

17 March 2023

Dan Stroud
Cover Storey Architects LLP,
The Studio,
18 St Georges Avenue
Havant Hampshire PO9 2RX
United Kingdom

Dear Dan

Re: 23003 Coach House, The Pallant, Havant. PO9 1BE

Introduction

North Point Structures have been appointed by Cover Storey Architects to provide advice on potential structural alterations at the Coach House, Havant

The aim of the report is to.

- Advise of the feasibility of the proposed structural alterations.
- Provide construction details to facilitate the alterations where feasible.
- Recommend next steps where the structural works require more investigations or are not feasible.

The report is based on a visual inspection made on 9th March 2023. Areas obscured by finishes, or that could not be seen without specialist access equipment, have not been inspected. No specialist techniques, access equipment or opening-up works were used during the inspection.

Dan Stroud of Cover Storey Architects and Kevin West of Dynamo Youth Theatre were in attendance during the inspection

This report includes sketches and calculations to support the construction details

Observations

1.1 Removal of first floor wall in the existing store.

An inspection of the roof void above this room revealed an existing truss, purlin and rafter arrangement that does not rely on the stud wall in this room for vertical support or stability. The clear storey glazing within this partition wall also limits its ability to support significant load from the roof structure. Therefore the partition wall may be removed. However, it is suggested that the wall is removed carefully as it may have, over time, provided some propping to the roof as the structure has settled. This slight movement may be released as the partition wall is removed. It would be prudent to control this slowly should it occur.

Sketch sheets 2, 3 and 4, enclosed with this letter report, show the location of the wall and sections through the building describing the arrangement of the roof and other supporting structure.

Photographs, enclosed with this report, show the typical existing arrangements

- 1.2 Removal of the wall in the ground floor toilet area (directly below the stud wall described above). This wall may be removed, albeit with some caveats. The existing joists have sufficient capacity to span the 3m between the remaining walls without further strengthening for domestic use (i.e. all usages within self-contained dwelling units). However, it is understood that the floor above the wall may be used as a rehearsal space. The imposed design loading associated with this use (C4 Areas with possible physical activities (dance halls, studios, gymnasia, stage) is significantly greater than domestic loading (just over three times greater). The joist do not have sufficient capacity to carry this load, and the ability of the joists in other areas of this floor to carry these loads is also doubtful. We therefore recommend the floors the proposed rehearsal area are strengthened. This can be achieved by pairing existing joists.

Sketch sheets 1, 3, and 4, enclosed with this letter report, show the location of the floor that needs strengthening. Sheet 5, also enclosed, shows a typical strengthening detail that 'pairs' existing joists.

Photographs, enclosed with this report, show the typical existing arrangements

- 1.3 A new door opening is proposed in the existing masonry wall next to the toilets. This can be achieved with two number 150 deep x 100 wide precast, prestressed concrete lintels over the new opening. Care should be taken to ensure that the new lintels have bearing lengths in accordance with the manufacturers recommendations (typically 150mm). Additionally, the masonry at the edges of the new opening should be made good to ensure a good bearing below the lintels. Temporary propping of the existing masonry above the new opening should be provided by the contractor.

Sketch sheet 1, enclosed with this report, shows the location of the new lintels.

- 1.4 The existing staircase to the north of the building is to be removed and a new stair void and stair case installed at the north end of the existing mezzanine. The new stair void can be created by trebling up the existing joists at the edge of the stair opening. It is suggested that the existing support arrangements are repeated for the support of the trimming joists at the existing beam and wall.

Sketch sheets 1, 2 and 5, enclosed with this letter report, show the location of the stair to be removed, the new stair opening and details of the new trimmer.

- 1.5 The levels in the ground floor may be raised by either introducing timber joist sized to raise the floor or by introducing a non-compressible floor insulation with a 75 screed cover

Sketch sheets 1, 4, and 5, enclosed with this letter report, show the location of the floor to be raised and details of how this can be achieved.

Next Steps

The works described above may be carried out in accordance with the sketches, enclosed with this letter report, and as described.

Please note that we have not checked the remaining first floor areas capacity to carry the proposed loads. This is outside the scope of this report. These checks would be prudent if the anticipated use of the areas is expected to change, particularly if loadings of the new use is likely to be more onerous.

