel frame of concave-curved lattice supported on 100 x 100mm steel posts: on one side of the roof the posts rest on a precast concrete pedestal, on the other side they extend down to steel beams at roof level. A ply deck above and below the roof structure acts as a stressed skin to stabilise the curve. The roof is covered with an Trocal flexible membrane on insulation with a concealed gutter. The eaves are extended with 'ladder' constructions of timber joists to give a delicate eaves line. They project over a band of clerestory glazing of double-glazed high-performance timber windows.

The single-storey houses have a waved roof covered with aluminium standing seam cladding on a double layer ply deck. Insulation is laid between Z-studs which are fixed to the profiled steel deck spanning between intermediate walls. Top-hat sections are cantilevered from the roof structure to form an extended eaves, and a box-section aluminium gutter is concealed behind an aluminium fascia.

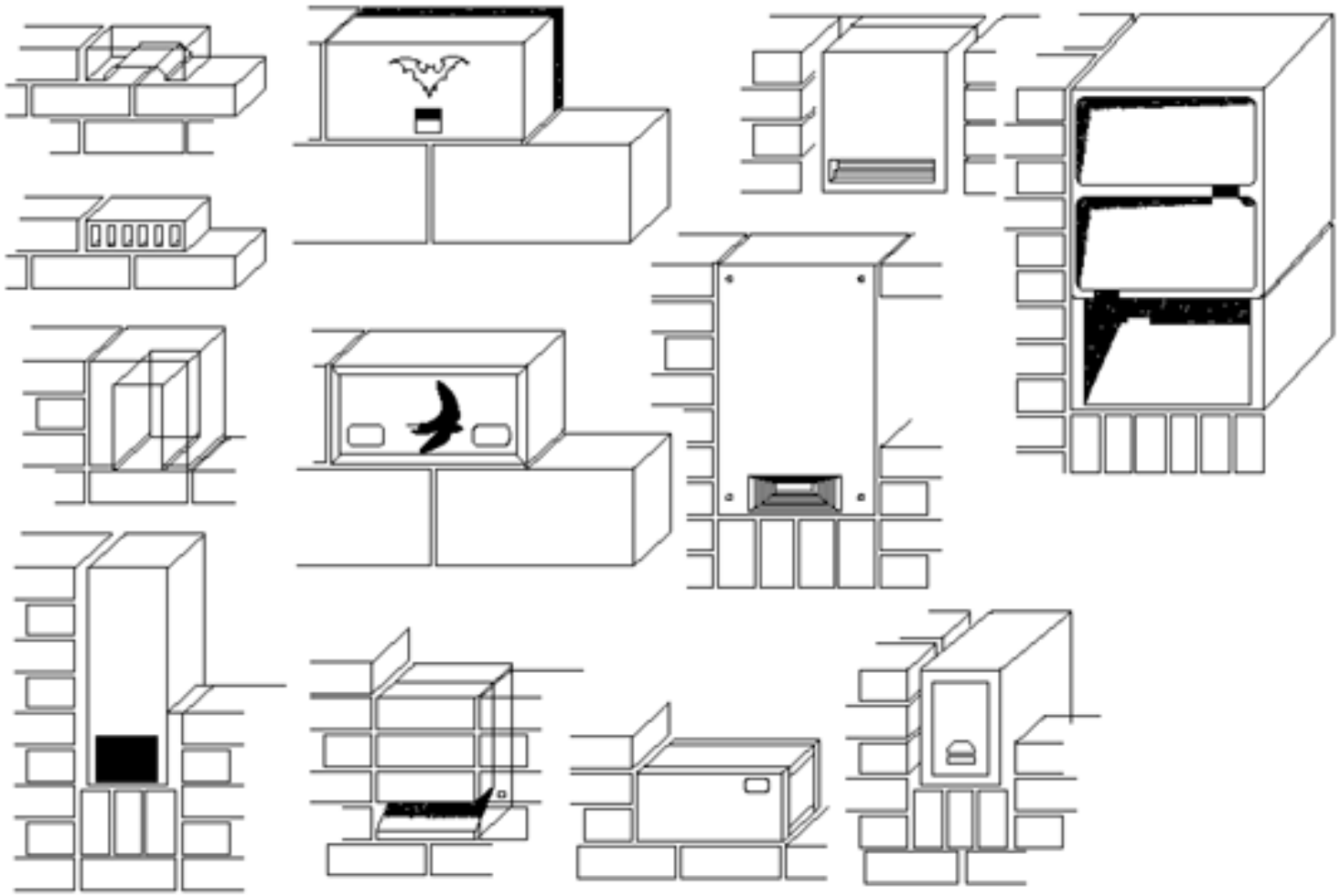




1 Facing brick
2 Thermal insulation
3 100mm concrete block
4 Concrete floor slab 250mm to structural engineers details painted fair faced soffit
5 Screed 75mm
6 Floor finish
7 Heating
8 Steelwork to structural engineers details
9 Vapour barrier
10 Solar control blinds
11 Sliding door - manually operated
12 Rainwater downpipe
13 Double glazing, timber framed windows
14 Masonry support angle
15 Acoustic ceiling
16 4mm sheet anodised aluminium flashing
17 Painted softwood window boards and framing
18 50 wall tie
19 Treated timber spacer
20 15mm Hardcoat plaster, 2 coats low VOC emulsion paint
21 Frameless double glazing
22 60x40mm Stainless steel framing angle
23 2x 12.5mm plasterboard on metal stud framing
24 4mm sheet aluminium gutter
25 Rainwater gear
26 Fibre-cement 600mm x 300mm slates 115mm overlap on 25x38mm treated timber battens
27 Treated timber purlins fixed to structural steelwork
28 2x12.5mm Plasterboard ceiling on metal stud framing
29 Sliding hardwood louvered solar control shutters
30 Composite insulated board aluminium faced with 5S where visible
31 Under slab thermal insulation and vapour barrier
32 Insupack protection board faced with 4mm anodised aluminium where visible
33 Compacted backfill and asphalt topping to match existing
34 Reinforced concrete to engineers details
35 20mm aluminium grating
36 25mm marine ply fixed to roof
37 Painted mild steel handrail 20mm dia rods at 100mmC/C
38 Painted softwood skirting
39 Steel external doors stainless steel faced
40 Stainless steel door furniture
41 Stainless steel threshold strip
42 Suspended ceiling
43 Lighting fixture to engineers specification
44 Internal walls, plasterboard on studwork
45 Compriband compressible strip 25mm
46 Cavity Closure
47 15mm Plywood boxing-in flush countersunk screws painted to match internal walls

Project	Brighton College Lower School
Client	Brighton College
Design Team	KIRKLAND FRASER MOOR
Structural Engineer	David Carter & Associates
Project Manager	Atelier 10
Quantity Surveyor	Gleeds
Drawing Title	Section Level 2 east/ west
Scale	1:50 @ A0
Status	FOR INFORMATION
Originated	24-05-08
Job No.	BC-LS
Dwg. No.	DD-501
Rev.	B
A	28-05-08 HF First Issue
B	03-06-08 HF For Information

3



Text for Architects drawings

DRAWING 1:

1. Reclaimed or local facing brick with lime mortar
2. 3 x 100 mm rock mineral fibre full fill cavity wall batts
3. Locally manufactured dense recycled aggregate concrete block with lime mortar
4. Insitu plaster for air tightness: clay, lime or gypsum
5. Precast concrete hollow plank floor See (14)
6. 'Eco screed' recycled glass and OP Cement replacement, 40 mm
7. Linoleum sheet flooring, 2 mm
8. 'TeploTie' extruded basalt and fibre long wall tie
9. 2 part long austenitic stainless steel wall tie
10. Hollow skirting board and dado rails carrying services to avoid chasing masonry walls

11 to 13a Options

11. 'Ibstock Swift Box' 326 x 140 x 100 mm.
12. 'Ibstock Bat Box' 215 x 290 x 100 mm.
13. Schwegler 1FE 00748/3, 300 x 300 x 100 mm.

13a DIY Bat Box using cement and wood fibre board, 25 mm. Grooved surface for climbing and hanging

12 & 13 Location: Best located at eaves or under window ledges not at lower levels.

