

**PROPOSED INTERNAL ALTERATIONS  
TO ATTICS  
TO CREATE  
ADDITIONAL HOTEL ACCOMMODATION  
AT WORTLEY HALL, WORTLEY,  
SHEFFIELD S35 7DB**

**FOR**

**WORTLEY HALL LTD.**

**Fire Compartmentation and Separation Strategy**

**1.00 BACKGROUND**

1.01 Wortley Hall was originally constructed in 1586, but the present building originates from 1742-6. It was the seat of the Montague family. Subsequent phases of development occurred in 1784-88 and 1867-73.

1.02 In the original range, to the South of the present house, there was a second-floor range of cellars. These have effectively been unused since the United States Air Force's requisition of the house ended in 1945.

After that, the Warncliffe Estate sold the building including the detached stable block to the Workers Educational Trust Ltd.

This organisation, supported from that day to this by various trades unions, restored the majority of the house to holiday accommodation.

My first appointment to that organisation was in 1989, and it is fair to say that a fantastic operation of upgrading and improvement of the fabric has taken place since, and the accommodation of the present Wortley Hall Hotel, operated by Wortley Hall Ltd. is of a very high standard, well meriting the AA Four Star rating.

1.03 The management of the Hotel instructed me to design proposals to bring the attic spaces back into beneficial use. Listed Building consent was obtained from Barnsley metropolitan Borough Council (Ref: B/99/0417/WO/LB).

1.04 An application for full plans Building Regulations approval was submitted to JHAI Ltd. (Ref: 236873/WK/17). After obtaining conditional approval of the application in July 2017, it was informally agreed with their representatives, Mick Clarke and Bilal Altaf, that full consent could not be granted until there had been some further opening up of the existing fabric, principally to expose the full existing nature and construction of floors and walls, so as to establish details for the required fire and acoustic separation and compartmentation.

1.05 After the partial opening up by the Hotel's selected Contractor, it became apparent that due to the complexity of the existing structure, the designed system could not be guaranteed to be installed sufficiently comprehensively to create a continuous barrier to the spread of fire and noise.

As any changes from that would require a variation to the scheme previously granted Listed Building Consent, a site meeting with the Barnsley Conservation Officer, Mr. Wiles, was arranged for 20<sup>th</sup> November 2017.

- 1.06 Mr. Wiles understood the position, and accepted that there would have to be a revised scheme to allow for the space to be brought back into beneficial use.

That would require a further application, for a revised consent, and that would need to include a Statement of Justification, as well as a full recording of the existing fabric material that would need to be removed. It is intimated that the application would be received sympathetically.

- 1.07 Following that meeting, a further detailed inspection and measured survey of the fabric as opened up was carried out, and a revised design to achieve Building Regulations compliance is now prepared.

## **2.00 PROPOSALS**

- 2.01 Further to item 1.07 above, Appendix A records that survey and the fabric as found/as existing.

- 2.02 Following consideration of that information, and particularly the dimensions and spacing of the structural floor members, a substantial literature review took place (see Appendix B).

- 2.03 The proposals for each room differ, because of the differing structural arrangement, and the differing extents of the amount of historic soundproofing and fireproofing remaining.

In proposed Bedrooms 1, 3 & 4, the whole existing floors are to be retained, with the required upgrading for acoustic and fireproofing applied over the flooring, because the existing headroom in these rooms so allows.

## **3.00 CONCLUSIONS:**

- 3.01 The opening up of the fabric of the affected parts of the building showed that it could not be guaranteed that the designed scheme, necessary to achieve fire compartmentation and acoustic separation of the new bedrooms from that existing on the First Floor, could be installed adequately to create a continuous barrier.

- 3.02 Alternative proposals are shown on the drawings attached (D/01 – Plan and D/02 – Construction Details).

- 3.03 Consent is sought for these proposals as a variation to the previous conditional Building Regulations approval and Listed Building Consent.

ANDREW SHEPHERD ARCHITECT  
CHARTERED ARCHITECT, SURVEYOR,  
453 GLOSSOP ROAD,  
SHEFFIELD,  
S10 2PT.

TEL: 0114 266 2458  
E-mail: [info@andreshepherdarchitect.co.uk](mailto:info@andreshepherdarchitect.co.uk)

14<sup>th</sup> February 2018  
ADWS/TJC

---

## Appendix A:

- 01 Further to **Background** set out in the preceding document, this section sets out the detailed recording of the fabric and structure of the building as opened up, so as to inform the detailed constructional changes needed to achieve both fire and acoustic compartmentation/separation of the additional guest accommodation which is to be formed for the current unused attic ranges.

Andrew Shepherd, Dip. Arch., Dip. Cons., R.I.B.B., I.H.B.C. carried out a visit on 6<sup>th</sup> December 2017 to survey the existing floors now they had been opened up so as to devise a methodology of producing the necessary fire precautions and acoustic separation required for the residential use of the rooms.

The scope of those studies is shown on the attached drawing P/06.

### 02 Proposed Bedroom 5:

In general terms the existing floor decking has been stripped out. This shows existing lime ash pugging over lath between the **joists** spanning between substantial floor **beams** which span North to South. There is a void and then to the underside of the substantial beams are a further set of **joists** (also spanning East to West) supporting the ceiling below. The pugging has been broken out in places normally where there have been services installations. Otherwise it appears to be generally in sound condition. There are a number of panels where it has gone completely and others where it is partly damaged.

The two roof trusses within the space are built down to corbels which are then built into the external North and South walls. Previously the walls have been rendered so presumably they were originally part of the space which subsequently then got "cupboarded out" during the Victorian works in this area.

The **partitions** into the proposed additional bedroom space and bathroom space to the West side of the main part of the room have been stripped exposing the layout of the studs and the collars of the formerly enclosed roof truss. Detailed rather differently to the other two trusses running across the room.

The **ceiling** lining has been taken down exposing rather ad hoc construction of the roof. There is now what appears to be 'Monarflex' impermeable felt underneath the roof slating.

There are very substantial baulk **purlins** on the outer South slope and another roof covered over by the dormer extension presumably at the time of the Victorian reorganisation of this space on the North side of the store. There is substantial evidence of water penetration around that dormer from which all the underdrawing has now also been stripped.

**Rainwater pipe** from the bottom of the pediment to the South side running along the South wall is going to need to be boxed in and insulated.

The **roof structure** shows signs of previous change with what appears to be the strut of a former truss being cut out and replaced with a bodedged system leaving a post.

The Easternmost **floor beam** is 300 x 200 mm wide and from the masonry wall partition back to Bedroom 4 to the approximate centre line of the beam is 1865 mm.

The centre line of the next Westerly **beam** is 1590 mm from that.

The next **beam** is some 1750 mm from that to its centre. This is an archaic beam with some evidence of beetle infestation not sawn like the other two but probably adzed. It has a shake to it. Unable to

obtain access for because of infilled debris to find out its depth. It in turn is 900mm from the similarly 300 x 200 mm collar to the truss which was formerly the wall partition to the West of the space. The joists between those two beams are again older 100 x 70 mm but laid over on their side so they are only 70 mm deep but they are at 330 mm centres. They are part morticed over the truss collar.

The **existing floor joists** (Detail C, Drawing D/02) of the space are 100 mm deep x 75 mm wide timber (oak/deal?) at approximately 420/430 mm centres.

The pugging laths are fixed to battens set down 55/60 mm from the top surface of the joists, substantially nail fixed into the sides of the joists with those battens being 50 x 30 mm. The lime ash itself is some 30 mm thick and as stated previously its top surface is set down some 25 mm from the top surface of the joists. This seems fairly consistent throughout the space. A sample of the material shows it to be lime ash **pugging** with considerable amounts of lime and cinder in it. Sample taken for possible future analysis if required.

The **ceiling joists to below** are not set out in as regular a fashion and certainly don't coincide with the floor joists to the Attic space above. The depth of the void is something in the order of 330 mm. Those ceiling joists are something in the order of 75 mm deep x 50 mm wide at about 400 mm centres. They appear to be fixed half rebated under the substantial beams or dove-tailed into the side.

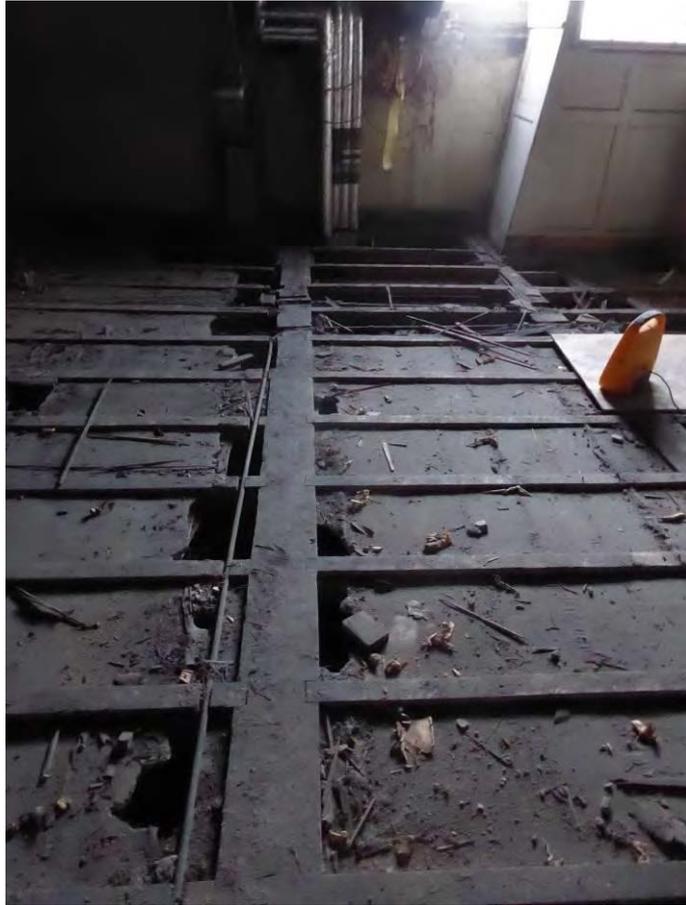
The floor rafters are similarly rebated into those beams, some with birdsmouth joists and others just with simple squared mortices.