Calculations have been included to support the works described.

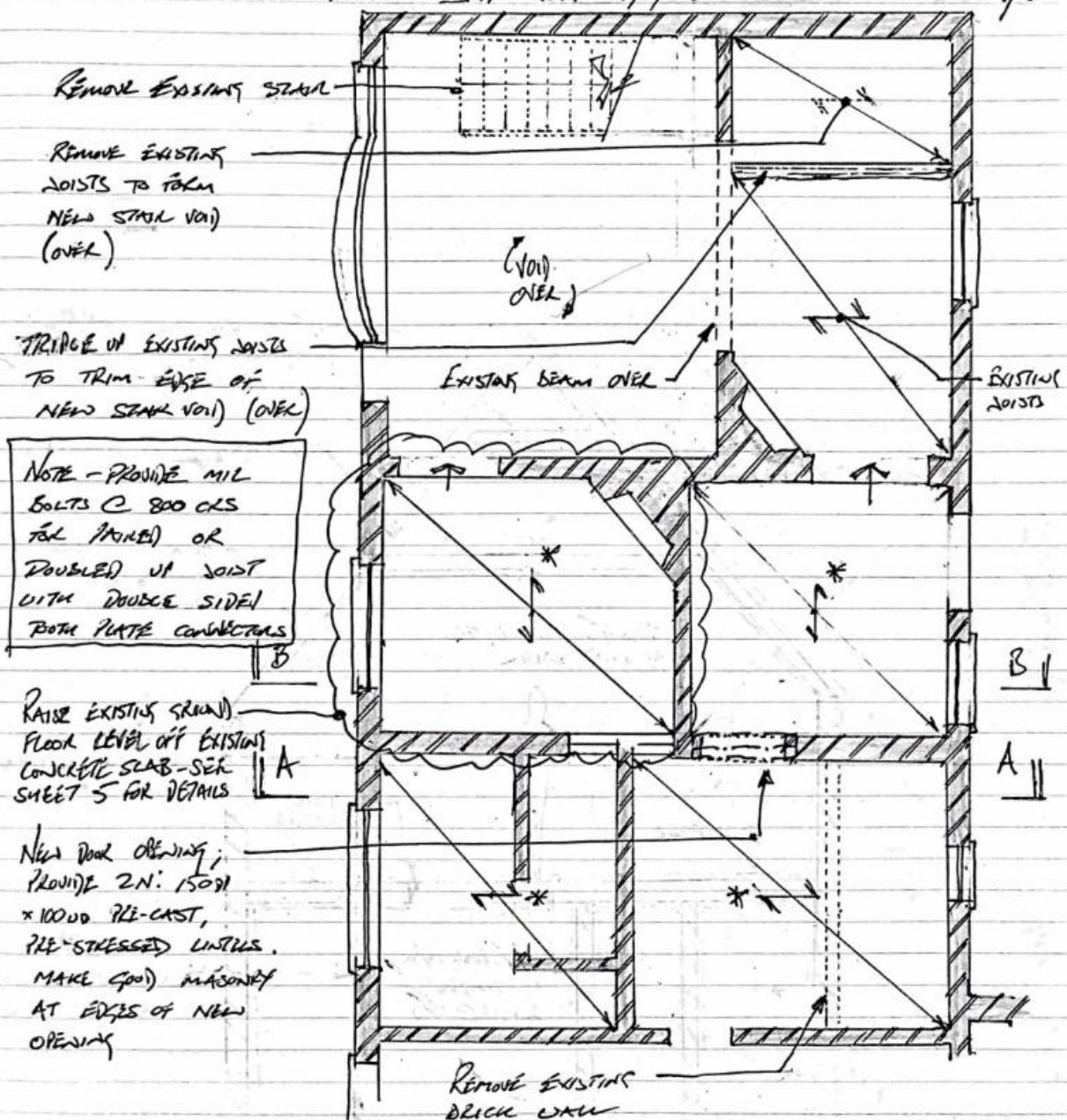
Yours sincerely

A handwritten signature in black ink, appearing to read 'Alastair'.