14. Wind tightness membrane: Top hat profile closing ends of plank with hollow core (5).
15. DPC damp proof course
16. Cavity closer

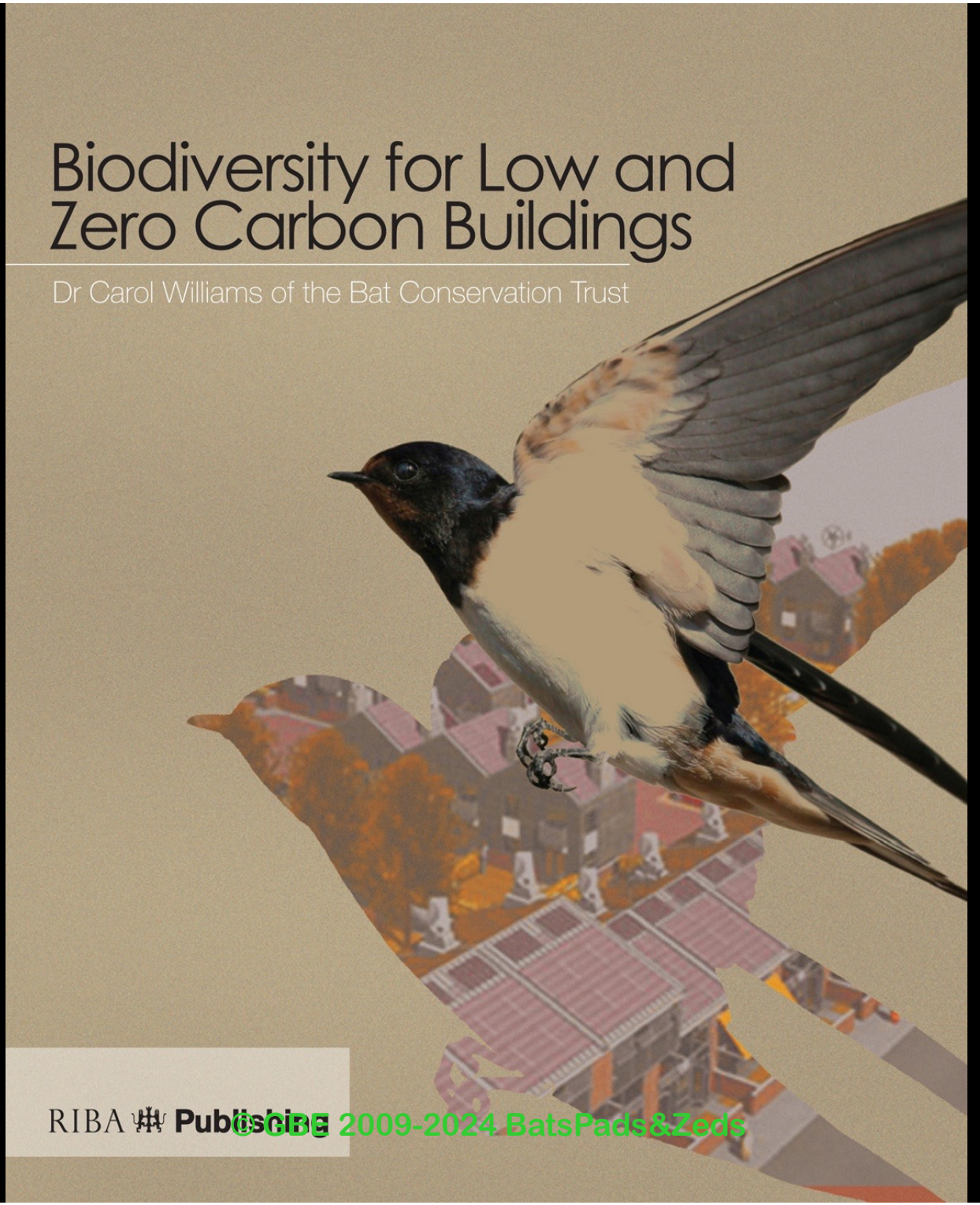
    diaphragm wall

17. Wall starter accessory
18. Un-insulated wall
19. See Sheet 13 for Eaves details

20 See Sheet 14 for Verge details

Guide

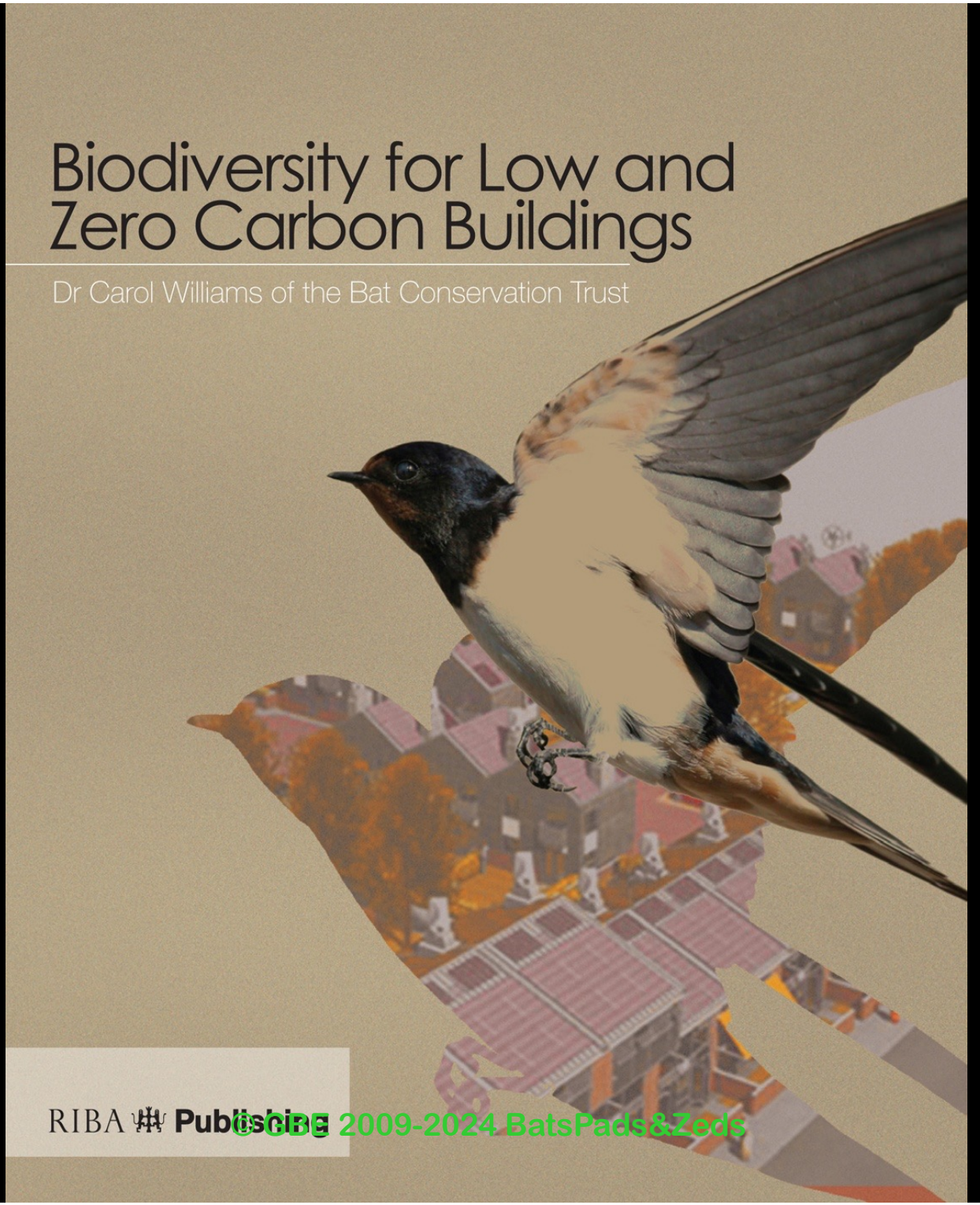
- EcoBuild '10 launched
- I bought £300 worth
  - I gave some as student prizes
  - I gave copies to my Architect Clients
  - 1 to mark up for 3rd edition
- Second edition is sold out
  - Trying to fund 3rd edition
  - Most likely to be a website
  - Spanish translation
  - Belgium Government copied some to website
  - Illegal PDF copy on USA Scribd website



