

How Traditional Buildings Perform: 'Breathing Buildings'

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Living, Breathing History



- Symbol of accumulation of wealth and power but craftsmanship/beauty
- An appreciation of beauty in time worn and weathered surfaces
- Positive contribution to the built environment
- Living, breathing 3D history



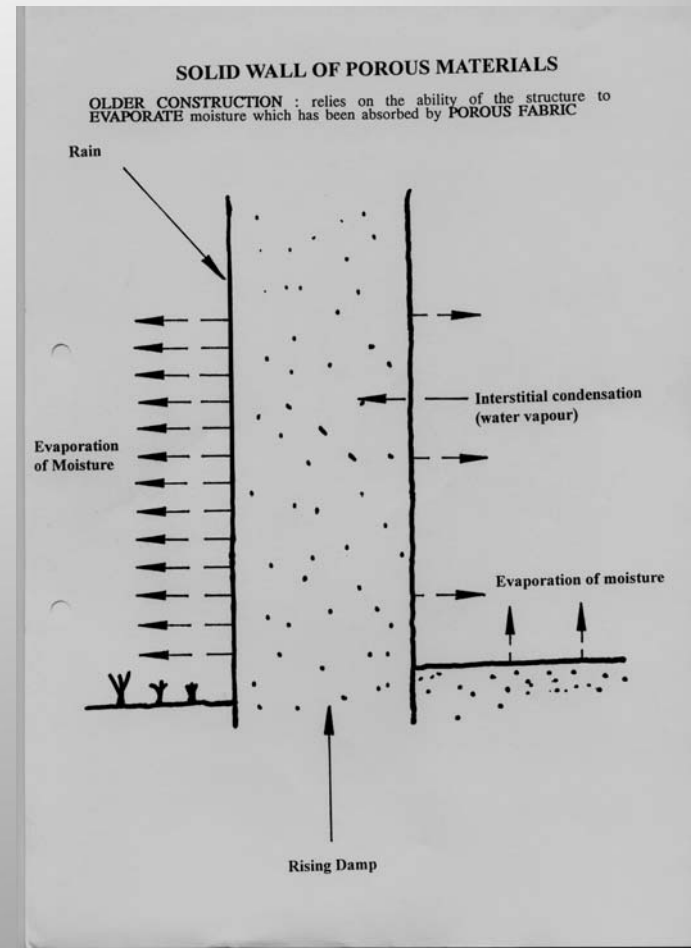
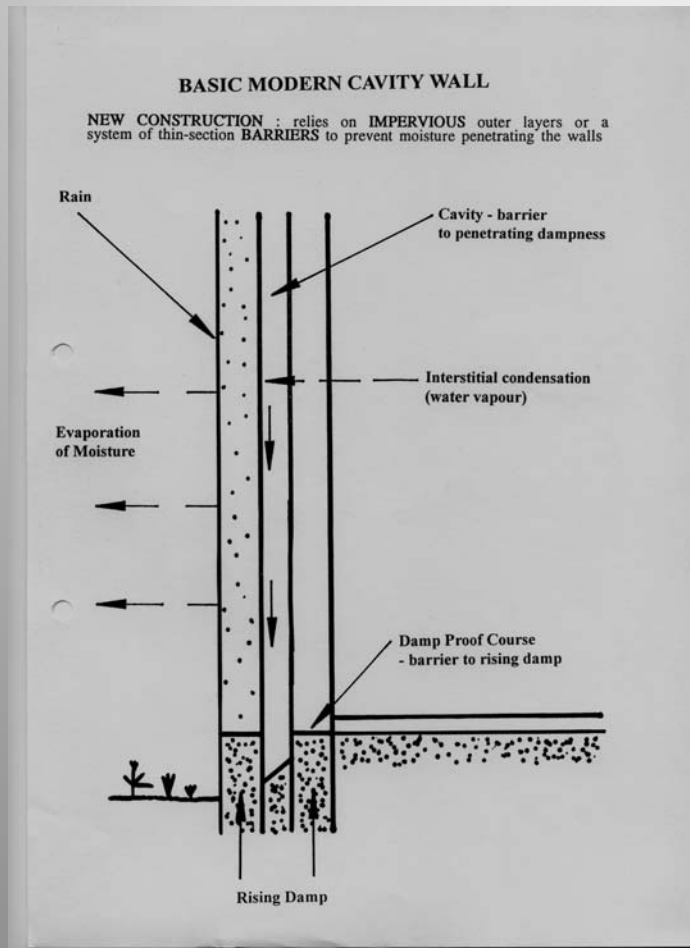
Vernacular level landscape
response undermining mass
produced homogeneity