There has been some damage to the top of joists with services chases made in them, but they do not generally exceed 25 mm and are generally close to the beam fixings of the joists rather than midspan.











The space for the **door opening into the Bathroom** could be formed relatively easily by removing two of the studs above the upper collar to create an opening 900 mm wide and then to brace the cut ends of that truss down onto the beam below. Headroom would be adequate but it would need to be a purpose made door. The other door opening into the proposed additional Bedroom space will similarly require the removal and relocation or removal of one strut above and one strut below and the relocation of one probably to the right-hand side. The existing opening is only 800 mm wide. That is the clear face to face dimension between the studs. The studs themselves are set onto the East face of the upper collar and morticed in something in the order of 30 mm. (Since the survey was carried out, the openings have been made in accordance with the proposals of Capstone Consulting Structural Engineers (See Appendix C).

The solid hearth to the **fireplace** still remains in situ, probably in the same pugging material but taken up higher to be flush with the original boards rather than recessed. No reason not to leave it as it is. Similarly, the fireplace itself.

There is collapse of the flooring joists in the South West corner of the space which will need to be investigated and presumably joist hangers or replacement timbers.

There is a run of service pipes and modern installations with insulation which will need to be dealt with in the centre of the North wall of the main space be built in.

Fireproofing of the stair head enclosure to be properly considered.







In the **Roof Void** beyond this truss to the West the floor structure (as Detail A, Drawing D/02) comprises **joists** to a lower ceiling being 200mm deep x 100mm wide at approximately 1000mm centres. The **joists** running North South across those are 85 x 75mm at 400mm centres. The **ceiling joists** to below (defining a void from the top of the floor joists to the topside of the plaster of 360mm) are 50 x 75mm at 300mm centres. In the space there is also a section of substantial beam which looks like a composite of some sort about midspan. The **floor joists** are 1 third/2 thirds morticed bearing onto some of the substantial timbers. The principal beams run East/West.

There was originally a lime ash floor to this space, which was regrettably broken out by the Contractor prior to my detailed inspection.

The existing rainwater disposal pipe running through the space needs to be rerouted.

There is what I presume to be a vent stack from below which will need a proper Durgo valve putting on it or alternatively a vent taking out through the roof.

Debris will need to be cleared from the void. No pugging or anything of this nature here. Certainly, there is parging debris from the underside of the roof slates which has been just left in the void.

The walls are rendered which suggests the space was always "inhabited" albeit through the access trap which existed in the truss.

**Upgrading Strategy:**  
(as Details B&D, Drawing D/02)

**Pugging existing and in good condition:** Leave, calculating that the combined existing lath and plaster ceiling and the pugging as described will achieve 60 minutes fire resistance – structural and integrity.

For acoustic separation – lag over the joists 100mm wide strips of Acoustic Resilient Foam, and then overboard complete, spanning across the joists with 40mm thick Karma Masspanel available from SIG or CMS Danskin Refurbishment.

**Where pugging is missing/destroyed:** Clear all debris, then relocated existing (or supplement with new) battens supporting pugging down to align with bottom face of floor joists/beams. Over battens, fit Karma TMF70 Stone Fibre Batts (Appendix D), to align flush with the top face of the floor joists/beams, sealing the joists between the batts and sides of the joists/beams (as possible) with Karma EX240 sealant (Appendix D).

Both materials available from SIG or CMS Danskin Refurbishment.

Over the retained top surfaces of the joists lay new floor decking as described above.

### 03 Bedroom 4

The existing ceiling plaster ripped out unfortunately already including the lath. There is much less headroom. Cupboards along the South wall are all removed and similarly on the North wall. Timberwork generally more ancient though the timbers to the **roof** are sawn rather than adzed. Some beetle infestation. Substantial purlins which are trenched. Timber is pegged and fairly substantially so. A collar has been removed to create headroom and raised presumably at the time of the Victorian works.

A dormer or similar has been formed into the roof space I think over the top of the trusses for the whole bay width.

The void underneath the flat roof outside is exposed. It will need to be insulated very substantially as this is now an external wall underneath the slates.

The South roof slope including over the pediment of the principal elevation has got sarking felt to the West side but not to the East. Very substantial water penetration has occurred though the under sarking boarding which is leached with salts, but in fact through a hole, it can be seen that there is in fact sarking felt above. This presumably is therefore all historic decay.

As a result of that damp, there is beetle infestation in a number of these timbers but no evidence of any deathwatch beetle infestation can be seen. They will all need to be cleared and cleaned. It is believed that the roof structure is all going to be retained with space underneath used for cupboards.

Headroom very much an issue in this space as there is a bare two metres underneath the existing already raised collar of the truss. I suppose it could be raised a bit further if it was required. The central truss one could be as well or replaced with perhaps a metal tie/brace at a higher level.

Roof rafters here 125 x 50 mm at 460mm centres. The roof/ceiling joists above are 125 mm deep to the underside on the South slope but only 80 mm on the North side. But beyond that they go back to 125 mm with fillets on top.

Standard kingpost trusses are reinforced with metal fairly crudely. I suspect it may be earlier work rather than Victorian.

The two roof trusses line up with the sides of the dormer window on the North elevation. There is a further truss which is going to form a part of the dividing wall at the change of levels down to Bedroom 3.

Exposed chimney with stonework built into the brickwork. Some salting. Obviously been water penetration as the plaster below is damaged.

A cupboard broken out in the North East corner of the space shows the **double floor construction** to below. There is another trap in the middle of the floor but this is less instructive. A hole has been broken under the roof void area which shows the same 32 mm lime ash flooring though again it is not possible to see any lath here as yet.

There are a couple of what are presumed to be service traps in the floor. No floor joists exposed except in the roof void area, but these offer an understanding of depths and frequency/spacing.

The lime ash floor finish itself does bow and dip about a bit and there is a substantial cracked area which has previously been repaired with cement running from an infilled service trench. This material appears to have been overlaid on the original work below so presumably this is actually some sort of Victorian insertion of sand screed cement very much like that in Bedroom 3. The original work in the South side of the room is broken up where it comes to the wall and presumably there has been damp and when it's been enclosed behind plaster in the modern era.

The walls behind it are coursed stonework which have been given a worked finish, presumably for an original exposure or the limewashing of the walls.

In the former cupboard space in the North East corner where the cupboards have been broken out and the floor structure is exposed, it can be seen there are substantial **beams** though not collars to the trusses which with a sort of cantilevered detail which seem to be in the order of 300 x 100 mm but it is not possible to see the one next to it, so they will be set out at very large centres.

The **floor joists** above are at approximately 1m centres. The depth of them is indeed 100 x 250mm.

The **ceiling joists** below also spanning East/West as do the floor joists are the same 75 x 100mm at 320 mm centres. Only the top side of the plaster soffits can be seen.











Inspection of the opposite void in the South West corner shows **floor joists** also approximately 75 x 100mm at 500 mm centres. There is no similar setting out of the ceiling joists below something like 300 mm.

Did not investigate the formerly enclosed space in the extreme South West corner as I believe the floor is unsafe there, as it is considerably broken up. Seems to show the same construction but with 125 x 50 mm joists on their sides spanning with lath over them. I do not believe this space is to be brought back into beneficial use.

**Upgrading Strategy:**

*(as Detail F, Drawing D/02)*

**Where existing boarding pugging remains (mainly):** lay floating floor over, to comprise non-compressible geotextile layer and re-laid/salvaged 22mm square edged boards.

**Where pugging is missing/destroyed:** Clear all debris. Cut back any remaining pugging to centre-line of floor joists to either side and fix stop battens to the top of the beams to the depth of the lime-ash floor/pugging (as shown on Detail F – Alternative). Then relocate existing (or supplement with new) battens supporting pugging as necessary to allow for fitting Karma TMF70 Stone Fibre Batts (Appendix D), to align flush with the top face of the lime-ash floor/pugging, sealing the joists between the batts and sides of the stop-battens (as possible) with Karma EX240 sealant (Appendix D). Over batts, lay new floor boarding on geotextile layer as remainder of room.

**04 Bedroom 3:**

Probably going to be the most problematic to ensure Building Regulations compliance as the lime ash **floor** is in generally adequate condition throughout. I believe in fact it is a Victorian overlaying. No holes in it to be able to find out but there is one service trap and another infilled presumably former service trap hole.