Plenary Feedback Bat's pads & ZEDs

Plenary Feedback

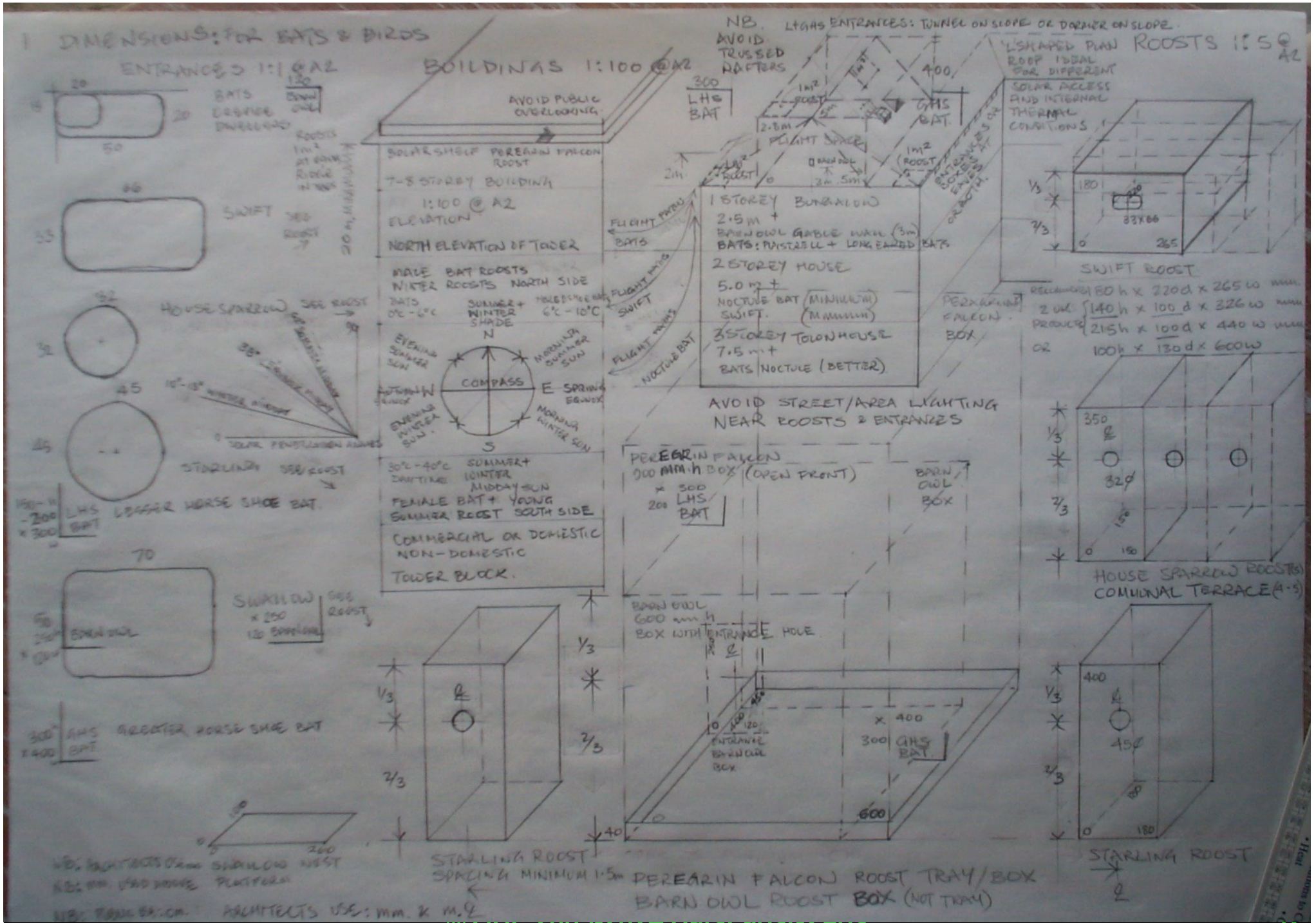
- An authoritative guide to accommodating bats and birds in Zero carbon Buildings is in draft right now
- URL http://www.ribaenterprises_____
- Publication in 2010
- Written by Carol Williams of BCT
- Construction by Brian Murphy GreenSpec
- Guided by Tony Mitchell Jones of Natural England
- Information from Manufacturers
- Many others