Preston Wynne Court Farm



Concept of the Breathing Building as an External Envelope



The Breathing Performance: mortars

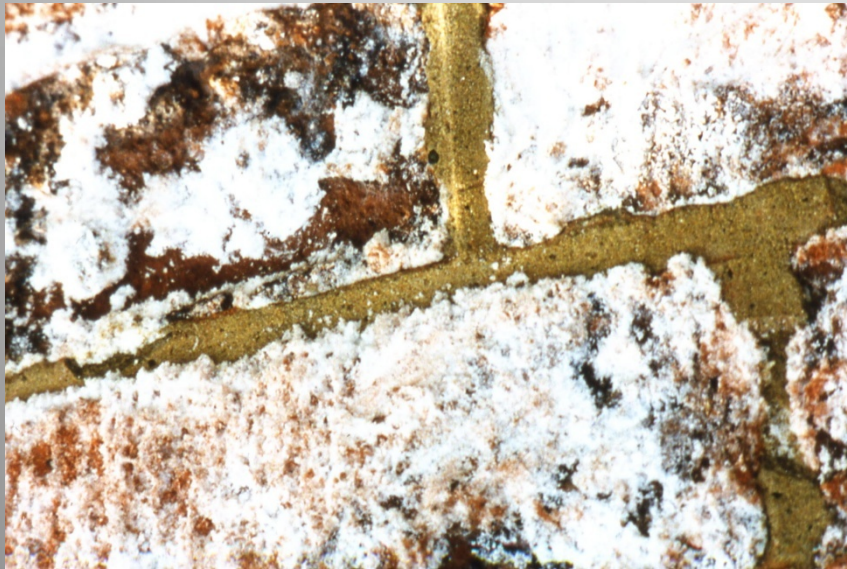


- 80% evaporation through the joint zone
- Moisture concentration = accelerated decay through freeze thaw and salt activity.
- Rate of decay?
- Ability to accommodate movement (autogenous properties)

Getting it Wrong: the unthinking use of incompatible construction technology materials



Salt Damage/Naming of Parts



- Wetting and drying cycles and the presence of soluble salts creates a build up of pressure
- Particularly damaging to masonry of uniformly distributed fine pores (microporous stone)
- Excessive use of water mobilises embedded salts
- Hygroscopic salts increases 'air dry' or natural content (relate to free or capillary moisture)

Entrapped Moisture



Industrialisation of Construction: when do we see the change in the forms of construction?



- Slate DPC from 1850
- Victorian buildings as hybrids
- DETR House Survey = 20 million dwellings of which ~ 5 million constructed pre 1918

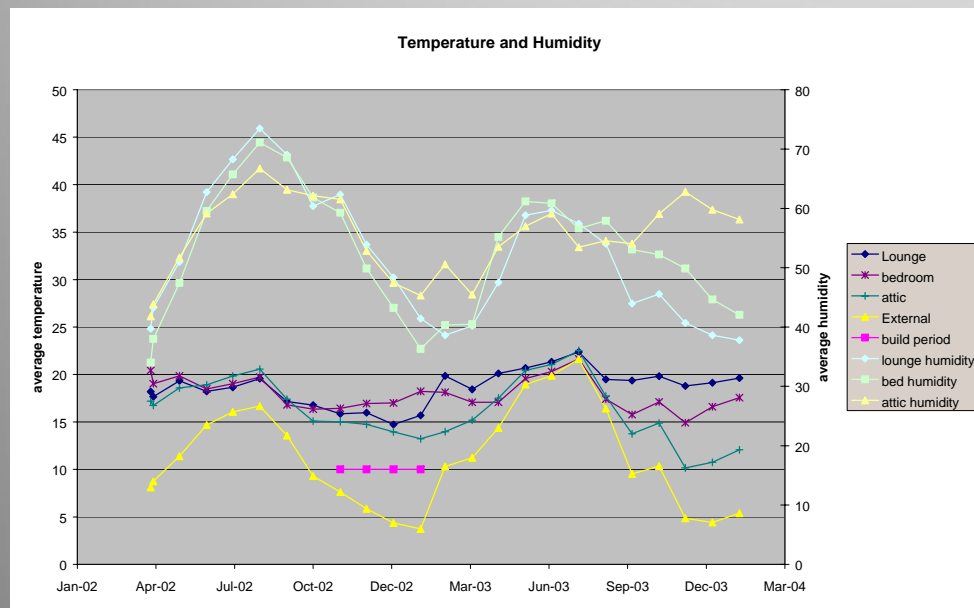
Thermal performance/Performance in use

- Traditional buildings are highly individual



Thermal performance/performance in use

Data Logging
Fuel bills
Fan pressurisation
tests



Thermal performance/performance in use

Thermal imaging Dampness testing



Manor Farm, South Stoke:
North Elevation.