The **roof** timbers are generally all enclosed with lath and plaster over the mid-span purlin. On the South side there is an area now stripped out exposing the rafters and undersarking boarding. Deathwatch beetle infestation in these areas. Presume the **truss** members are the same as in the

adjacent Bedroom 5 with the plastered collars not actually supporting the truss but a corbel in the wall does the task but this cannot be proven until a bit more casing is taken out.

Awkward service pipe on the North wall which will require more than a bit of trouble.

Sufficient headroom under the two collars to achieve fire/acoustic overboarding over the top of the existing floor.

Problem then arises with necessary sloping of the floorboarding level back to the corridor access outside, presumably with a hardwood shaped fillet under the anticipated carpet finish.

Fireplace to be retained presumably with its hearth which is now integrated at the same floor level as the lime ash.

Floor to ceiling from the underside of the truss collars to the top of the existing lime ash is only 2070 mm. Where the plaster casing has been removed at one end it can be seen that the lath and plaster there is probably of an overall thickness of something like 20 mm, so if that was removed it would give clear height of 2090 mm.







**Upgrading Strategy:**  
(as Detail F, Drawing D/02)

Damaged/missing floor areas: to be repaired and upgraded as described for Bedroom 4.  
Undamaged areas: overboard etc. as Bedroom 4.

## 05 Bedroom 2:

Certainly, part of the original earliest phase of the construction of the house. Fabric in very poor condition following a lot of water penetration in the South East corner leading to deathwatch beetle infestation of the timbers. Decay of the original plaster which had been limewashed. Wallplate in poor condition. Wall directly underneath a gutter. Deathwatch beetle infestation around the existing rooflight. Part of the ceiling is still underdrawn. Sagging ceilings probably need underboarding. New rooflights are to go in.

The **floor** construction is lime ash in actually much better condition than when previously discussed. A lot of debris from reroofing presumably in the North area. Decayed dragon tie now not supported any more. Collar onto a post to come down to create level access and to remove part of the canopy there.

The floor is set down something in the order of 50 mm from the timber floor of the corridor adjacent.

Solid **masonry wall** to the Bedroom 3 adjacent. Framing of the **partition wall** onto the corridor is fairly cursory with single lath and plaster to both faces with hair something like 18 mm thick inner face and less it would seem to the outer face. Hole bashed through!! It needs to be stressed to the contractor the importance of keeping the studs and to overboarding them in the corridor side to increase the fire resistance and acoustic separation as previously specified.

New door access to be formed from the corridor. It is suggested that the flat ceiling is retained.

Inspection of the floor void could only be made by "hidden" photographs taken into openings, as the pugging is mostly still in position. Lime ash actually not in bad condition, cracks in it, services installations caused trenches through it.

Large heating pipe around the perimeter to be dealt with.









**Upgrading Strategy:**  
(as Detail F, Drawing D/02)

As for Bedrooms 3 and 4 for undamaged and damaged areas of existing pugging, which is to be retained as possible.

## 06 Bedroom 1:

The existing lime ash **floor** in this room has been overboarded with plywood.

Small trap on the North side against the studwork partition to the void against the eaves of the roof there shows it to be the same lime ash 32 mm over lath, but it is not possible to obtain access to inspect/measure the joists.

Principal issue in this room is the floor to ceiling height underneath the central truss collar which at present time is 1825 mm. Problem. If the beam casing is removed to expose the timber it's going to be something in the order of 1840 mm. Waiver under the Building Regulations? Alternatively, to be retained "as existing"?

The step up to the threshold of the hatch through to the proposed Bathroom in the existing adjacent roof void is 540 mm.

There is a hole in the **ceiling** underdrawing of the roof plane, showing it is fixed directly to lath and plaster directly to the underside of the timber sarking board to the roof cladding.

In that present Roof void (proposed Bathroom) there are floor joists running North to South which are 50 x 75 mm at approx. 460 centres. These span something in the order of 1960 mm from beams to beams running East/West, from the solid partition wall to the collar of the first truss around the back of the curved chimney stack, and these are 120 x 200 mm deep. No floor joists, presumably those will go over those larger beams.

The space between the top of the ceiling joists below and the top of the beams/floor joists here at present is 140 mm.







**Upgrading Strategy:**  
(as Details H & J, Drawing D/02)

**Bedroom:** Retain existing plywood overboarding of existing pugging over double floor/ceiling construction, and apply new floor over, as Bedrooms 2, 3 & 4. Feather off ramp in access corridor from stair head.

**Bathroom:** Between existing ceiling joists to First Floor ceiling, install Karma TNF70 Batts (Appendix D), as described elsewhere. Above those existing ceiling joists, lay new 75 x 175mm C24 floor joists (as Structural Engineer's detailed drawing P627/10 – Appendix C). Over new joists lay KARMA Masspanel (Appendix D) on Resilient Acoustic Strips as Bedroom 5

ADWS/TAM/TJC  
14<sup>th</sup> February 2018  
03.22.15-16

## Appendix B:

### Bibliography/References:

Ministry of Housing, Communities and Local Government.: *Building Regulations: Approved Document Part B: Fire Strategy: Volume 2: Buildings other than dwellinghouses (2006 edition incorporating 2010 and 2013 amendments.)*

Kincaid, S. *An investigation into the fire safety management of historic buildings.* (unpublished dissertation accessed from Sheffield Hallam University Research Archive at <http://shura.shu.ac.uk/7603/>)

Derbyshire Fire and Rescue Service: Heritage Premises: *Fire Safety Guidance* (2015) (accessed at [www.derbyshire-fire.gov.uk](http://www.derbyshire-fire.gov.uk))

London Fire Brigade: *Fire Safety Guidance Note GN80: Heritage and Buildings of Special Interest* (Revision O, 2015) (Accessed at [www.london-fire.gov.uk](http://www.london-fire.gov.uk))

Historic England: *Fire Research Database* (Accessed at [www.historicengland.org.uk](http://www.historicengland.org.uk))

Institute of Fire Engineers: *Fire Safety in Traditional Church Buildings*, (2017)

Emery, S: Presentation to ASCHB (2016): *Fire Protection for Heritage Buildings*.

European Fire Protection Association: *Managing Fire Safety in Historic Buildings: CFPA – E Guidance 30: 2013F* (2013)

Cooke, G: *Upgrading the Fire Resistance of Floors and Doors in Heritage Buildings.* (Symposium paper, Kyoto, Japan 2003, accessed at [www.cookeonfire.com](http://www.cookeonfire.com))

Heritage Council of New South Wales, Australia: *The Fire Resistance of Ceilings/Floors Systems Commonly Found in Heritage Buildings* (1993) (accessed at [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au))

Building Research Establishment: *BRE Digest 208 Increasing the Fire Resistance of Existing Timber Floors*, Watford, 1988.

Building Research Establishment: *Guidelines for the Construction of Fire Resisting Structural Elements*, Watford, 1988.

Hertfordshire Building Control Technical Forum: *Fire Resistance of Floors with Lath and Plaster Ceilings, Technical Guidance Leaflet No. 27* (2015) (accessed at [www.welhat.gov.uk](http://www.welhat.gov.uk))

Brighton and Hove Council: *Supplementary Planning Guidance SPE19: Fire Precautions Works to Historic Buildings*, (2004)

Historic England: *Fire Safety Engineering in Historic Buildings (draft)*, (undated)

Davidson, M.: *Fire Safety Engineering Techniques in Historic Buildings*: presentation IBCI Conference, Athlone, 2012

Various manufactures' technical literature.

## **Appendix C:**

### **Structural Engineer's Proposals:**



Project		
<b>Wortley Hall Attic Alterations</b>		
Drg. Title		
<b>Bed 1 En-Suite proposed floor</b>		
	Date NOV 2017	Drawn JR
Drg. <b>P627/10</b>	Revision	