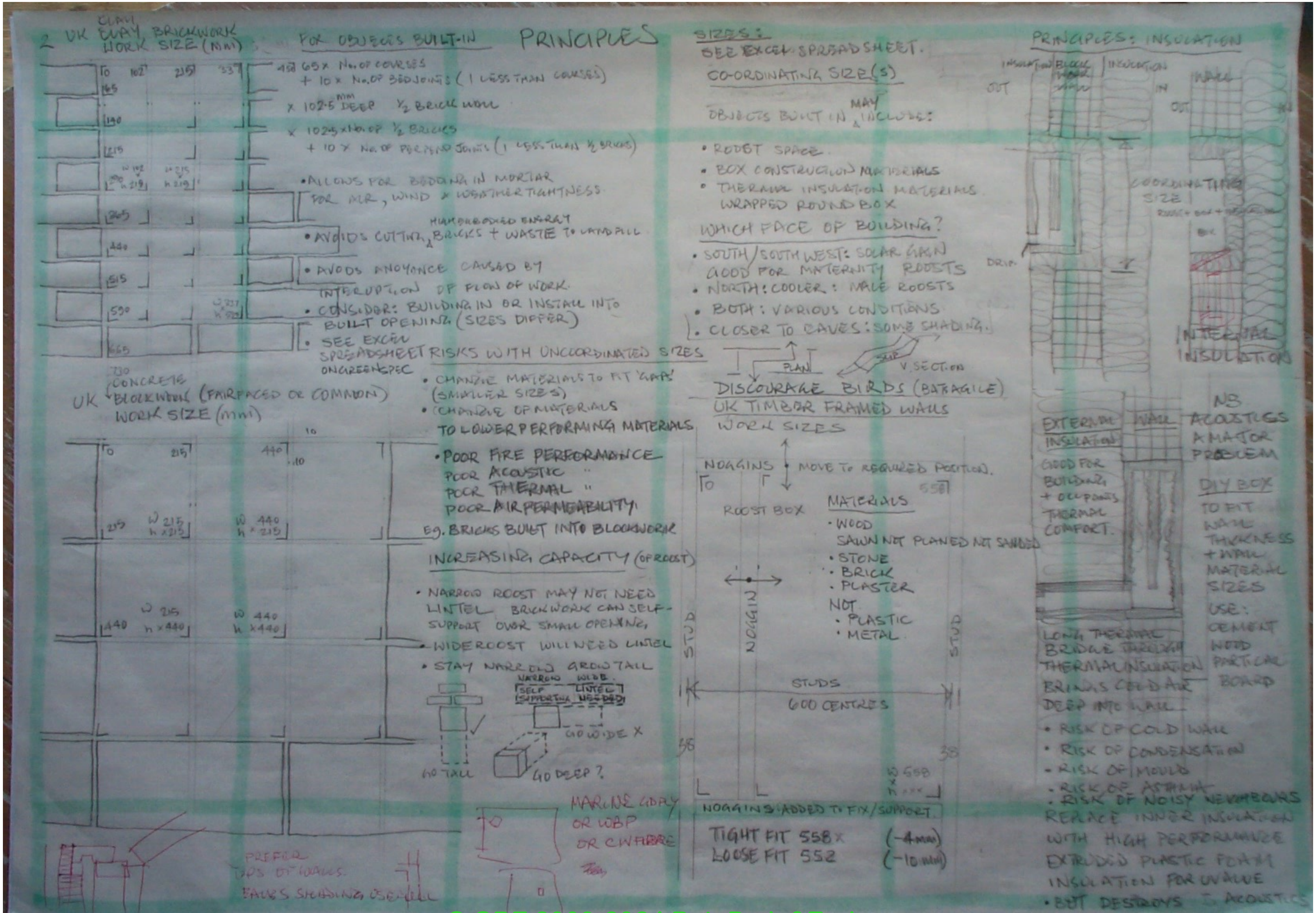


		Method of construction	Materials	Facings/Linings	General Contractor	Self-build Self-manage	Specialist Applicator	Green Builder	Simplicity	Familiarity to wider Construction industry	MMC Modern method of construction?	Off-site fabrications?	Improvement on common method	Potential popularity in future	Potential longevity	Good U values possible Dimensions dictate	Exploits any potential thermal mass	Exploits any potential moisture mass	Needs solar shading	Needs weather protection
New Build		Box outside	Any	Any	Yes	Yes	No	Yes	Yes	No				Yes		Yes	Yes		Yes	?
New Build		Box within construction	Any	Any	Yes	Yes	?	Yes	No	No				Yes		?	?			No
New Build		Box inside building	Any	Any	Yes	Yes	?	Yes	No	No				Yes		No	No		No	No
New Build	1	SOLID MASONRY WALL																		
New Build	1A	SOLID MASONRY WALL	Brick																	
New Build	1A	SOLID MASONRY WALL	Brick	External Insulation Render	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Retrofit	Yes	Yes	Yes	No	No	No
New Build	1A	SOLID MASONRY WALL	Brick	Internal insulated plaster	Yes	Yes	No	No	Yes	Yes	No	No	No	Retrofit	No	Some	No	No	No	No
New Build	1A	SOLID MASONRY WALL	Brick	Tile hanging on insulation	Yes	Yes	No	No	Yes	Yes	No	No	No	Retrofit	Yes	Yes	Yes	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or Air																	
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	External Insulation Render	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	Internal insulated lining	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	Some	No	No	No	No
New Build	1B	SOLID MASONRY WALL	Concrete Block: Dense Light or A	Tile hanging on insulation	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block																	
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	External Insulation Render	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Render	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Some	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Internal insulated lining	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Some	No	No	No	No
New Build	1C	SOLID MASONRY WALL	Cellular Clay Block	Tile hanging on insulation	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
New Build	1D	SOLID MASONRY WALL	Pumice lime block	Any	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No
New Build	1E	SOLID MASONRY WALL	Wood cement block concrete fill	Any	Yes	Yes	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No
New Build	1F	SOLID MASONRY WALL	Hemp-lime block	Any	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1G	SOLID MASONRY WALL	Unfired clay/straw block	Any	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1H	SOLID MASONRY WALL	Unfired clay/gypsum block	Any	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
New Build	1I	SOLID MASONRY WALL	Papercrete block	Any	Yes	Yes	?	Yes	Yes	No	No	No	No	Yes	Yes	Yes	?	?	No	No
New Build	1J	SOLID MASONRY WALL	Recycled glass block	Any	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
New Build	1K	Insulated concrete formwork																		
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork																	
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork	Insitu concrete fill	Yes	Yes	No	No	Yes	No	No	No	?	Yes	No	Yes	No	No	No	No
New Build	2	Insulated concrete formwork	Expanded Foam Plastics permanent formwork	Eco concrete fill	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	No
	3	CAVITY WALL																		
New Build	3A	CAVITY WALL	Unfilled cavity		Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
New Build	3B	CAVITY WALL	Full fill insulated cavity																	
New Build	3B	CAVITY WALL	Full fill insulated cavity	Brick outer block inner	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	?	Yes	Yes	No	No	No
New Build	3B	CAVITY WALL	Full fill insulated cavity	Brick outer cellular clay inner	Yes	Yes	No	No	No	Yes	No	Yes	Yes	Yes	?	Yes	Yes	No	No	No
New Build	3C	CAVITY WALL	Partial fill insulated cavity																	
New Build	3C	CAVITY WALL	Partial fill insulated cavity	Brick outer block inner	Yes	Yes	No	No	No	?	No	No	No	Yes	No	Yes	Yes	No	No	No
New Build	3C	CAVITY WALL	Partial fill insulated cavity	Brick outer cellular clay inner	Yes	Yes	No	No	No	?	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No

General outline of roosting and nesting requirements

	Access dimensions	Roost dimensions	Height of entry	Aspect of roost	Temperature ° C		Materials and other comments
					Summer	Winter	
Crevice dwelling bats	15-20 h x 20- 50 mm l (like tiny letterboxes!)	Any size as long as some components of the area are crevices in the region of 20 – 30 x mm width of gap. Greater total areas of something like 1 metre square would be useful for nursery (summer) roosts. Male roosts are smaller numbers of bats or even individual bats.	2 - 7 m (except noctule over 5 m)	Summer nursery roosts most south or west aspect for solar heating. Male roosts and winter hibernation roosts on northerly aspect.	30-40 daytime.	0-6	• Rough (for grip) • Non-toxic • No risk of entanglement • Suitable thermal properties (reducing 24 hr fluctuations)
Bats needing a flying area	15-20 h x 20- 50 l mm.	2.8 h x 5 m x 5 m not trussed. incorporate roost cervices dimensions as above,	Over 2 m	The crevice roosting provision within the roost to be located on the south or west side for solar heating. The flight area not as important.	30-40	0-6	
Horseshoe bats	Lesser horseshoes 300 l x 200 h mm. Greater horseshoes 400 l x 300 h mm.	2.8 h x 5 m x 5 m not trussed to allow flight.	Over 2 m	The roost is most likely going to be in a roof space and this should have an orientation that allows a south-facing solar gain or better still an l-shape to allow temperature-range choice.	30-40	6-10	
Swifts	65 w x 33 h mm	180 h x 265 w x 220 d mm. or 600 x 130 x 100 h mm.	Over 5 m Preferably integral to the building but where this is not possible external under the eaves. It is important to have several potential nest site for	Out of direct sunlight away from windows	No requirements that I am aware of expect to avoid direct sun that would lead to over-heating.		Concrete, masonry or marine ply. In establishing a new colony, playing recorded swift calls may attract them.
House sparrow	32mm hole	350 h x 150 w x 150 d mm.	Ideally within the structure at soffit/eaves	Out of direct sun. Easterly best.			




2 UK CLAY BRICKWORK WORK SIZE (MM)
FOR OBJECTS BUILT-IN
PRINCIPLES
45 65 x No. of COURSES + 10 x No. OF BED JOINTS (1 LESS THAN COURSES)
x 102.5 mm DEEP ½ BRICK WALL
x 102.5 x No. OF ½ BRICKS + 10 x No. OF PERPEND JOINTS (1 LESS THAN ½ BRICKS)
• ALLOWS FOR BEDDING IN MORTAR FOR AIR, WIND & WEATHER TIGHTNESS
• AVOIDS CUTTING BRICKS + WASTE TO LAND FILL
• AVOIDS ANNOYANCE CAUSED BY INTERRUPTION OF FLOW OF WORK
• CONSIDER: BUILDING IN OR INSTALL INTO BUILT OPENING (SIZES DIFFER)
• SEE EXCEL SPREADSHEET ON GREENSPEC
RISKS WITH UNCOORDINATED SIZES
• CHANGE MATERIALS TO FIT 'GAPS' (SMALLER SIZES)
• CHANGE OF MATERIALS TO LOWER PERFORMING MATERIALS
• POOR FIRE PERFORMANCE
POOR ACOUSTIC
POOR THERMAL
POOR AIR PERMEABILITY
Eg. BRICKS BUILT INTO BLOCKWORK
INCREASING CAPACITY (OF ROOST)
• NARROW ROOST MAY NOT NEED LINTEL BRICKWORK CAN SELF-SUPPORT OVER SMALL OPENING
• WIDE ROOST WILL NEED LINTEL
• STAY NARROW GROW TALL
GO TALL
GO DEEP?
GO WIDE X
UK CONCRETE BLOCKWORK (FAIRFACED OR COMMON) WORK SIZE (mm)
PREFER TOPS OF WALLS EAVES SHADING
MARINE GRADE OR WBP OR CWFIBRE
SIZES:
SEE EXCEL SPREADSHEET.
CO-ORDINATING SIZE(S)
OBJECTS BUILT IN MAY INCLUDE:
• ROOST SPACE
• BOX CONSTRUCTION MATERIALS
• THERMAL INSULATION MATERIALS WRAPPED ROUND BOX
WHICH FACE OF BUILDING?
• SOUTH / SOUTH WEST: SOLAR GAIN GOOD FOR MATERNITY ROOSTS
• NORTH: COOLER: MALE ROOSTS
• BOTH: VARIOUS CONDITIONS
• CLOSER TO EAVES: SOME SHADING.
PLAN
V. SECTION
DISCOURAGE BIRDS (BATAGILE)
UK TIMBER FRAMED WALLS WORK SIZES
NOGGINS MOVE TO REQUIRED POSITION.
ROOST BOX
MATERIALS
• WOOD SAWN NOT PLANED NOT SANDED
• STONE
• BRICK
• PLASTER
NOT
• PLASTIC
• METAL
STUD
NOGGIN
STUDS 600 CENTRES
NOGGINS ADDED TO FIX/SUPPORT.
TIGHT FIT 558 x (-4mm)
LOOSE FIT 552 (-10mm)
PRINCIPLES: INSULATION
OUT
IN
DRIP
COORDINATING SIZE
INTERNAL INSULATION
NB ACOUSTICS A MAJOR PROBLEM
EXTERNAL WALL INSULATION
GOOD FOR BUILDING + OCCUPANTS THERMAL COMFORT.
DIY BOX
TO FIT WALL THICKNESS + WALL MATERIAL SIZES
USE: CEMENT WOOD PARTICLE BOARD
LONG THERMAL BRIDGE THROUGH THERMAL INSULATION BRINGS COLD AIR DEEP INTO WALL
• RISK OF COLD WALL
• RISK OF CONDENSATION
• RISK OF MOULD
• RISK OF ASTHMA
• RISK OF NOISY NEIGHBOURS
REPLACE INNER INSULATION WITH HIGH PERFORMANCE EXTRUDED PLASTIC FOAM INSULATION FOR U VALUE
• BUT DESTROYS ACOUSTICS