Alastair Craig
For North Point Structures

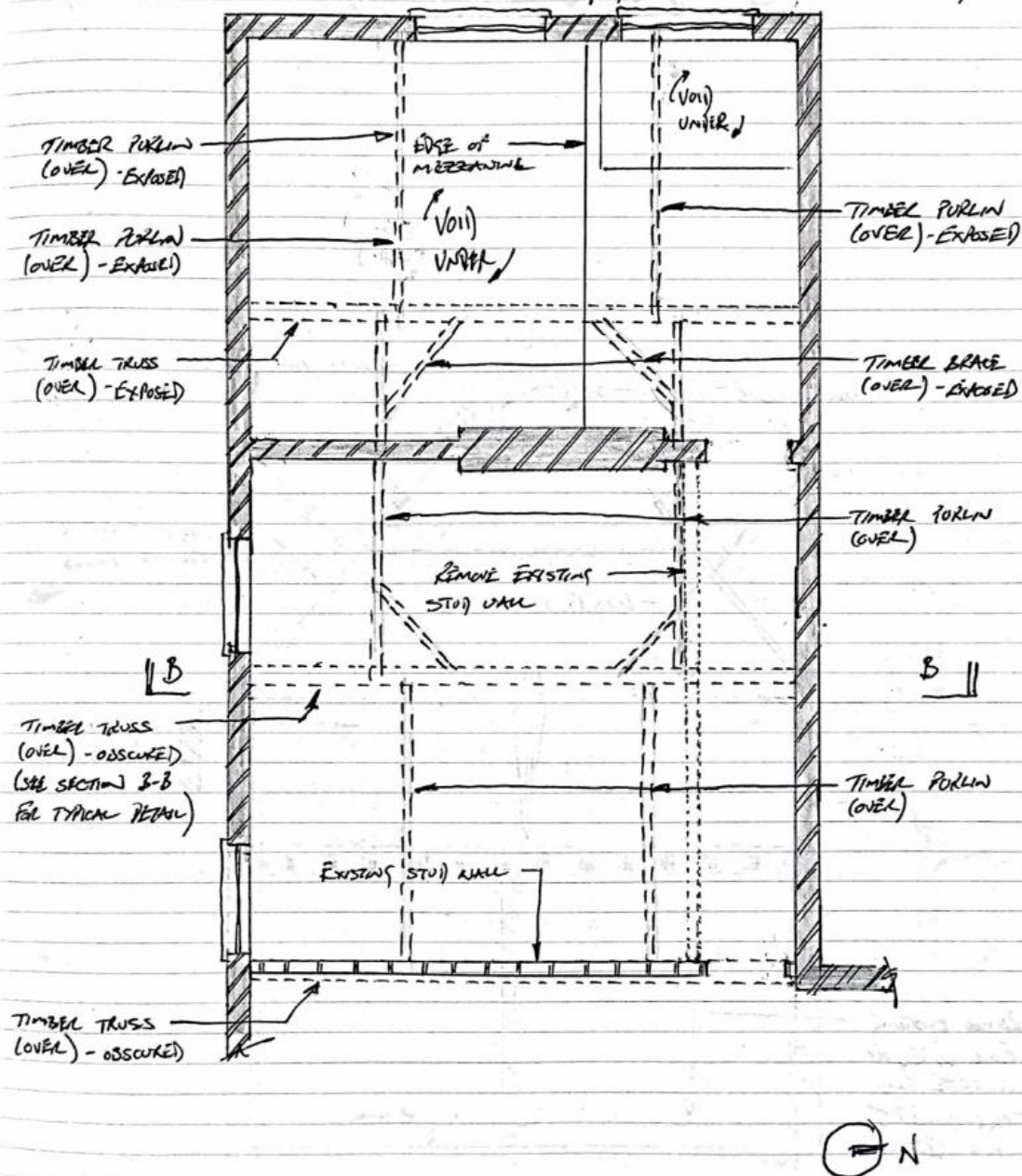
23003 - Coach House - SITE VISIT 9/3/25

A CHART
1/5