Fourteen thermographic
images have been
etched together and
overlaid on the photo.
The close-studded
timber frame is clearly
defined.



The likely positions of
the timber frame
elements, based on the
thermographic survey
are shown overlaid on
the photograph.

Evidence for the
possible box-framing
to the east of the main
gable is very faint, and
is shown hatched.

Manor Farm, South Stoke: West Elevation



There is no evidence of any timber frame surviving within the west elevation.
There is a very faint indication that the tie beam and collar of the roof truss have been
retained within the masonry.

The second floor window has been reduced in size and the masonry between the
ground and first floor windows is very much thinner. This probably accounts for the
cracks visible in the render between the windows.



Thermal performance/performance in use

Occupant feedback

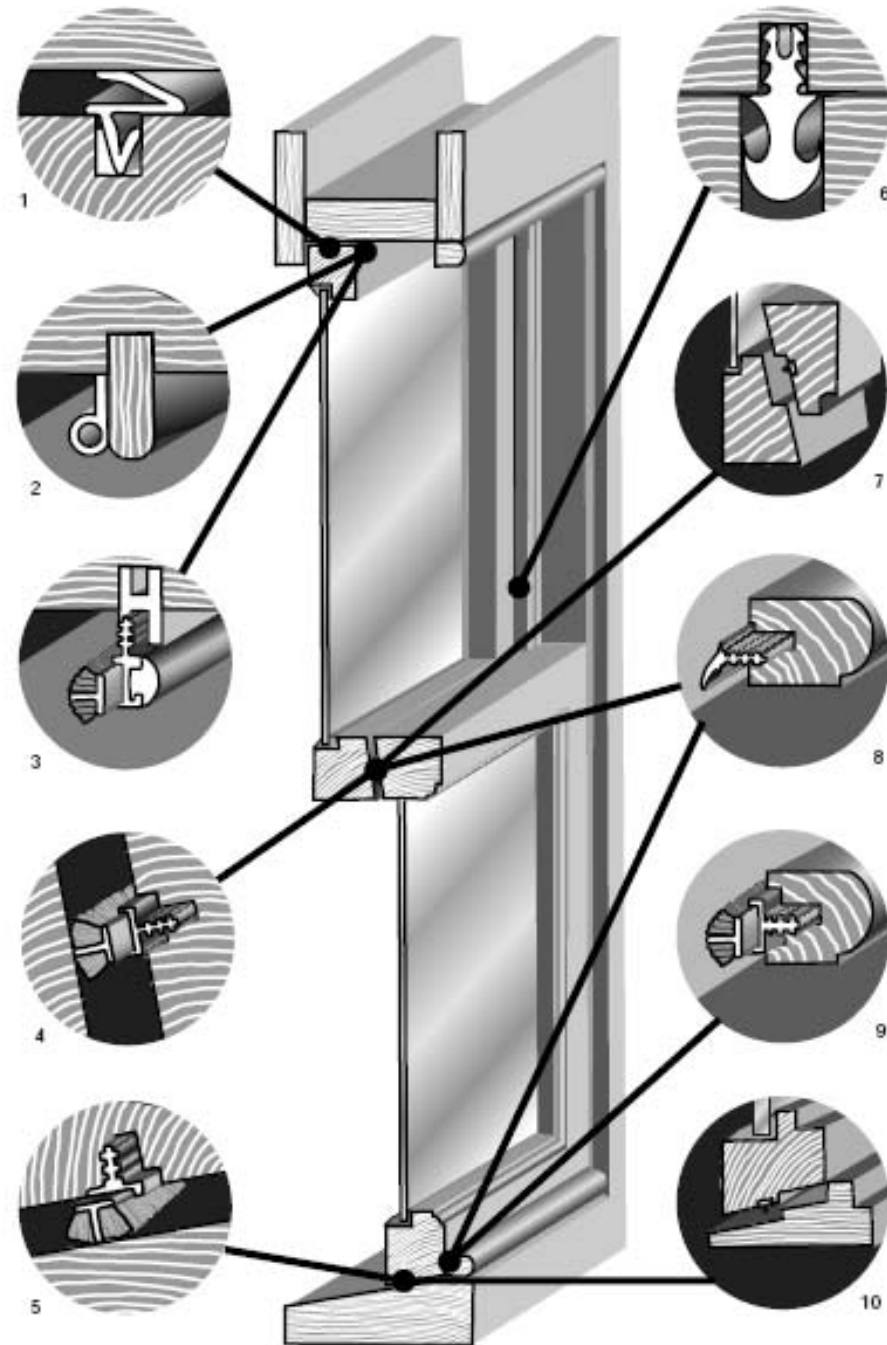
- Analyse usage patterns
- Survey user experiences
 - Staff / residents / visitors
- Compare to other buildings
- SBEM / SAP models