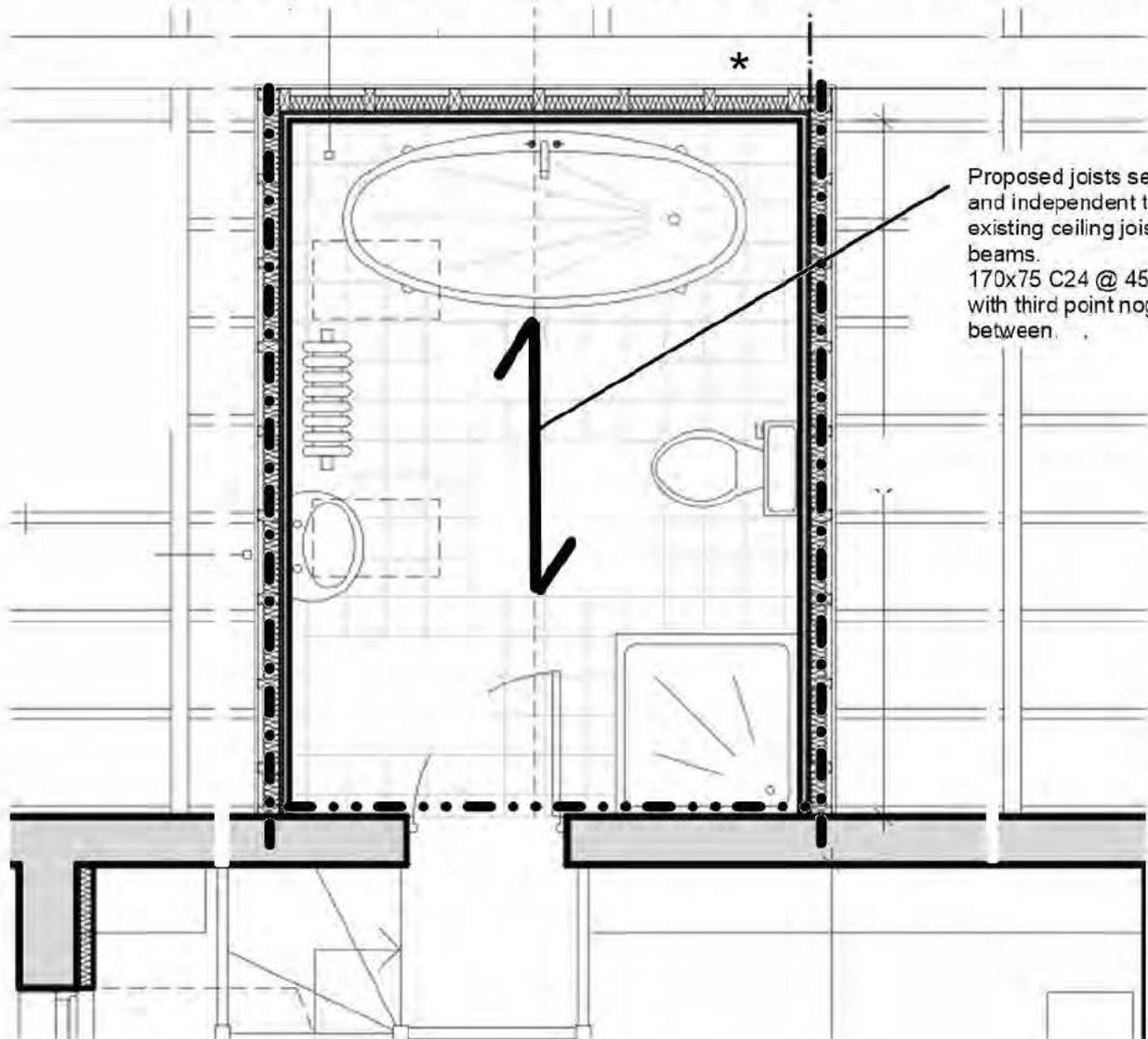
Home Farm Hollinsclough, BUXTON SK17 0RH Tel: 01298 83151  
www.capstone-uk.com © Copyright 2017

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND WITH THE SPECIFICATION

Extract from P/02 rVC marked up up to show proposed floor structure for En-Suite to Bedroom 01

●●●●●●●● 170x75 C24 wall plate. Mid depth M16 resin anchors, 175 long in Rawl RK-F2 resin at max 450ccs. Simpson Strong Tie SAE 380/76 joist hangers to joists. Fix in accordance with manufacturer's details

●●●●●●●● Doubled up joists centred on proposed partitions: 2no. 170x75 C24 with 6no. equally spaced M12 through bolts, alternating top and bottom. Bear min 120 into pockets in brickwork. Bearing onto truss tie chord: Simpson Strong Tie SAE 500/150 joist hangers to joists. Fix to truss with 4no. M12 coach screws, 75 long in the 4no. joist hanger holes. Use all nail holes to the joists, fitting in accordance with manufacturer's details.



Proposed joists set above and independent to the existing ceiling joists/upstand beams.  
170x75 C24 @ 450 max ccs with third point noggins between.

\* Existing timber truss - diagonal strut is missing at this location. Install a new diagonal strut, to be tight fitting, sized to match the existing strut on the left hand side. Grade C24. Hold in place using pair of M10 coach screws, 150 long, to each end, positioned to drive through strut and anchor into the supporting timber beyond.