	Walling element height (mm.)	Walling element width (along wall length) (mm.) NB. Half or whole units	Wall thickness (number of half bricks or whole block widths)	Wall thickness (mm.) NB. Half or whole units	Bed Joint (mm.)	Perpend Joint (mm.)	Tolerances deducted once (mm.)	Insulation on all sides: thickness (mm.)	Bat box wall thickness (mm.)	
UK metric brick	65	102.5	%%%	102.5	10	10	3	25	20	
Number of units in wall length						1				2
Choose from drop down menu:						122.5				235
UK metric brick							74.5			
UK imperial brick		Mortared in		Dry fit		Mortared in	Dry fit	Bat/bird void	Bat/bird void	Mortared in
UK modular brick	10					w x h x t (mm.)	w x h x t (mm.)	w x d x h (mm.)	w x d x h (mm.)	w x h x t (mm.)
UK block	65	65			Mortared in	102.5 x 65 x 102.5		62.5 x 62.5 x 25		235 x 65
UK thin joint block	10			57	Dry fit		74.5 x 57 x 102.5		34.5 x 62.5 x 17	
UK cellular clay block	65	140			Mortared in	102.5 x 140 x 102.5		62.5 x 62.5 x 100		235 x 140
EU cellular clay block	10			132	Dry fit		74.5 x 132		34.5 x 62.5 x 92	
	65	215			Mortared in	102.5 x 215 x 102.5		62.5 x 62.5 x 175		235 x 215
	10			207	Dry fit		74.5 x 207		34.5 x 62.5 x 167	
	65	290			Mortared in	102.5 x 290 x 102.5		62.5 x 62.5 x 250		235 x 290
	10			282	Dry fit		74.5 x 282		34.5 x 62.5 x 242	
	65	365			Mortared in	102.5 x 365 x 102.5		62.5 x 62.5 x 325		235 x 365
	10			357	Dry fit		74.5 x 357		34.5 x 62.5 x 317	
	65	440			Mortared in	102.5 x 440 x 102.5		62.5 x 62.5 x 400		235 x 440
	10			432	Dry fit		74.5 x 432		34.5 x 62.5 x 392	
	65	515			Mortared in	102.5 x 515 x 102.5		62.5 x 62.5 x 475		235 x 515
	10			507	Dry fit		74.5 x 507		34.5 x 62.5 x 467	
	65	590			Mortared in	102.5 x 590		62.5 x 62.5 x 550		235 x 590
	10			582	Dry fit		74.5 x 582		34.5 x 62.5 x 542	
	65	665			Mortared in			62.5 x 62.5 x 625		235 x 665
	10			657	Dry fit		74.5 x 657		34.5 x 62.5 x 617	

	Walling element height (mm.)	Walling element width (along wall length) (mm.) NB. Half or whole units			Bed Joint (mm.)	Perpend Joint (mm.)		Insulation on all sides: thickness (mm.)	Bat box wall thickness (mm.)	
UK imperial brick	?	?			?	?				
				Wall thickness (mm.)			Tolerances deducted once			

BAT & BIRD BOX PRODUCT CRITIQUE

GENERALLY:

DIMENSIONS:

If made in the UK it may fit with UK standard size construction products (not always)
If made in Germany it may fit with German standard size construction products (or be face fixed)
If made in Germany and imported to the UK it is unlikely to work with UK standard size construction products.
And on the whole they don't.

Despite EU and ISO standards UK and Germany have different standards sizes
The Metric brick size was introduced in the 1970's
We got bored with them by the 1980's

If made by a brick manufacturer most likely to fit brick sizes
If made by a stone or reconstructed stone manufacturer most likely to fit stone/block sizes
If made by a bat enthusiast likely to fit bats.
Norfolk Bat Brick is the exception: it fits bats and bricks

Width out of co-ordination: increase widths of purpend joint in brickwork either side, and/or above and below to fit.
Height out of co-ordination: turn bricks on edge underneath or on end and cut soldier course to length.
Depth out of co-ordination: Likely to cause thermal bridges through U value envelop
Width and height: out of co-ordination do not use brickwork use blockwork and render it to hide the mess.
Width, height and depth out of co-ordination: consider a different method of construction or a different bat box

Most bat boxes will accommodate many bats in a colony
Do bats come in standard size colonies?
Does the size of a bat box put an artificial barrier on colony sizes?
To modify the box size will just modify the number of bats the box can accommodate
Modifying box size lets it co-ordinate with construction

PRODUCT CRITIQUE

Product 1

BAT & BIRD BOX MATERIAL CRITIQUE

MATERIALS:

Clay facing brick:

- Good points:
  - Frost resistant
  - Strong
  - Thermal mass
- Bad points
  - absorbent so will smell of urine in time
  - High embodied energy

Cement based concrete:

- Good points
  - cement is impervious to moisture,
  - strong,
  - durable
  - thermal mass
- Bad points
  - High embodied energy
  - High embodied carbon
  - Alkali do not use aluminium fasteners

Cement and wood chip fibre concrete

- Manufacturer’s recipe
  - Copyright? Schwegler Wood-Concrete
  - Make in UK under licence?
- Good points
  - thermal mass
  - Added moisture mass
  - Medium carbon sequestration
  - Vapour permeable
  - Easy to mould to any shape

N80 BIODIVERSITY ENHANCEMENT/MITIGATION SYSTEMS
To be read with Preliminaries/General Conditions A10-A55

F30 ACCESSORIES TO BRICK/BLOCK/STONE WALLING.
To be read with Preliminaries/General Conditions A10-A55

____ CONCRETE EAVES/VERGE SYSTEM
Reference Drawing(s): _____
Location: _____
Roof configuration:
- Mono ridge
- Pitched roof with gables: Eaves and verges
- Pitched roof with eaves: Eaves only
- Pitched roofs with hips: Eaves only

Background:
- Cavity wall construction
- Solid wall construction

Cavity:
- Total cavity: ___ mm.
- Insulation thickness: ___ mm.
- Residual cavity: ____ mm.
- At eaves/verges: cavity reduced by 100 mm. by projecting eaves/verge blocks into cavity

Blocks: To BS 6073-1
Type:
- Solid
- Hollow with bird aperture in face
- Hollow with bat aperture in base

Manufacturer: RoofBLOCK Limited, 6 Almoner's Field, Cullum Road, Bury St Edmunds IP33 2TS, UK
T/F 028 9181 8285
Manufacturer: RoofBLOCK Limited, 5 Bramble Wood, Newtownards BT23 8WZ, IRELAND
T/F 048 9181 8285
E sales@roofblock.co.uk W www.roofblock.co.uk
Product Reference:
- RoofBLOCK masonry roof overhang system
- RoofBLOCK masonry roof overhang system with bird box adaption