23003 Coach House - Site Visit 9/3/23

A CRAY
2/5



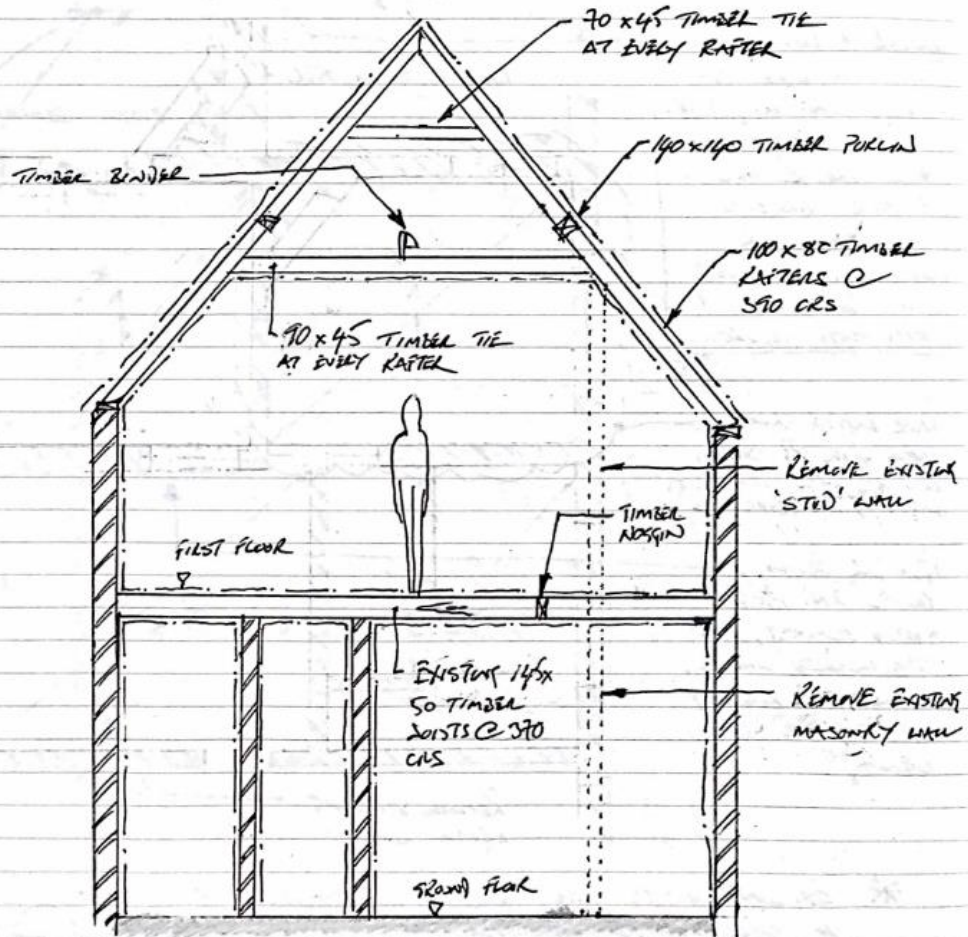
PLAN - FIRST FLOOR (STRUCTURE SHOWN OVER)