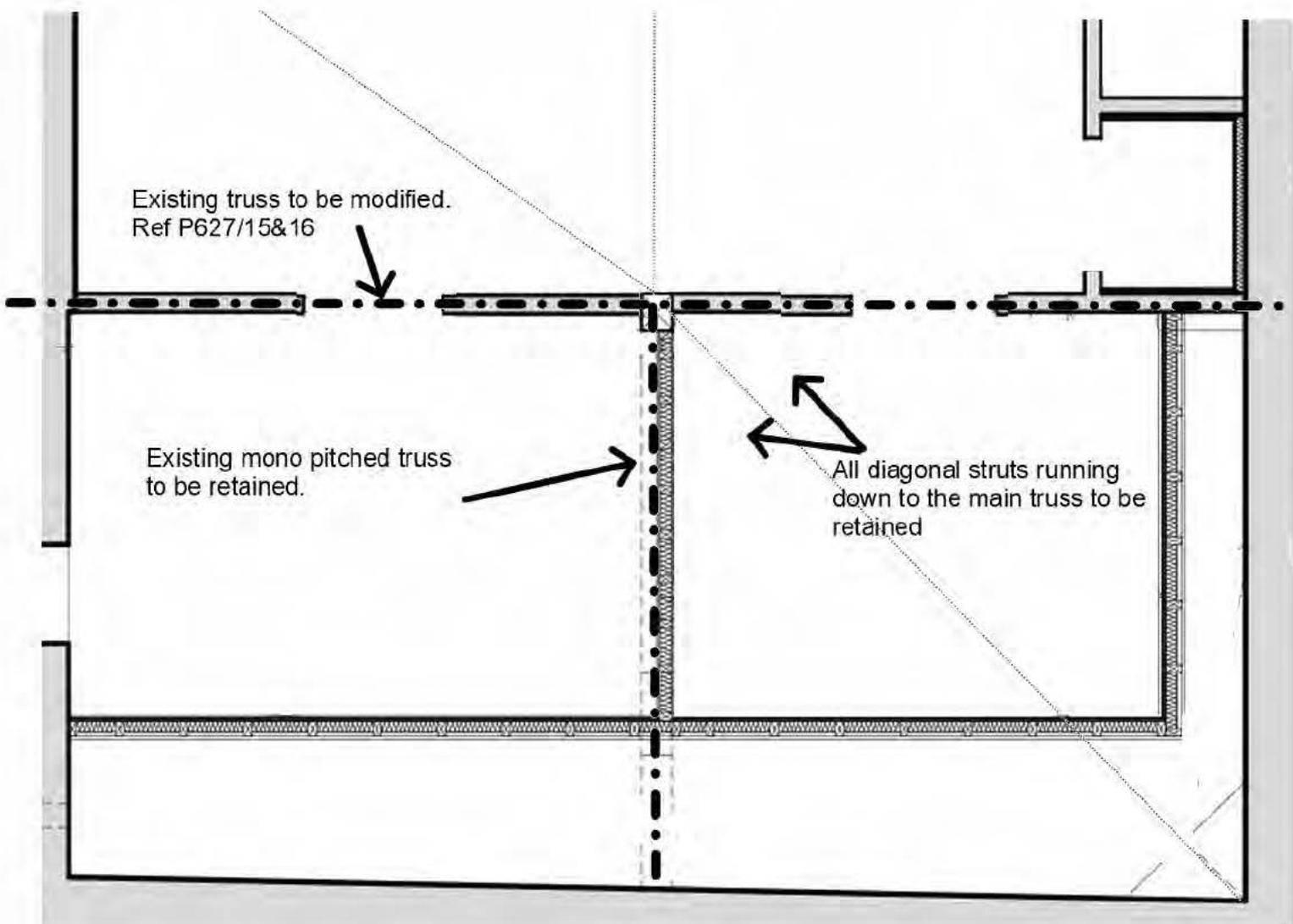


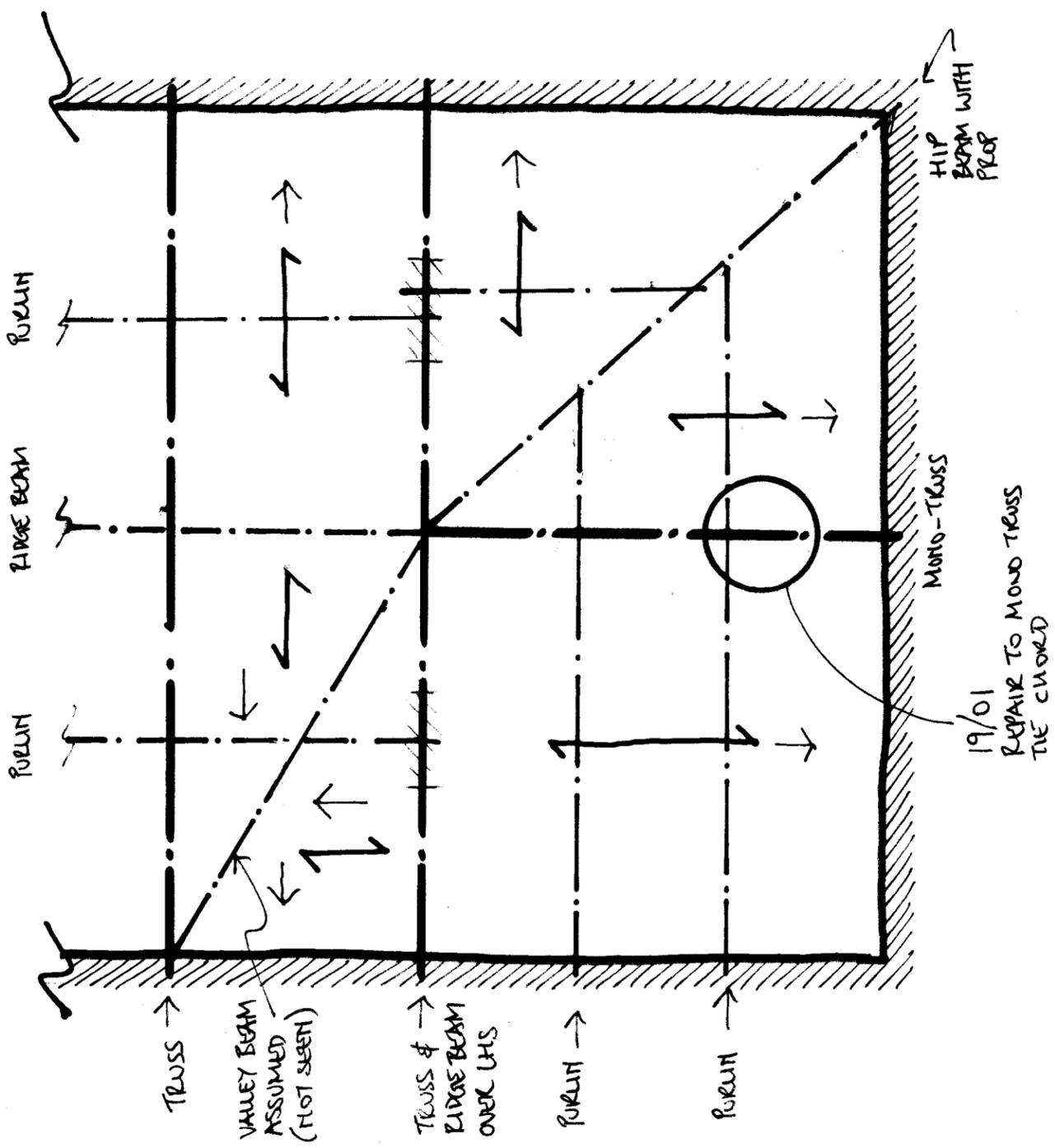
Project		
<b>Wortley Hall Attic Alterations</b>		
Drg. Title		
<b>Bedroom 5 Truss Alteration</b>		
	Date NOV 2017	Drawn JR
Drg. <b>P627/15</b>		Revision

Home Farm Hollinsclough, BUXTON SK17 0RH Tel: 01298 83151  
www.capstone-uk.com © Copyright 2017

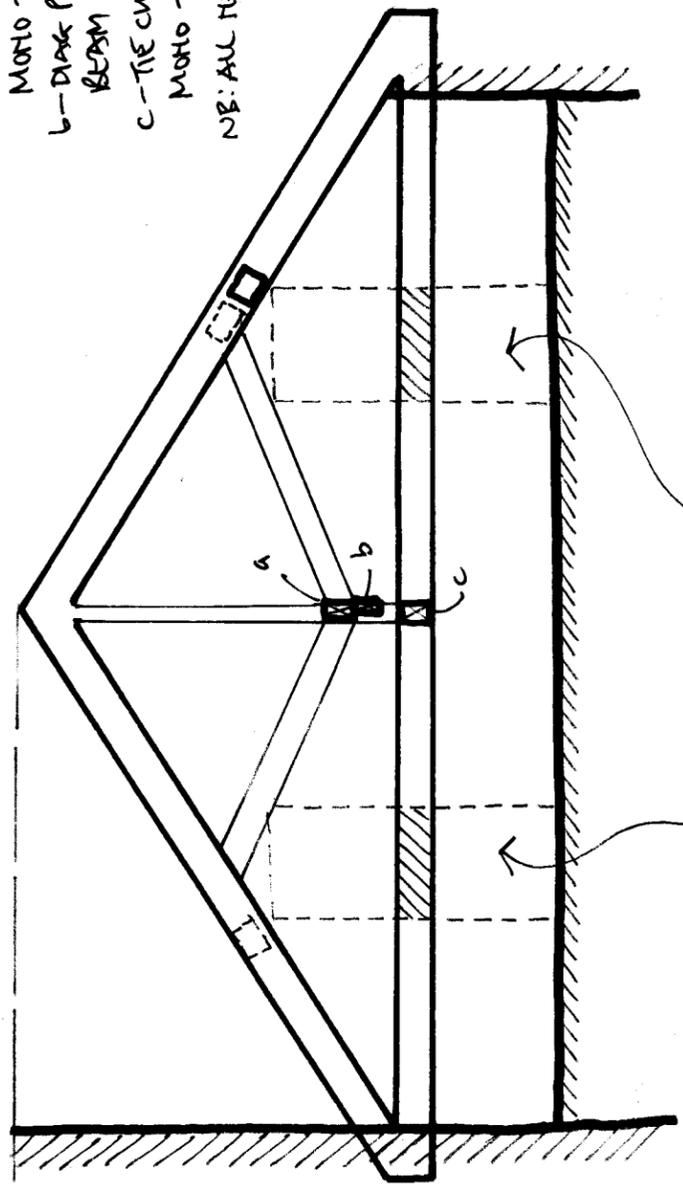
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND WITH THE SPECIFICATION

Notes - i) Assessing existing floor structure is beyond Capstone's scope. 2) Roof structure to remain unaltered other than for alterations as shown on the proposed drawings. 3) Temporary works - new steel support beams and all posts/braces, and associated brackets to be fully installed to the truss/below the truss prior to forming the door openings by cutting through the truss tie chord. 4) NB - in the structural design it is assumed that a contractor experienced with truss alterations will be undertaking this work. If not, the contractor is to seek assistance from an experienced contractor as required.





a - DIAG PROP TO MONO TRUSS  
 b - DIAG PROP TO HIP BEAM  
 c - TIE CHORD TO MONO TRUSS  
 NB: ALL NEED TO REMAIN

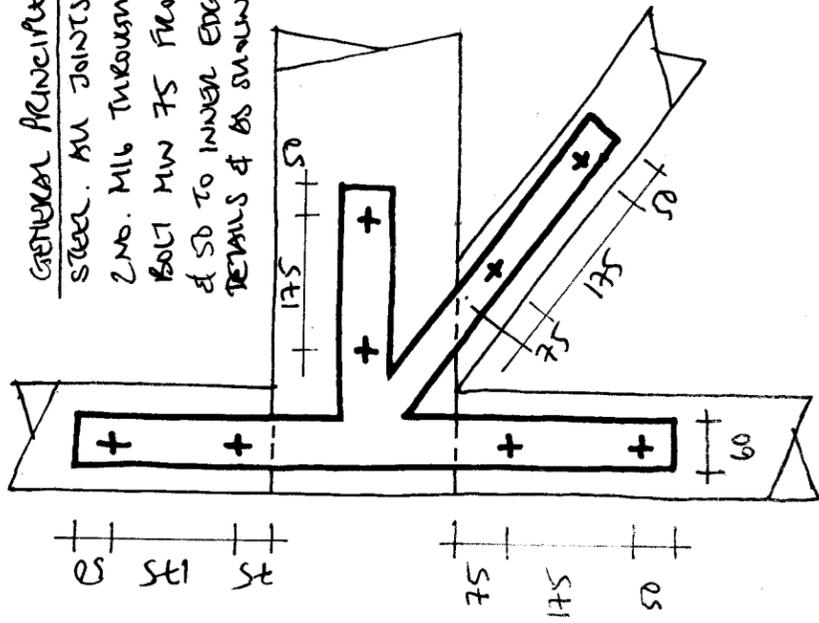


PROPOSED PROP OR BRACES MUST BE POSITIONED TO AVOID DIAGONAL STRUTS AS SWOLN. ENSURE ALL STRENGTHENING WORK UNDERTAKEN TO TRUSS/FLOOR PLATE TO CUTTING THROUGH TIE CHORD IS THE 2 LOCATIONS SWOLN. REF THE PROPOSED DRAWINGS.

© Copyright 2014. Note: this drawing is to be read in conjunction with all architect's and engineer's drawings and the specification.