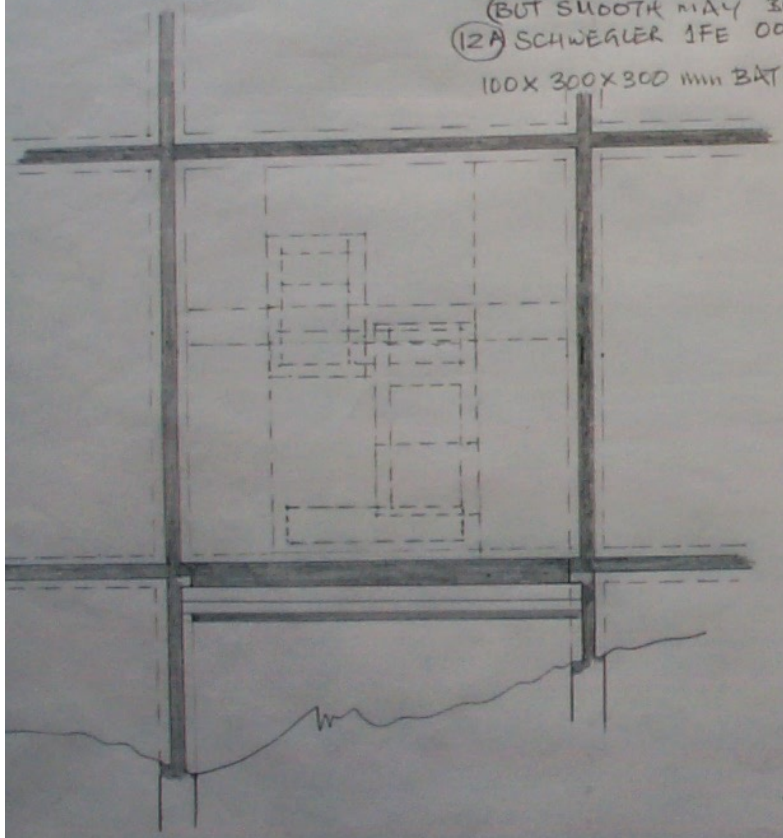
8

(12) SCHWEGLER 1FE 00747/6
80 X 300 X 300 mm. BAT BOX/ENTRANCE
WOOD-CONCRETE

(13) CEMENT-WOOD PARTICAL BOARD
ROUGHENED SURFACE FOR CLIMBING
HANGING.

(14) CEMENT-WOOD PARTICAL BOARD
TUNNEL BETWEEN ROOSTS
ROUGHENED SURFACE FOR CLIMBING
(BUT SMOOTH MAY BE OK)

(12A) SCHWEGLER 1FE 00748/3
100 X 300 X 300 mm BAT ROOST



RAINSCREEN CLADDING
ELEVATION 1:5 @A2.

(1) SOFTWOOD STUD FRAMING
RECLAIMED, LOCALLY GROWN
OR FSC TEMPORATE
140 X 38 mm @ 600mm CENTRES

(2) DENSE WOOD FIBRE BOARD
THERMAL/ACOUSTIC INSULATION
LAPPED T & G JOINTED; EXTERNAL TO STUD
AVOIDS THERMAL BRIDGES
THROUGH INSULATION
8 NO X 25 mm. 200 mm. 2/A

(3) WIND TIGHTNESS LAYER
Eg. 'ProClima Solitex WA'
LAPPED + SEALED JOINTS

(4) SOFTWOOD BATTENS
50 X 50 mm @ 600 mm CENTRES

(5) SOFTWOOD NOGGINS
DURABLE SPECIES TO AVOID
(6)+(4)+(5) PRESERVATIVE TREATMENT.

(6) CLADDING RAILS/BATTENS
SOFTWOOD/HARDWOOD OR
METAL

(7) RAINSCREEN CLADDING.
OPEN JOINTS VENTILATED
CAVITY, PRESSURE EQUALISED
MANY MATERIAL CHOICES
SYSTEMS ON MARKET

(8) CAVITY FIRE BARRIER
GALVANIZED MILD STEEL ANGLE
SOFTWOOD OR SHEATHED ROCKWOOL

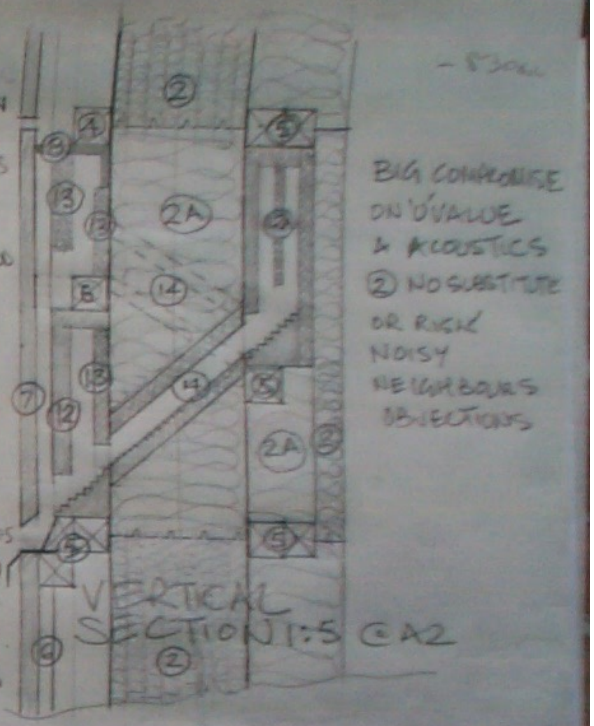
(2A) CELLULOSE FIBRE THERMAL
INSULATION (EASY TO CUT TO
SHAPE & TO FIT ODDSHAPED
CAVITY)

(9) AIRTIGHTNESS LAYER
LAPPED + SEALED JOINTS
Eg. 'ProClima DB+'

(10) DRYLINING CLAYBOARD 40 mm

(11) SKIM FINISH CLAY 2 mm.

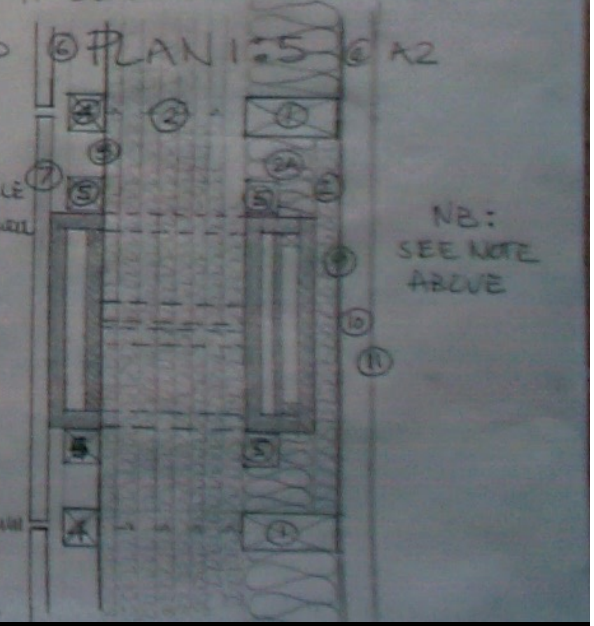
(15) PRESSED METAL CAP/SILL



BIG COMPROMISE ON U VALUE & ACOUSTICS
② NO SUBSTITUTE OR RISK NOISY NEIGHBOURS OBJECTIONS

VERTICAL SECTION 1:5 @A2

TIMBER FRAME CONSTRUCTION
TIMBER STUD FRAMING

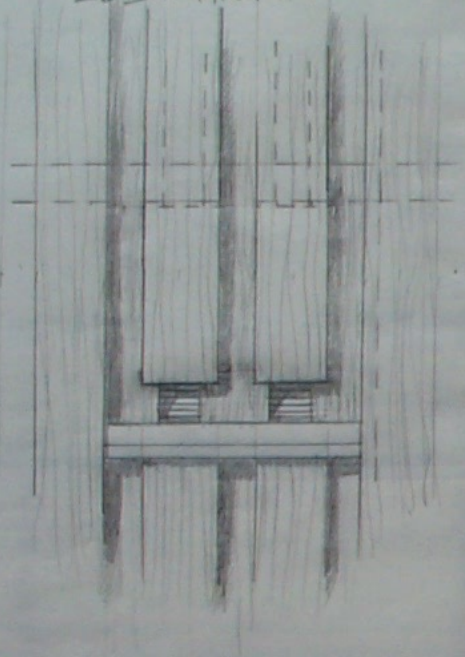


PLAN 1:5 @A2

NB: SEE NOTE ABOVE

TIMBER FRAME CONSTRUCTION
I-STUDS FOR MORE INSULATION
ISPS INSULATED STRUCTURAL PANEL SYSTEM

ELEVATION 1:5 @A2



ISPS

3No. ①, +②+③+④
+ INT LINING (
+⑭ BETWEEN ABUTTING PANELS & ASSEMBLE ONSITE ADD
④ +⑤+⑩+⑪
⑨+⑥+⑦+⑧
⑤+④ TO OVERLAP PANEL JOINTS +SEAL LAPS

③/③A CAN BE PRE OR POST INSTALLED

⑬ LOCATE CLOSE TO EAVES.