NORTH POINT STRUCTURES



23003 - Coach House - SITE VISIT 9/3/23

A CHAK
3/5

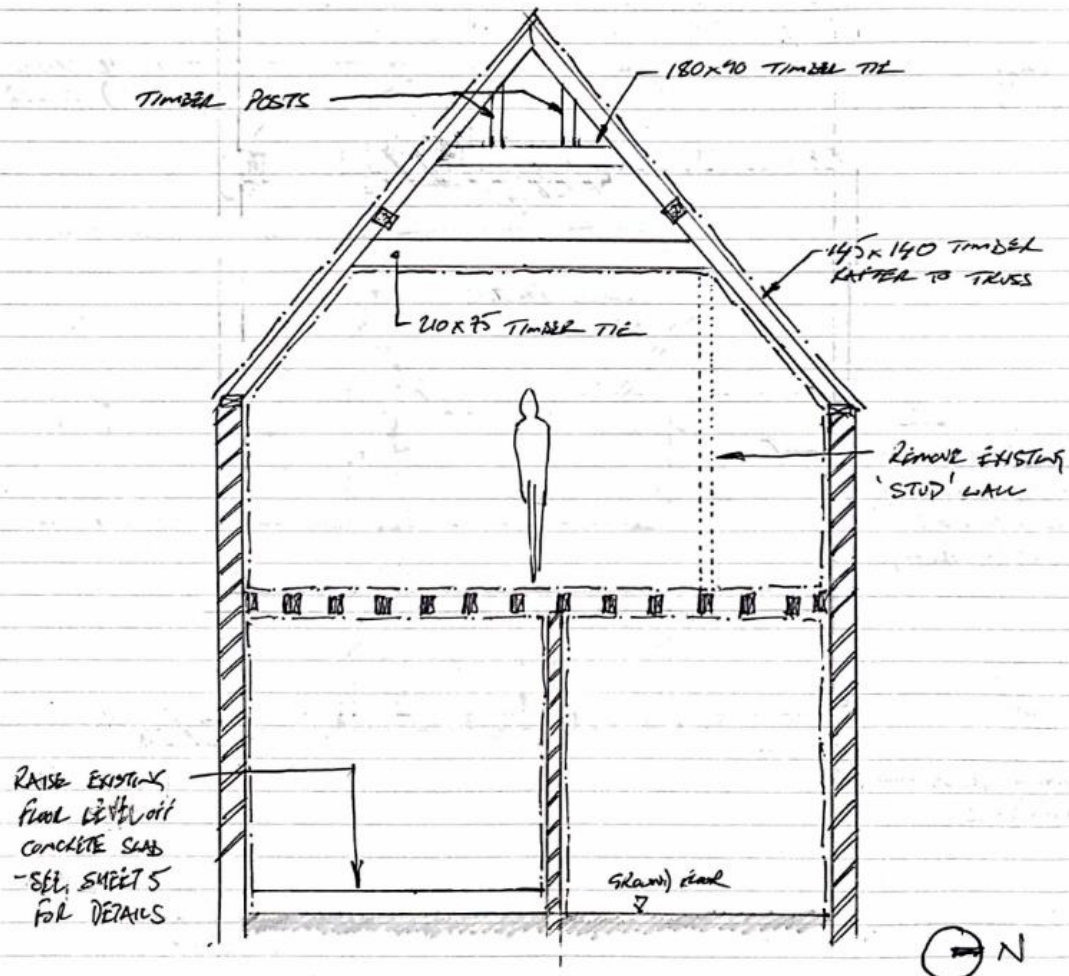


SECTION A-A - RAFTERS



23002 - COACH HOUSE - SITE VISIT 9/3/23

A CRAG
4/5



SECTION B-B - TRUSS

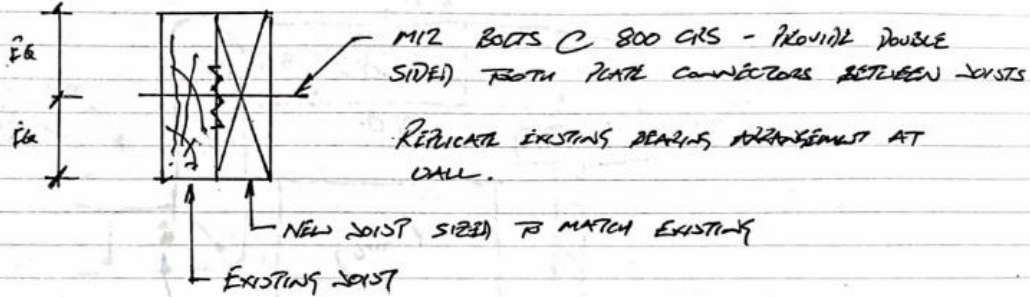
NORTH ROOF STRUCTURES

0 1 2 3m

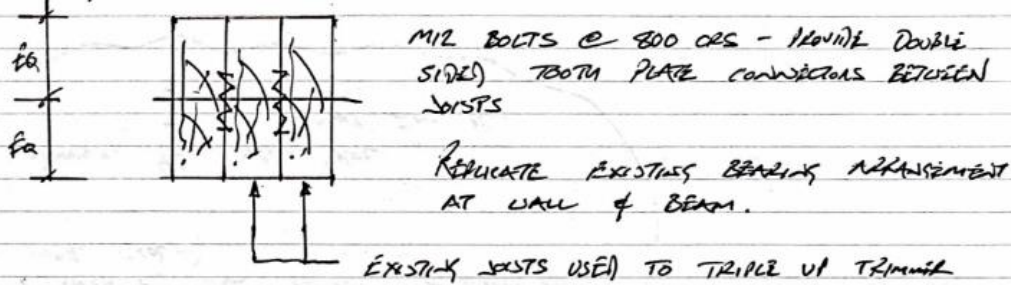
23003 COACH HOUSE - SITE VISIT 9/3/23

A CRAY
6/5

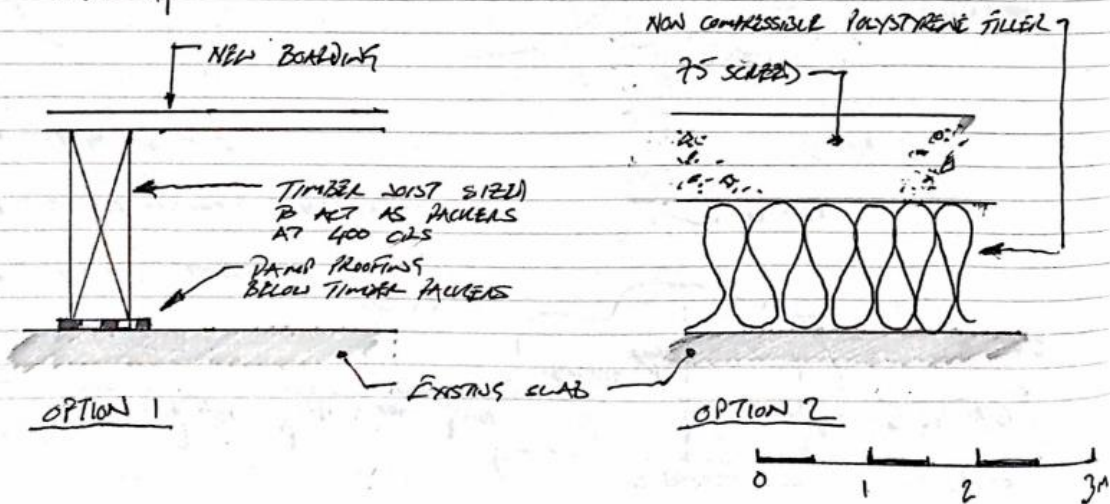
DETAIL - JOINING EXISTING JOISTS
1:5 @ A4



DETAIL - TRIPLE UP EXISTING JOIST TO FORM STAIR TRIMMER
1:5 @ A4



DETAIL - INFILL EXISTING FLOOR
1:5 @ A4



Photographs



Photograph 1 – Roof void as shown on sections A-A and B-B



Photograph 2 – Partition to be removed at first floor

Photographs



Photograph 3 – Ceiling void at first floor as shown on sections A-A and B-B



Photograph 4 – Roof rafters and Trusses at west end of building. Similar to arrangement shown on section A-A and B-B; although some adjustments in this area to make vaulted.

North Point Structures

Dynamo Youth Theatre
Coach House, The Pallant, Havant. PO9 1BE

STRUCTURAL CALCULATIONS

Project Number: 23003
Date: March 2023
Revision: -
Produced by North Point Structures Ltd

North Point Structures

Job Title

Section

Job No.

23003

Member/Location

Drawing Ref

By

Sheet No.