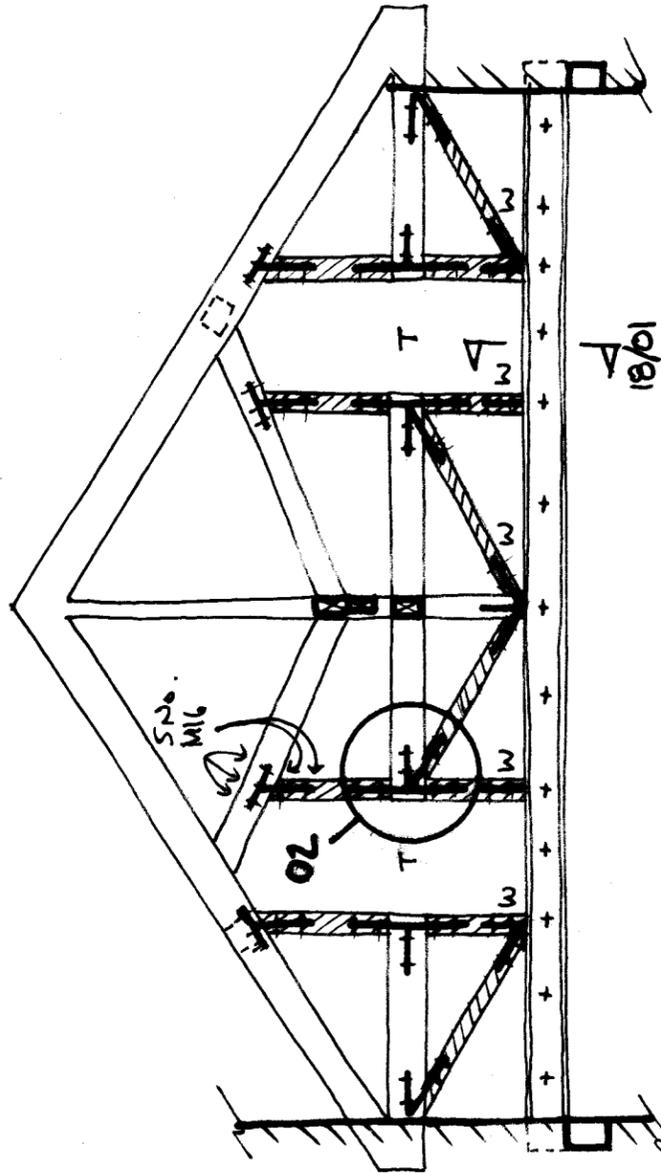
Rev.	Date	Amendment	 <b>CAPSTONE</b> CONSULTING ENGINEERS		
			Capstone Consulting Engineers Ltd Structural and Civil Engineers Historic Building Specialists Home Farm · Hollinsclough BUXTON · SK17 0RH 01298 83151 www.capstone-uk.com		
Project:			<b>WORTLEY HALL ATTIC ALTERATIONS</b>		
Scale:			1:50	Date:	Nov/17
Drg. Title:			<b>BEDROOM 5 TRUSS AXIS - EXISTING</b>		
Drawn:			JR	Revision:	
			Drg: <b>P627/16</b>		

GENERAL PRINCIPLES OF THE STRAPS: 60 x 8 S275 STEEL. ALL JOINTS: FULL PENETRATION BUTT WELDS. 2 NO. M16 THROUGH BOLTS PER MEMBER END. OUTER BOLT MIN 75 FROM MEMBER END. 175 TO 2ND BOLT & 50 TO INNER EDGE OF STRAP. OTHERWISE TO FABRICATOR'S DETAILS & AS SHOWN IN GENERAL ON I:50 ELEVATION.



DETAIL 02 (1:10)

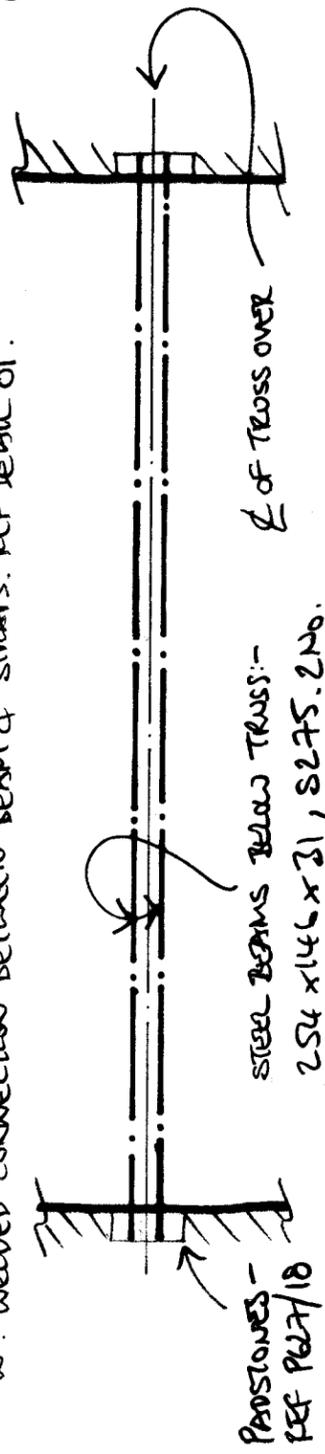
ALL OTHER STRAPS TO BE SIMILAR, TO FABRICATOR'S DETAILS BASED ON SITE MEASUREMENTS.



18/01 (ROOF OMITTED HERE FOR CLARITY. REF 18/01)

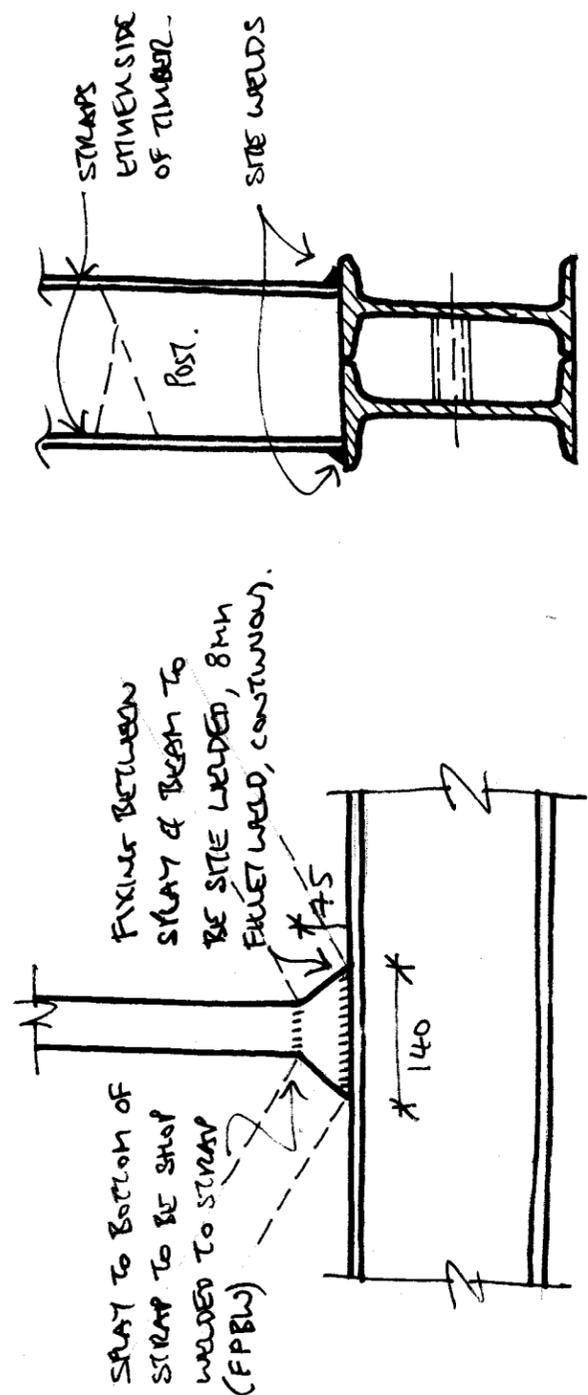
NEW DENSE ARCH PINE MEMBER (TO MATCH TRUSS).  
 VERTICAL: 200x100. DIAGONAL: 200x100. C24  
 T: SECTION OF THE CHORD TO BE REMOVED ONLY ONCE  
 i) STEEL BEAMS INSTALLED, ii) ALL NEW TIMBERS & STRAPPING INSTALLED

W: WELDED CONNECTION BETWEEN BEAM & STRAPS. REF DETAIL 01.



STEEL BEAMS BELOW TRUSS:-  
 254 x 146 x 31, S275. 2 NO.  
 M16 THROUGH BOLTS AT MAX 600CS

PANSTONES -  
 REF P627/10



NOTE - ALL NEW TIMBERS TO BE TIGHT FITTING. TIMBERS TO BE KILN DRIED.

© Copyright 2014. Note: this drawing is to be read in conjunction with all architect's and engineer's drawings and the specification.