① 'MASONITE' I-STUD@600mmC EXCEL INDUSTRIES IN UK 300X50 mm LENGTH TO SUIT MANY OTHER SIZES AVAILABLE

② 'BREATHING' SHEATHING BOARD 25mm T&G JOINTED WITH OR WITHOUT RACKING STRENGTH WOOD FIBRE BOARD

③ 'HOMATHERM' 3X100 mm DENSE CELLULOSE FIBRE RECYCLED MAGAZINES THERMAL/ACOUSTIC INSULATION

④ RECYCLED PAPER/CELLULOSE AIR TIGHTNESS LAYER
Eg. 'PRO CLIMA DB+' NATURAL GLUED JOINTS

⑤ WIND TIGHTNESS LAYER
Eg. 'PRO CLIMA SOLITEX WA'

⑥ COUNTER-BATTENS 50X50mm @ 600 CENTRES FSC SW

⑦ BATTEN FOR WEATHERBOARDING, 25X50 mm. DURABLE HARDWOOD

⑧ DURABCE HARDWOOD RECLAIMED, LOCAL GROWN OR FSC TEMPORATE SPECIES WEATHER BOARDING, BOARDONBOARD

⑨ 30X30 mm SERVICE ZONE BATTENS + SERVICES FSC + INSULATION TO FILL VOIDS

⑩ DRYLINING, REED REINFORCED CLAY BOARD 40mm.

⑪ CLAY FINISH

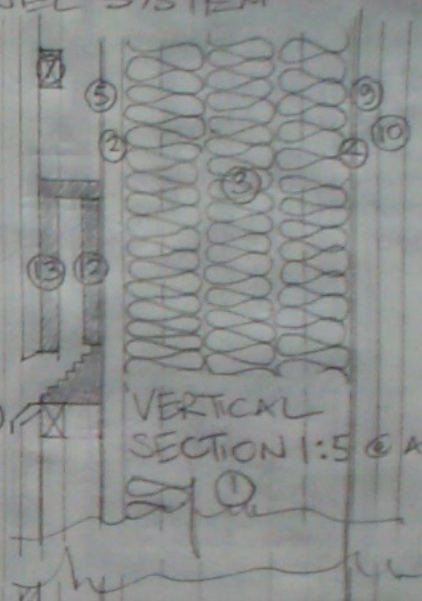
⑫ CEMENT/WOOD PARTICLE BOARD 25mm GROOVED FOR CLIMBING HANGING

⑬ SCHWEGLER 1FE 00747/6 80X300X300 mm CONCRETE-WOOD BAT BOX.

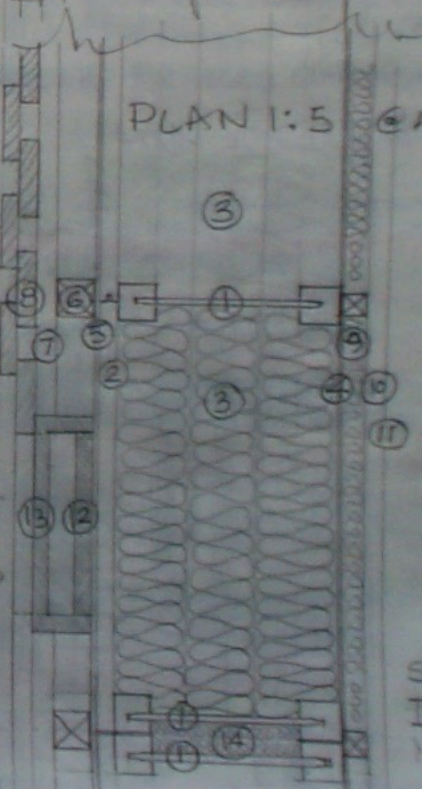
⑭ DENSE WOOD FIBRE BOARD INSULATION BETWEEN ISPS

⑮ PRESSED METAL DRIP OR HW

③A ALTERNATIVES: DRY OR DAMP SPRAY OR BLOWN IN INSULATION



VERTICAL SECTION 1:5 @A2



PLAN 1:5 @A2

See ISPS NOTES

(1A) & (1) BLOCKWORK OPTIONS

1.1 DENSE AGGREGATE
1.2 LIGHT AGGREGATE
1.3 AERATED AUTOCLAVED
1.4 CELLULAR CLAY (FIRED)
1.5 HEMPCRETE (HEMP-LIME)
1.6 LIME POMICE CELLULAR
1.7 CEMENT-WOOD FIBRE
1.8 UNFIRED CLAY (NLB?)
1.9 UNFIRED CLAY + STRAW (NLB?)
NOT CHEAP? 1.10 RECYCLED GLASS SAND & RESIN
IMMINENT! 1.11 PAPER CRETE
WRAP MADNESS → AVOID! 1.12 UNFIRED CLAY + GYPSUM
AIRLEAKY → AVOID! 1.13 BREEZE BLOCK
NLB = NON-LOADBEARING
IMMINENT! 1.14 WOOD SHAVINGS/CEMENT
1.15 PAPER/PLANT BASED RESIN?

(16) DRAIN SPOUT
(17) GYPSUM & WOOD FIBRE BOARD 'DRY SCREED' BOARDS
(18) PEREGRIN FALCON

(1) 200 mm BLOCKWORK
(1A) 140 mm BLOCK LAID ON SIDE 215 mm WALL
(2) 200 mm INSITO REINFORCED CONCRETE FLOOR
(3) 200 mm CANTILEVER SHELF
(4) SCREED TO 1:40 FALL

NB. NORTH ELEVATION

20m ABOVE G.L.

(6) SCHÖCK ISOKORB TYPE K THERMAL BREAK & REINFORCEMENT CONTINUITY
(5) 2 No. 100 mm DENSE THERMAL INSULATION
(7) MINERAL BASED THIN RENDER 2 LAYERS REINFORCED
(8) 450 x 600 x 40 mm TRAY STAINLESS STEEL WITH WALL UPSTAND 450 mm
(9) WATER PROOF MEMBRANE WITH UPSTAND
(10) PRESSED METAL FASCIA/COPING/DRIP
(11) PLASTER FINISH
(13) DOT & DAB DRY LINING METHOD
(14) DRY LINING

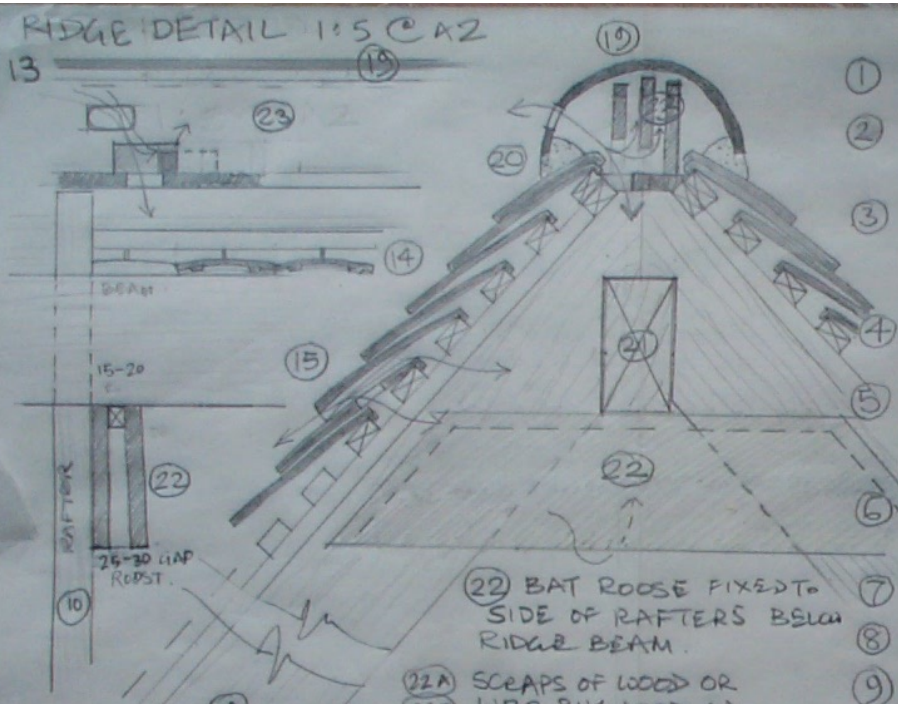
CONCRETE FRAMED 1:5 SECTIONS @ A2
SOLAR SHADING SHELF

360mm

SEE MATERIAL OPTIONS 1.1 - 1.15

RIDGE DETAIL 1:5 @ A2

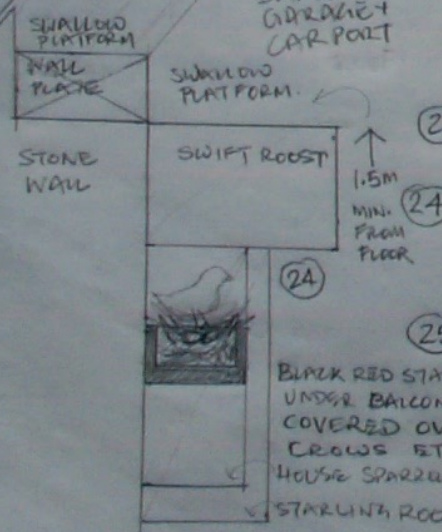
13



(22) BAT ROOST FIXED TO SIDE OF RAFTERS BELOW RIDGE BEAM.