Draught-proof

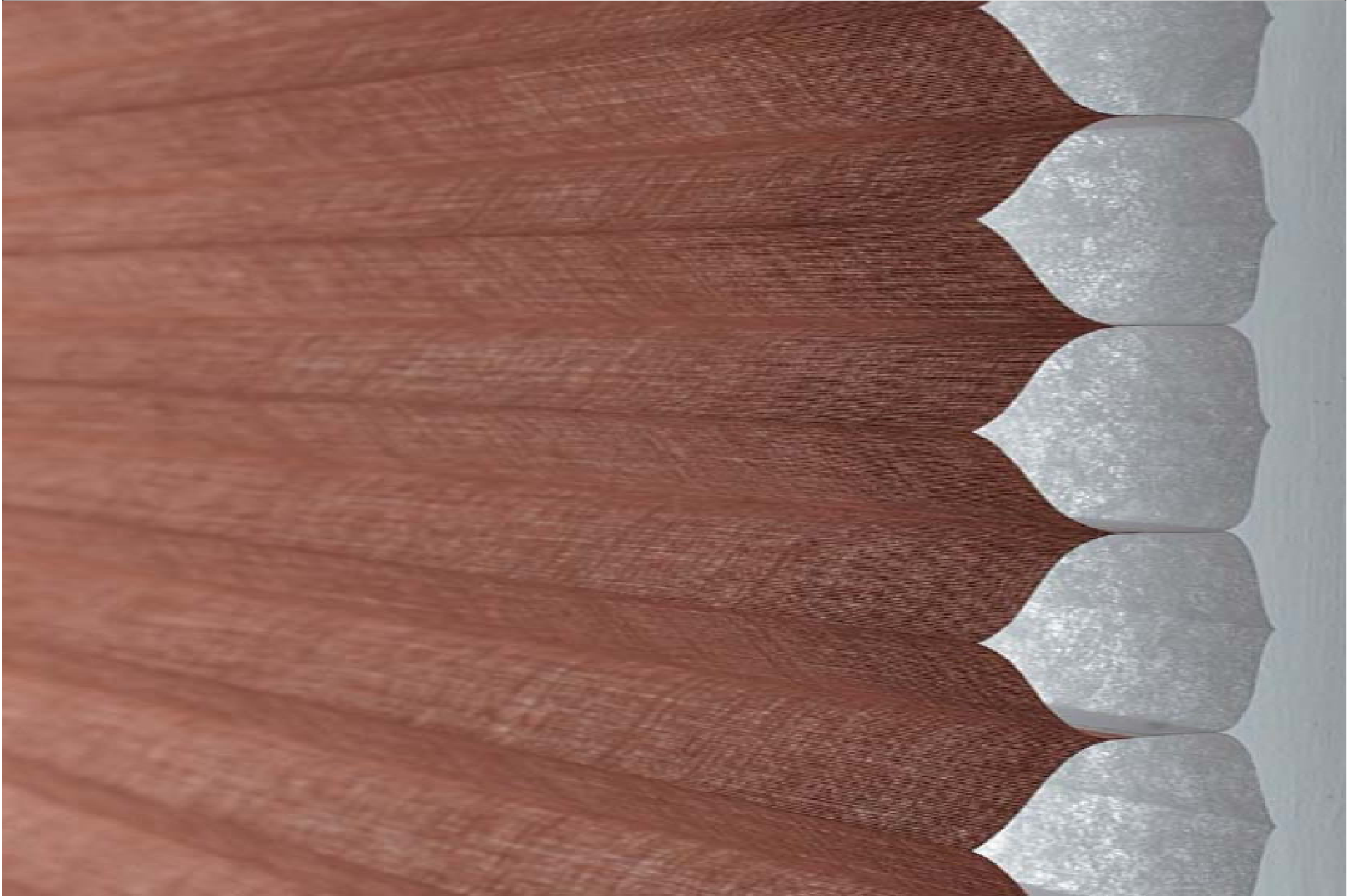
- Repair first
- Can bring 60-75% of savings of double glazing