Rev.	Date	Amendment
 <b>CAPSTONE</b> CONSULTING ENGINEERS		
Capstone Consulting Engineers Ltd Structural and Civil Engineers Historic Building Specialists Home Farm · Hollinsclough BUXTON · SK17 0RH 01298 83151 www.capstone-uk.com		
Project: <b>NORWICH HALL ATTIC ALTERATIONS</b>		
Drg. Title: <b>BED 5 TRUSS ALTERATIONS - PROPOSED</b>		
Scale: <b>1:50</b>	Date: <b>NOV 17</b>	Drawn: <b>JR</b>
Revision:		<b>P627/17</b>

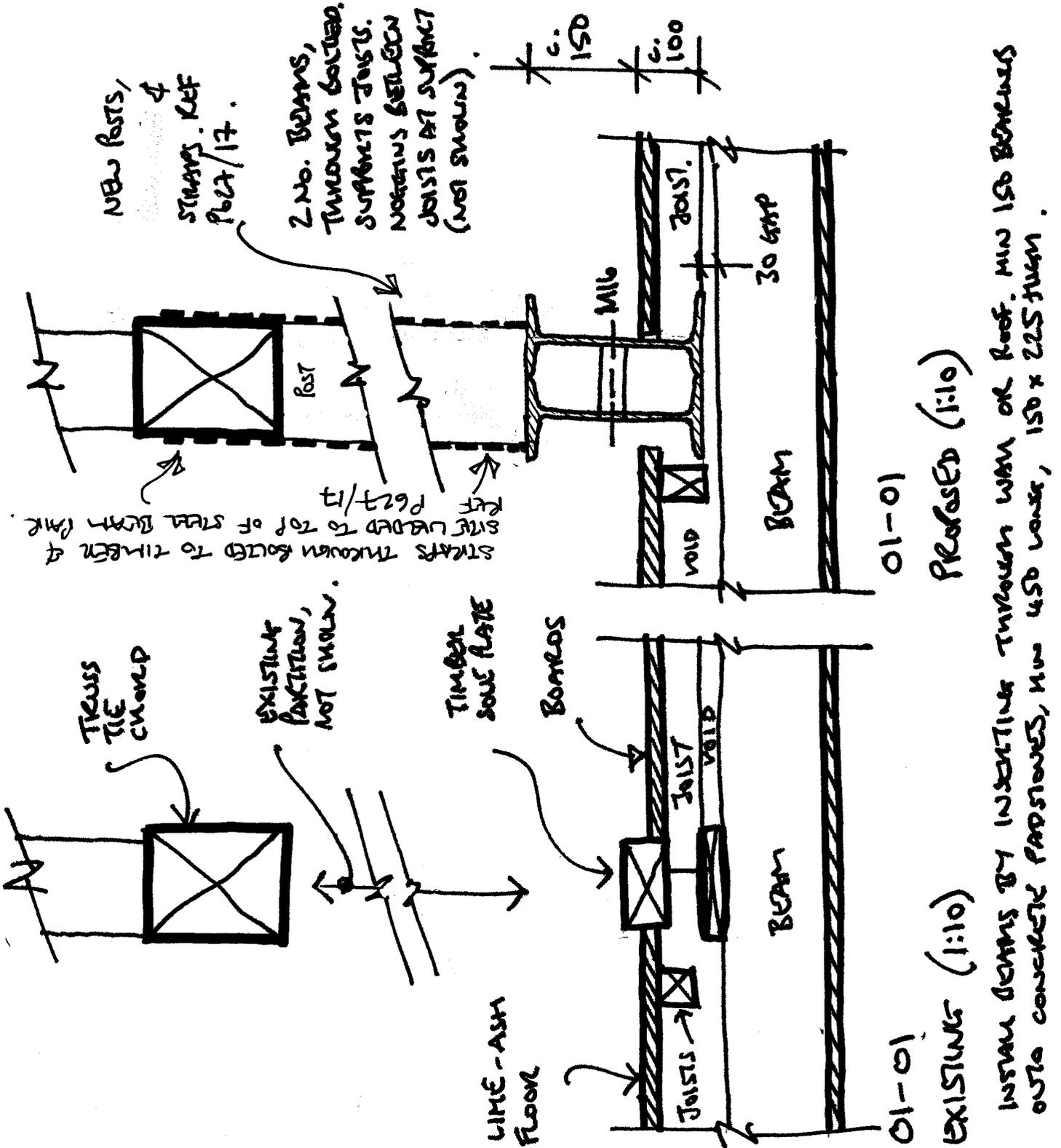


Project		
Wortley Hall Attic Alterations		
Drg. Title		
Bedroom 5 Truss Alteration		
Date	Drawn	
NOV 2017	JR	
Drg.	Revision	
P627/18	A	

REV A - MINOR REVISIONS

Home Farm Hollinsclough, BUXTON SK17 0RH Tel: 01298 83151  
www.capstone-uk.com © Copyright 2017

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND WITH THE SPECIFICATION



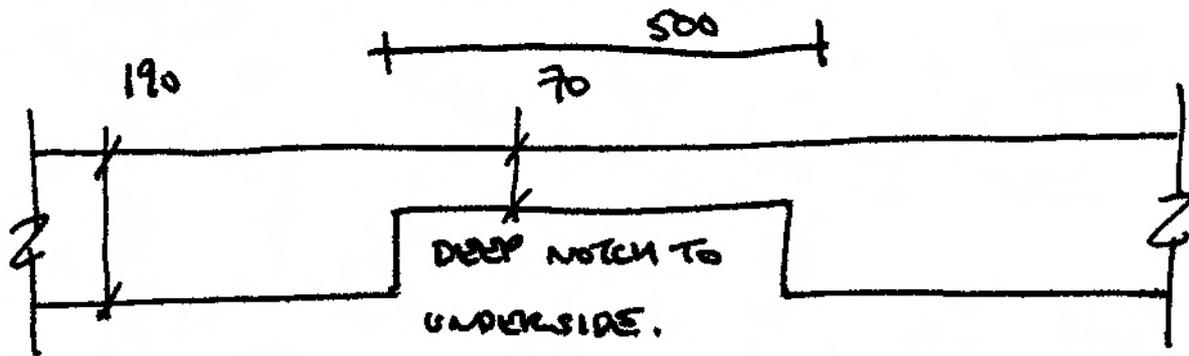


Project -		
Wortley Hall Attic Alterations		
Dwg. Title		
Bedroom 5 Truss Alteration		
	Date NOV 2017	Drawn JR
Dwg. P627/19	Revision	

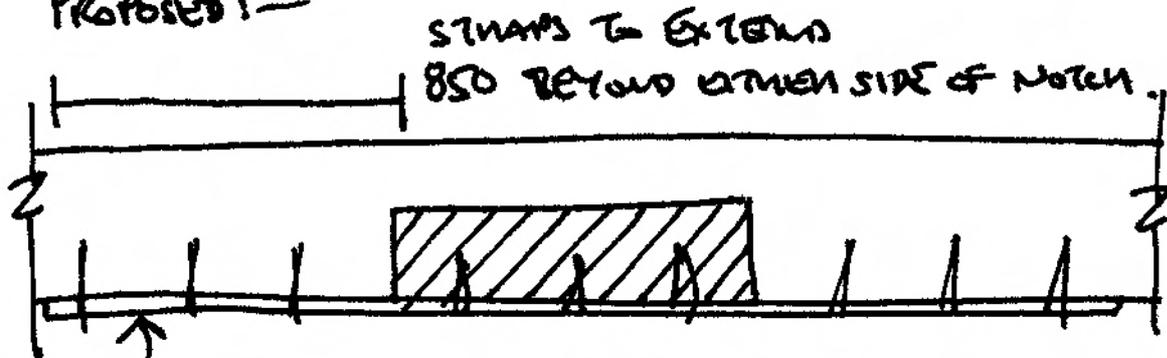
Home Farm Hollinsclough, BUXTON SK17 0RH Tel: 01298 83151  
www.capstone-uk.com © Copyright 2017

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND WITH THE SPECIFICATION

MONO TRUSS TIE CHORD - AS EXISTING :-



PROPOSED :-



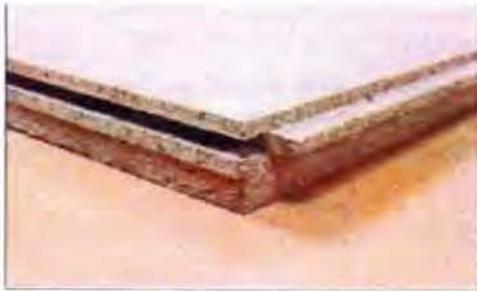
GLUED & SCREWED TIGHT FITTING  
HARDWOOD PACKER INSTALLED INTO  
NOTCH

3 no. 30 x 5 GALV. STAYS FIXED UP TO UNDERSIDE,  
GANGED 14 WOODSCREWS, MAX 100CC (STAGGERING  
STAYS). NOTE - AS SHOWN IS INDICATIVE ONLY.  
STAYS TO BE 2.2M LONG & CONTINUOUS.

## **Appendix D:**

### **Manufacturer's Product Literature:**

TECHNICAL INFORMATION SHEET



**Karma Masspanel** is a high performance acoustic floor panel with an exceptional performance to height ratio. Comprising an 18mm cement particleboard T&G4 bonded to a 12 mm woodfibre resilient layer. Karma Masspanel provides excellent impact and airborne sound insulation in a single product. It can be used on an existing floor or directly to joists making it an ideal product for refurbishment projects.

**Typical Applications** is used in refurbishment projects, improving existing structures where access is only available from above and when height restrictions exist but reliable performance is still required.

**TEST INFORMATION**

The separating floor construction as tested consisted of a 30mm Karma Masspanel and 15mm OSB on 235mm I-joists at 600mm centres with 100mm quilt between joists. The ceiling to the underside consisted of RB1 resilient bar and 2 layers of 15mm Soundbloc on resilient bars. The test detailed was carried out in full accordance with Part 4 and Part 7 (1998) of BS EN ISO 140 and to the requirements of the Building (Scotland) Regulations 2010.