ROOF TO:
- STABLES
- OUT BUILDING
- BARN + SHED
- GARAGE + CARPORT

(22A) SCRAPS OF WOOD OR
(22B) WBP PLYWOOD OR
(22C) CEMENT-WOOD PARTICLEBOARD ROUGHENED SURFACE FOR CLIMBING + HANGING
2 BOARDS SPACED APART
15-20 MINIMUM GAP
25-30 MAXIMUM GAP
BATTENS SW OR CWP



(23) RIDGE ROOST SIMILAR MATERIALS TO (22)

(24) POTENTIAL ROOST POSITIONS (NOT NECESSARILY ALL TOGETHER)

(25) VAPOUR CONTROL LAYER

BLACK RED START OPEN NEST BOX (LIKE ROBIN) UNDER BALCONY, EAVES, MEZZANINE FLOOR COVERED OVER (PROTECTION FROM MAGPIE, CROWS ETC.)

HOUSE SPARROW ROOSTS

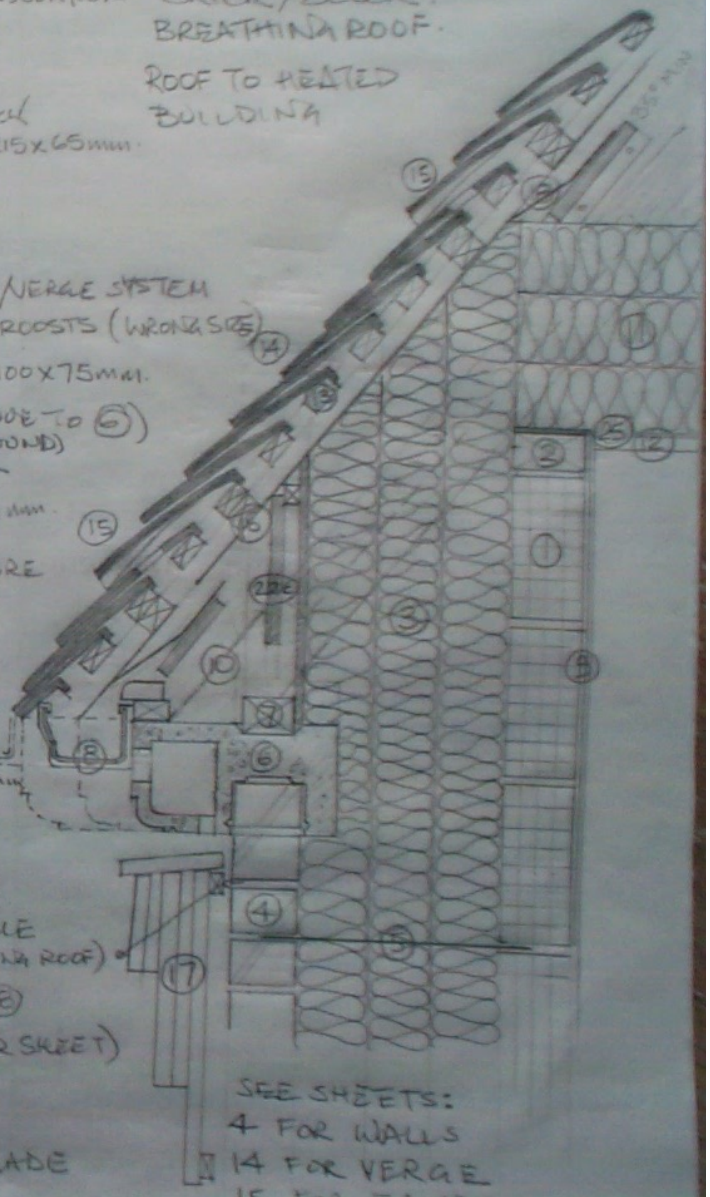
STARLING ROOST

1. BLOCK WORK INNER LEAF. 100mm. CELLULAR CLAY BLOCK
2. SOFTWOOD WALL PLATE 75x100 mm Ex WITH HOLDING DOWN STRAPS
3. FULL FILL CAVITY WALL INSULATION ROCK MINERAL WOOL 3x100 mm.
4. FIRED CLAY FACING BRICK OUTER LEAF 102 mm x 215 x 65 mm.
5. WALL TIE: OPTIONS EXTRUDED BASALT. 2 PART STAINLESS STEEL
6. CONCRETE HOLLOW EAVES/VERGE SYSTEM INCORPORATING BIRD OR BAT ROOSTS (WRONG SIDE)
7. SOFTWOOD WALL PLATE 100x75mm.
8. GUTTER (WRONG POSITION DUE TO 6) GALVANIZED STEEL (HALF ROUND)
9. PARGE COAT OR PLASTER
10. SOFTWOOD RAFTERS 200 mm. (AVOID TRUSSED RAFTERS)
11. 3x100 mm CELLULOSE FIBRE INSULATION
12. DRY LINING. CEILING.
13. ROOF TILING BATTENS SOFTWOOD (DURABLE SPECIES)
14. CLAY PLAIN ROOF TILING HAND MADE 265x160x10mm
15. BAT ACCESS TILE SET 18 mm GAP x 165 LONG GAP IN UNDERLAY BELOW
16. WIND TIGHT VAPOUR PERMEABLE ROOFING UNDERLAY (BREATHING ROOF) 'PRO CLIMA SOLITEX SA' SEE (18)
17. KENT BAT BOX (SEE OTHER SHEET)
18. GAP IN UNDERLAY (IDEALLY AN AIRLOCK)
19. CLAY RIDGE TILE HAND MADE
20. MORTAR BEDDING
21. [illegible]

EAVES DETAILS
1:5 @ A2

CAVITY WALL CONSTRUCTION BRICK/BLOCK. BREATHING ROOF.

ROOF TO HEATED BUILDING



SEE SHEETS:
4 FOR WALLS
14 FOR VERGE
15 FOR EAVES

BCT PUBLICATION JARGON BUSTER

AIR BARRIER
An air barrier comprises materials and/or components, which are air impervious or virtually so, separating conditioned spaces (heated, cooled or humidity controlled, usually inside), from unconditioned spaces (unheated, un-cooled, humidity uncontrolled, usually outside).
(based on SEDA Scottish Environmental Design Association definition)

AIR EXFILTRATION
The uncontrolled outward leakage of indoor air through cracks, discontinuities and other unintentional openings in the building envelope.
(SEDA Scottish Environmental Design Association)
In winter the air is likely to be heated and heated air exfiltration will result in uncontrolled heat loss and potential interstitial condensation risk.
(GreenSpec ’09 & EBS ‘09)

AIR INFILTRATION
The uncontrolled inward leakage of outdoor air through cracks, discontinuities and other unintentional openings in the building envelope.
(SEDA Scottish Environmental Design Association)
In winter the air is likely to be cold and cold air infiltration will result in uncontrolled draughts, leading to thermal discomfort and condensation risk.
(GreenSpec ’09 & EBS ‘09)

AIR LEAKAGE PATH
A route by which air enters or leaves a building or flows through a component.
(based on SEDA Airtightness Guide definition)
The air leakage path may not pass directly through an element but can also pass long its length or across its area, leaks in the external envelop can manifest themselves in more than one location and in any junction of external or internal construction.
Plasterboard is an example of an air-leaky construction where air moves between walls and plasterboard and leaks out of electrical switches and sockets, around skirting, etc.

Holes through the building fabric through which air can pass, that can destroy the integrity of the fabric’s acoustic, fire, thermal, wind, weather, water and air tightness performance.

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