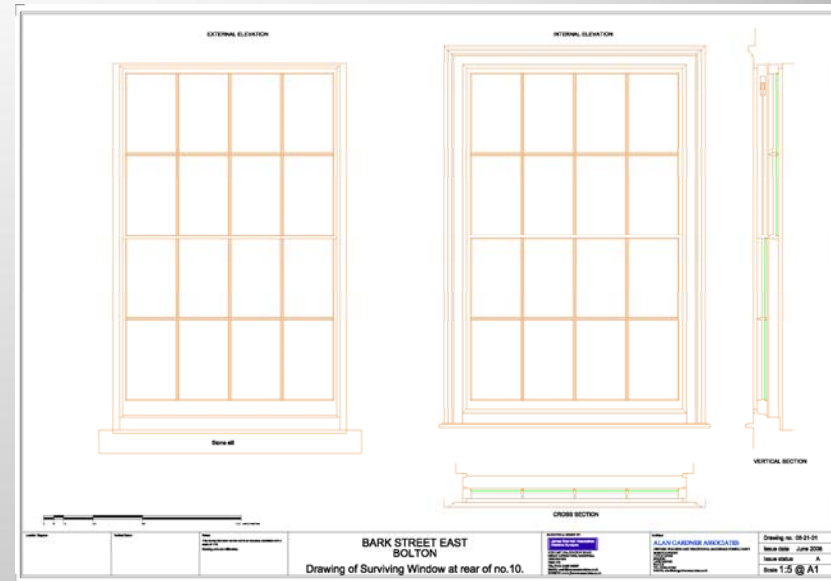




Thermal Shades



Bark Street East, Bolton



THI's: Bark Street, Bolton: philosophical contortions & restoration



Bolton Bark Street TH1 Exemplar



Bolton, Bark Street THI: Exemplar



The implications of making improvements:

- Change in performance
- Balancing reduced ventilation and the need for old buildings to “breathe”