Criteria/Measured	Airborne Sound Insulation	
	ADE (England & Wales) DnTw+Ctr (dB)	Section 5 (Scotland) DnT,w (dB)
Criteria Conversions	≥43	≥56
Criteria New Build	≥45	≥56
Measured	53	60

Criteria/Measured	Impact Sound Insulation	
	ADE (England & Wales) L'nT,w (dB)	Section 5 (Scotland) L'nT,w (dB)
Criteria Conversions	≤64	≤56
Criteria New Build	≤62	≤56
Measured	56	56

\*Site tested by independent UKAS accredited acoustic consultant

The use of TNF70 fire retardant slab used in conjunction with the floor build up above will over a 90minute fire resistances. It is friction fitted between the joists and sealed with Karma EX240 intumescent and acoustic mastic.

**Benefits of Karma Acoustic Overlay / OverlayPlus**

- Excellent impact and airborne sound performance for 30mm thickness
- Installed from above – existing ceiling can be retained
- Can be used with most common floor finishes
- Dry system which is quick to install
- Non load bearing partitions can be built off the finished floor surface
- Can be used on existing subfloors or direct to joists
- Reaction to fire of top layer – Class 1 surface spread of flame to BS476Pt 22 or Class 'O' (Euroclass B) up to 90min

**Physical Information**

- Dimensions: 1200mm x 600mm x 30mm
- Weight: 20kg/m<sup>2</sup>

**Accessories**

- Karma acoustic PU adhesive
- Karma Acoustic Perimeter Strip
- Karma EX240 mastic

**Additional Information**

- Part E – Has demonstrated compliance with Approved Document E (England & Wales)
- Fire – Product/System has been tested to a particular fire rating

**Karma Masspanel Installation Instruction**

**Preparation**

**Storage** – All components should be kept inside under cover and in dry conditions at all times. Panels should be stacked flat on a level surface. Materials should be located into the environment in which they are to be fixed at least 48 hours prior to fixing.

**Subfloor Tolerances** – The subfloor evenness tolerances must not exceed +/- 2mm per 2 meter run. The base floor must also be clean and completely dried out. The floor should be clear of pipes and other obstacles.

**Partitions** – Lightweight non-loadbearing partitions can be supported on top of Karma Masspanel boards.

**Moisture** – On concrete subfloors a vapour barrier (minimum 1000 gauge) should be laid below the Karma Masspanel.

**Installation Procedure**

1 – Place Karma 6mm thick ‘L’ shaped flanking strip between Karma Masspanel and perimeter walls during installation. This will reduce flanking sound transmission.

2 – Lay Karma Masspanel as shown in the illustration with the grooved edges or cut edges facing perimeter walls. Use the offcut from the final panel in the first row to commence the next row. Do not start a row with an offcut less than 250mm long. Lay panels in a brick bonded fashion.

3 – While laying boards apply a liberal amount of Karma PU Adhesive to the grooves of the T&G joint and tightly butt the boards together. Wipe off excess adhesive with a damp cloth. Avoid walking on the boards until adhesive has dried.

**Expansion Provision** – Expansion provision should be calculated at a rate of 2mm per metre run. This may be provided in a gap at perimeter walls but intermediate expansion joints may be needed on ling runs of flooring and at door thresholds as recommended in BS8201.

**Loading** – Karma Masspanel has been designed for use in areas with a maximum UDL of 1.5kN/m<sup>2</sup> and a maximum concentrated load of 1.4kN in accordance with BS6399 – Part 1. Please contact Technical Help for advice if loading is expected to exceed these figures.

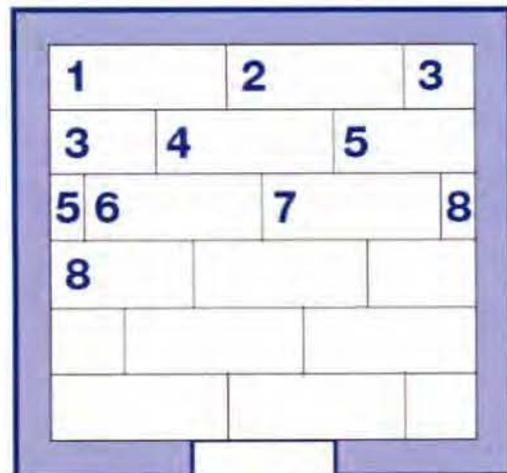


Illustration of installation sequence

Before installing Karma Masspanel please refer to BS8201 Code of Practice for the installation of wood based flooring

## TECHNICAL INFORMATION SHEET

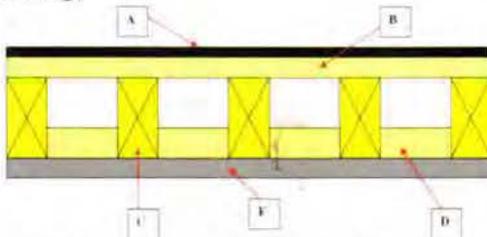


**Karma TNF70** is a very high-density (140kg/m<sup>3</sup>) stone-fibre batt, which is used in conjunction with Karma Masspanel in a floor build-up. This is used to upgrade the fire resistance of timber floors to 90 minutes fire integrity and insulation. Often used where a lath & plaster ceiling cannot be disturbed or where access is not possible from the soffit face because of occupancy of a dwelling or congestion caused by mechanical services.

**Typical Applications** is used in refurbishment projects, improving existing structures where access is only available from above and whereby additional acoustic & fire performance is required. In particular multiple occupancy, houses, flats, offices, shops, hotels and nursing homes.

### TEST INFORMATION

\*The separating floor construction as tested consisted of (A) Karma Masspanel (B) 18mm T&G chipboard or plywood deck (C) 150mm x 50mm timber joists at 400mm centres (D) 70mm thick TNF70 fire coated slab friction fitted between joists and sealed with Karma EX240 sealant (E) typical 20mm Lath & Plaster ceiling.



Description	Tested	Results
Floor Construction*	Airborne Improvement	7dB DnT,w 5dB DnT,w+Ctr
TNF70	Fire Rating	90min fire rating
TNF70	Thermal Conductivity	0.035W/mK

A simple method of upgrading timber floors to achieve up to 90 minute fire rating and improved airborne requirements. All tested to BS 476 Pt22 and conforms to Building Regulations Document Part B and Approved Document Part E (2003).

TNF70 is coated on the top side with a smoke and fire resistant sealant. These are cut to suit on site and fitted between joists, after removing a number of floorboards, secured under compression and bonded with Karma EX240 Intumescent mastic.

#### Benefits of Karma TNF70

- Improves fire rating up to 90 minutes
- Improve airborne properties of floor build-up
- No requirement for any mechanical fixings
- Lightweight and quick to install
- 1200mm x 600mm size covers most joists centres
- Dry system that will not damage sensitive lath & plaster ceilings or fine plaster mouldings

#### Physical Information

- Dimensions: 1200mm x 600mm x 70mm
- Colour: White

#### Accessories

- Karma EX240 mastic

## TECHNICAL INSTALLATION GUIDE



- 1) Locate and review TNF70 fire & acoustic system for timber floors Health & Safety notes before commencing work.
- 2) Lifts sufficient floorboards to allow TNF70 to be installed.
- 3) Clear any remaining pugging from the ceiling/floor void and clear dust from the sides of the joists to improve the adhesion of the bonding EX240.
- 4) Apply a 10mm bead of EX240 to the side of each joist 35mm from the bottom. If adhesion is difficult, spray the joists with water from a small garden spray.
- 5) Measure the gap between the joists and cut TNF70 along the 1200mm sides to fit tightly between the joists **WHITE** coated side up.
- 6) Place loosely in position at 45° between joists. Using a timber board to spread the load, ease into final position using gentle foot pressure.
- 7) When finally positioned, apply a 5mm bead of EX240 all around the seal and on the butt joints.
- 8) Inspect and check work and re-fix floorboards.



## MATERIAL SAFETY DATA

- 1) Identification – TNF70 a mineral fibre batt coated on one face with white acrylic fire rate mastic that can be used as lightweight acoustic, smoke and fire barrier.
- 2) Composition – High density rock fibre slab painted with an ablative coating non-hazardous.
- 3) Hazard Identification – Non-hazardous as defined by the chemicals (HIP) regulations 1993.
- 4) First Aid Measures –  
 Inhalation – Move in fresh air. In case of irritation to respiratory systems or mucous membranes seek medical advice.  
 Skin Irritation – If skin is affected wash with plenty of soap and water. Do not use solvent or thinners.  
 Eye Irritation – Flush eyes with clean fresh water for at least 10 minutes. Seek medical advice.
- 5) Fire Fighting Measures – The product is not flammable. However in a fire the coating does release chemically bound water molecules to form steam. Fires should be fought with water mist, CO2 or foam dry powder.
- 6) Wear gloves and overalls but this is not mandatory. To be stored in dry place away from eating, drinking or smoking areas.
- 7) Exposure Control (Personal Protection) – It is advisable to use eye protection if installation is above head height. Avoid contact with skin as much as possible the fibre batt content can be an irritant long term exposures to excessive amounts of dust may lead to adverse effects. If working for prolonged spells wear a mask.
- 8) Chemical Properties – The ablative coating is a mixture of resins, pigments, mineral extenders, additives and organic solvents.
- 9) Toxicology Information – No toxic effects unless burnt.
- 10) Disposal Considerations – Waste products are not hazardous and their disposal should be in accordance with local regulations.