Repairs provide
opportunity to
make
improvements



Make improvement
more cost
effective



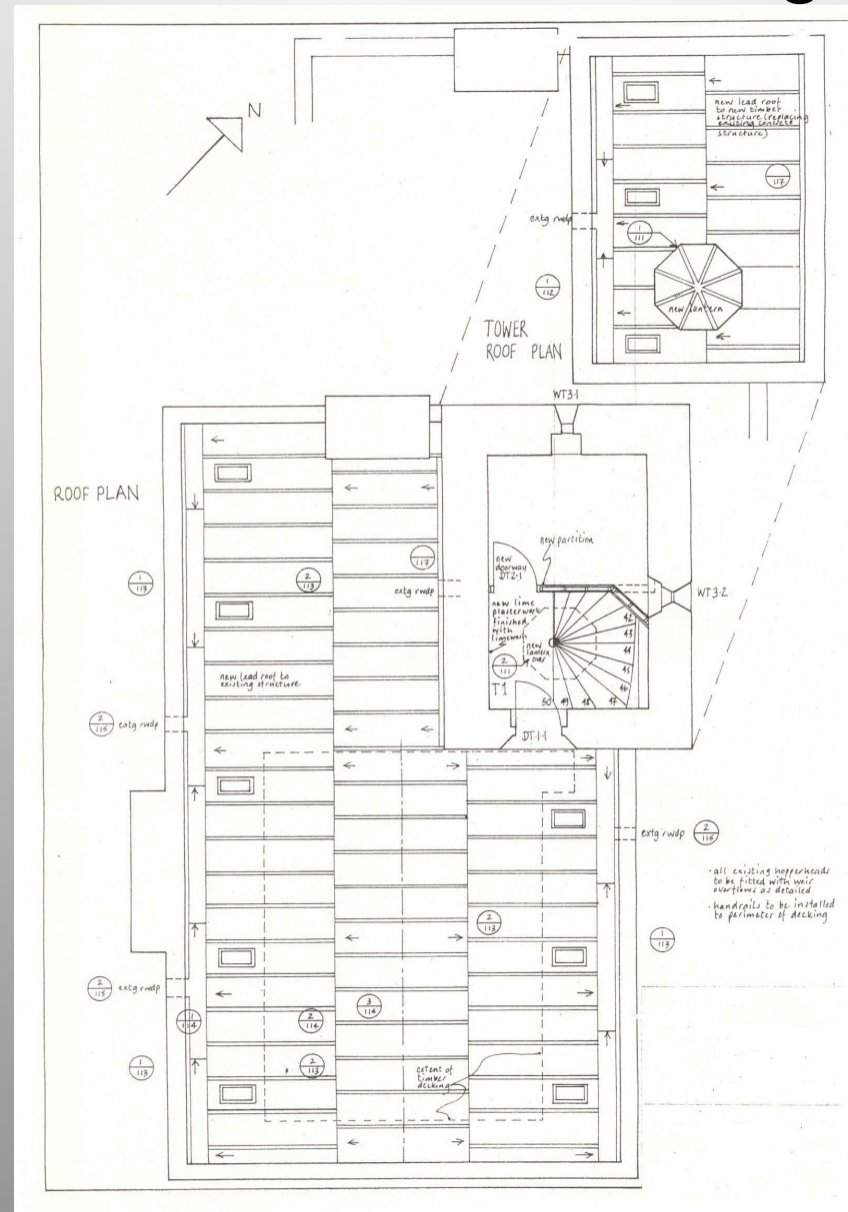
North Lees Hall, Hathersage Derbyshire



North Lees Hall, Hathersage

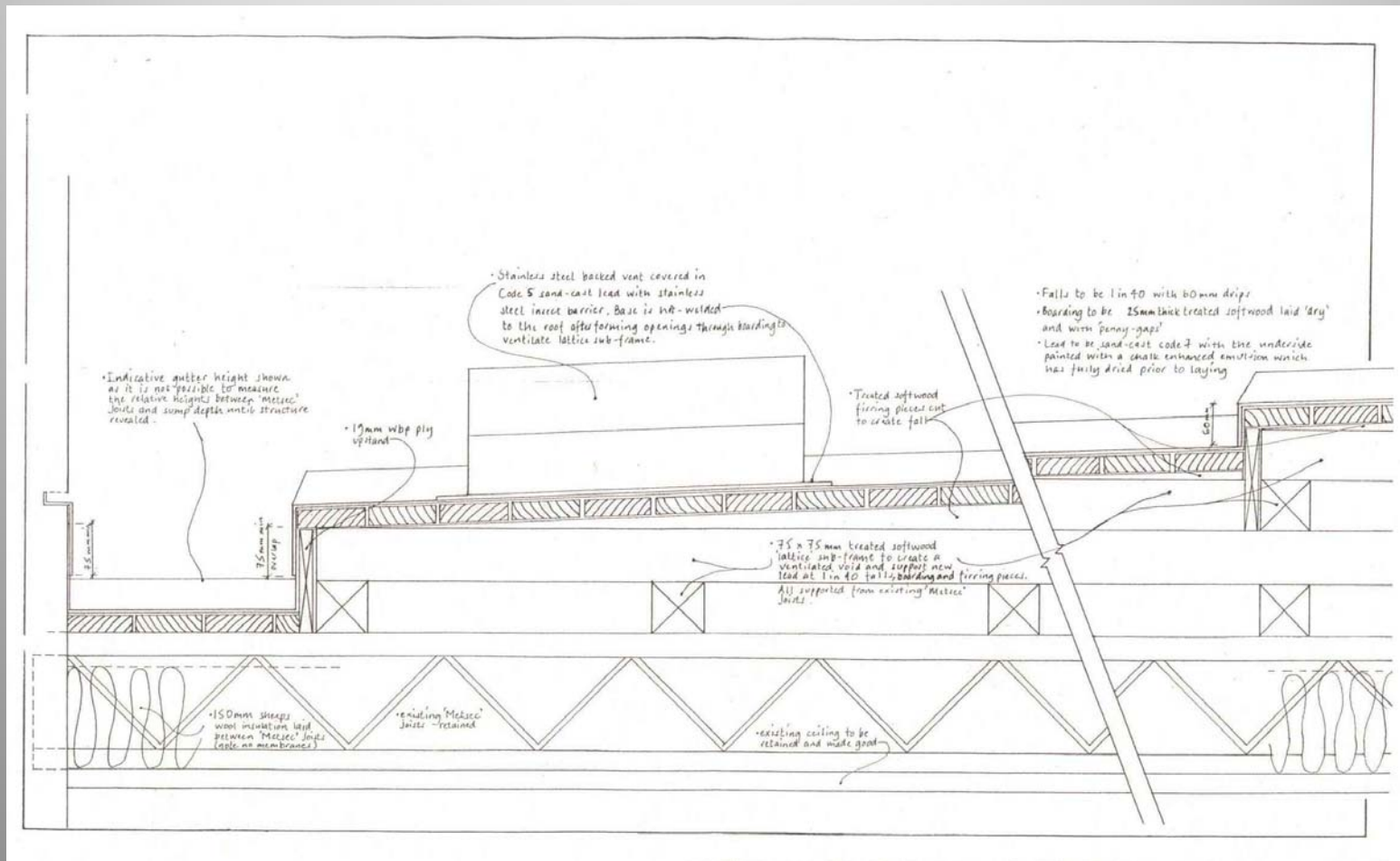


North Lees Hall, Hathersage: Roof Plan the role of drawing



North Lees Hall, Hathersage

Roof Cross Section: Project Development or Blind?



North Lees Hall, Hathersage

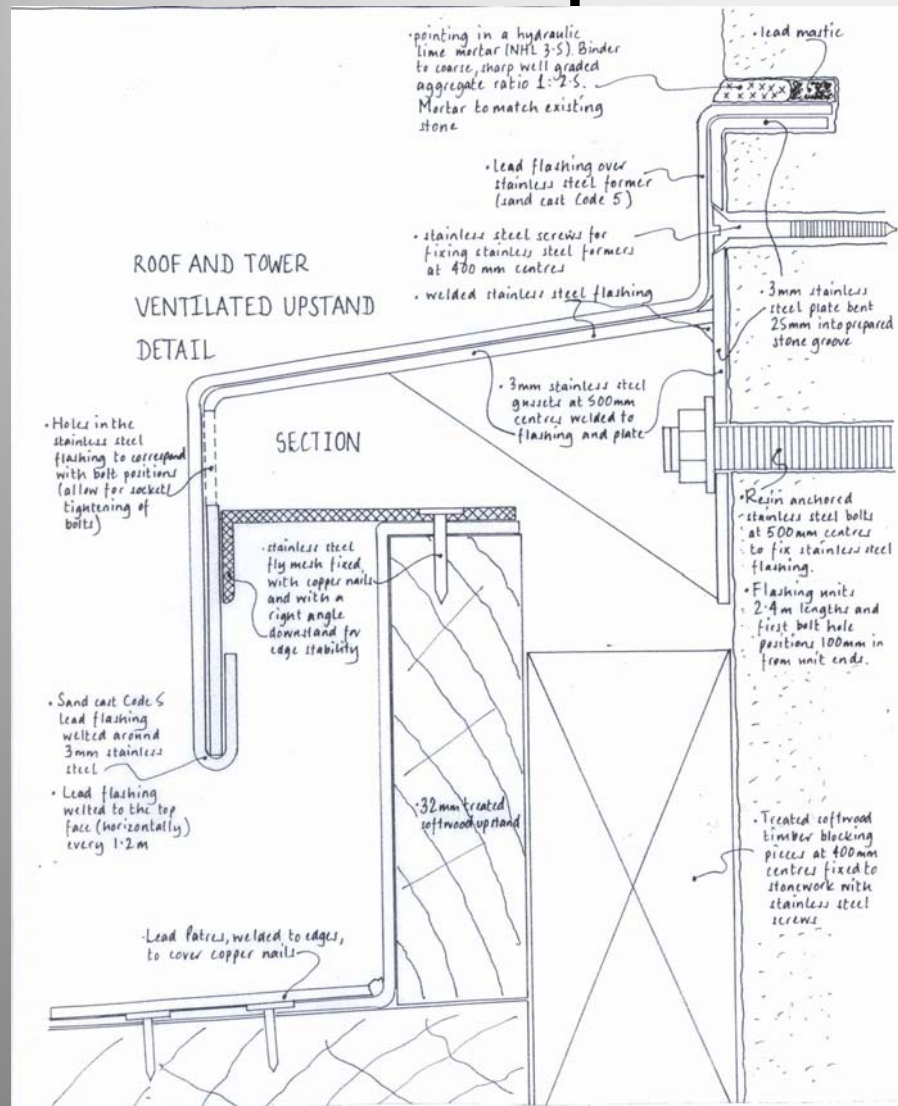


North Lees Hall, Hathersage



North Lees Hall, Hathersage

Upstand Detail

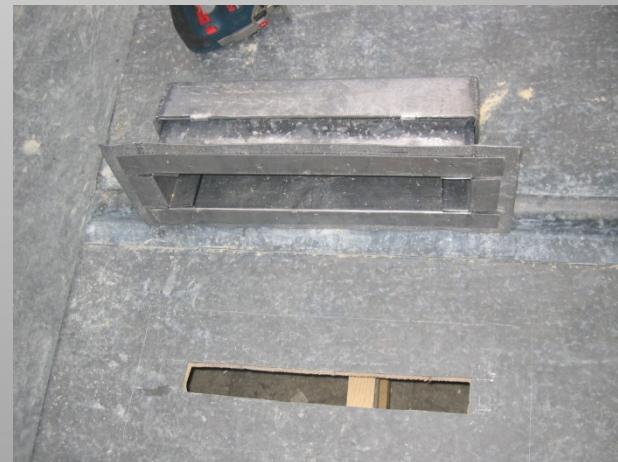
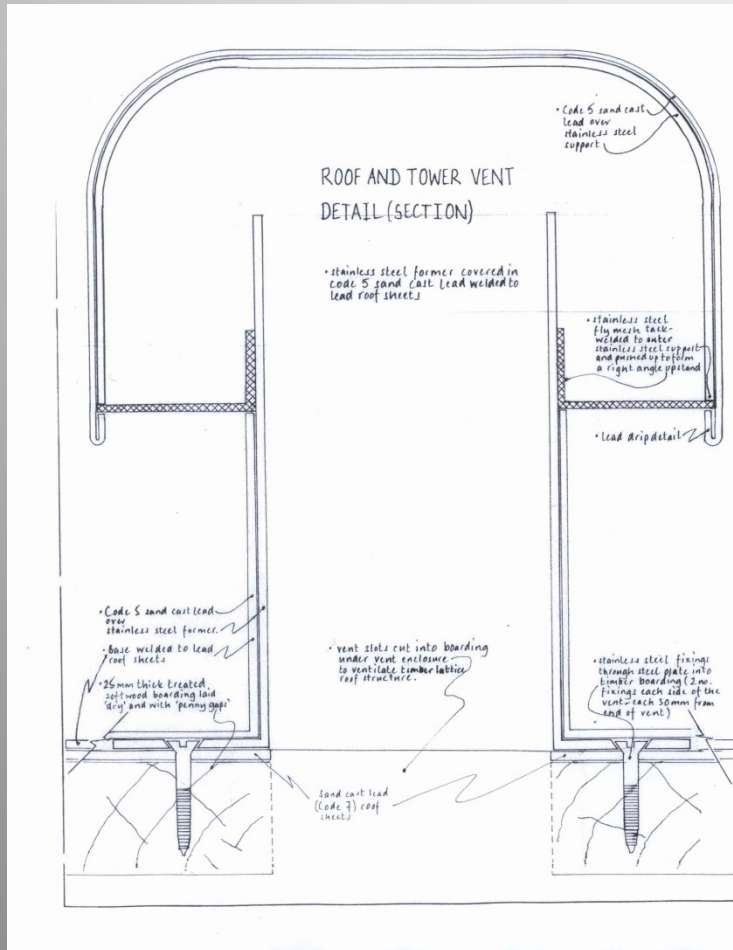


North Lees Hall, Hathersage: completed upstand detail



North Lees Hall, Hathersage

Vent Detail



North Lees Hall, Hathersage



North Lees Hall, Hathersage





Hermon Chapel, Oswestry



What is an appropriate improvement?

- Beware of trying to achieve the unachievable
- Base targets on an understanding of the building
- Do not rely on common misconceptions
- Bespoke solutions - avoid standard solutions



- Start with:
 - Lighting
 - Heating boilers & controls
 - Loft insulation
- Simple and relatively effective
- Are not in conflict with old buildings
 - Appearance
 - Performance





280
stainless





Disused Chimneys





Where does patina become soiling?



Don't panic ... but understand the
existing equilibrium!



But if there is an excess
(water, heat loss, etc.)



Stop (or at least reduce it) It!

By understanding causes and performance





Buildings as a physical manifestation of
positive human endeavours/palpable
expression of the human spirit



'Tingle Factor' and Trusteeship