Revision

First Floor

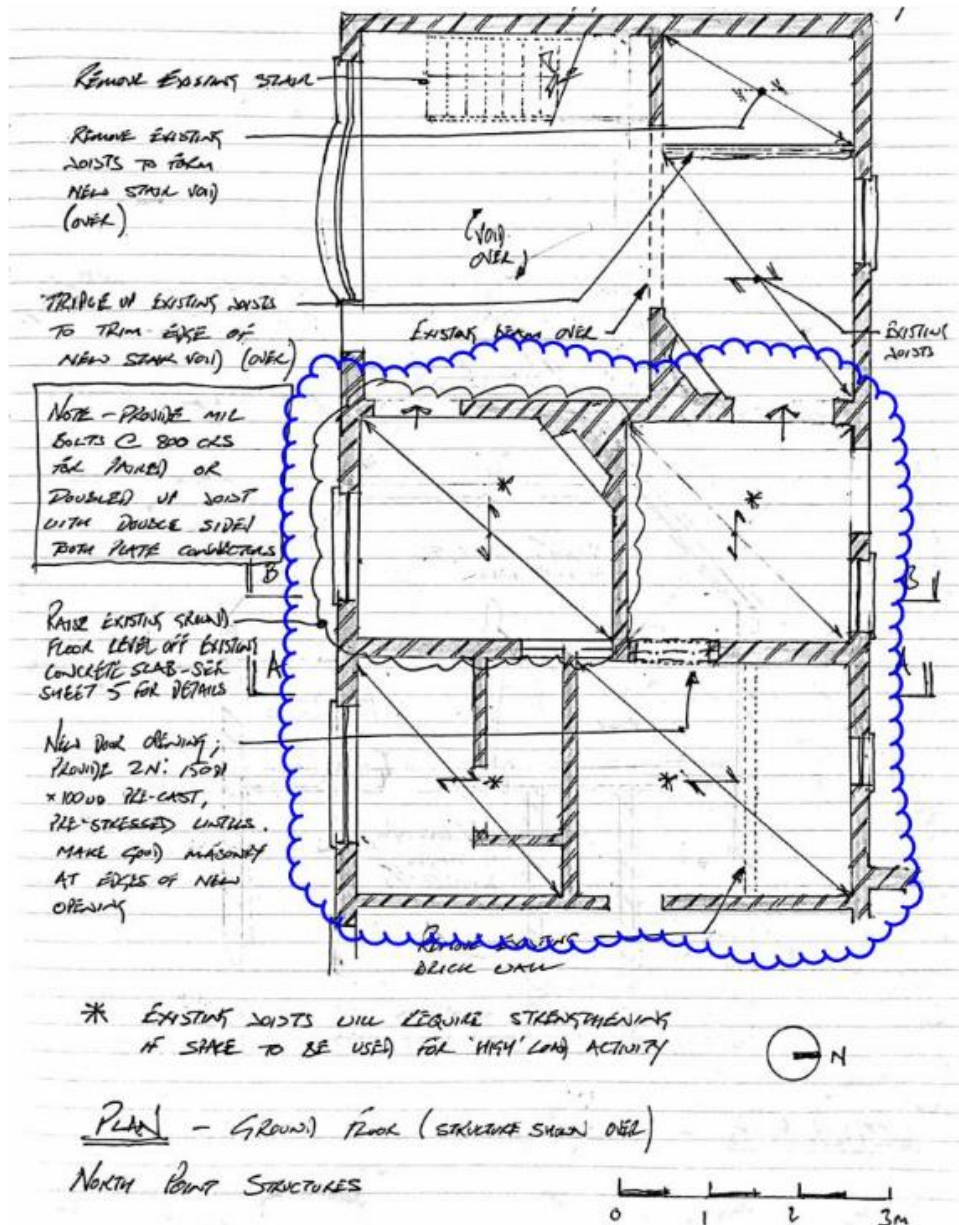
Sketch 1, 3, 4 and 5

Date

Chk

1. Introduction

The following calculations justify the existing first floor joists within the area clouded below.



23003.npcalcrev-

2. Loadings

	Permanent kN/m ²	Imposed kN/m ²
<i>First floor</i>		1.5 (Residential)
<i>Boarding</i>	0.15	Or
<i>Timber joists</i>	0.15	5.0 (Rehearsal Space)
<i>Ceiling</i>	0.20	
<i>Total</i>	0.50	
<i>Internal wall brick (1 brick wide)</i>		
<i>102 brick</i>	2.24	
<i>Plaster (both sides)</i>	0.50	
<i>Total</i>	2.75	

3. Structural Design Checks

3.1. Floor joists (Existing - based on domestic loading 1.5kN/m²)

Maximum clear span = 3m

See Sheet TB1 for design check

145x50 C16 Joists @ 360mm centres acceptable

3.2. Floor joists (Existing - based on rehearsal space loading 5.0kN/m²)

Maximum clear span = 3m

See Sheet TB2 for design check

145x50 C16 Joists @ 360mm centres not acceptable

145x50 c16 Joists @180mm centres acceptable (pair joists)

LOADINGS FOR: Floor joists - existing

Span = 3.000 m

Partial load factors: $\gamma_G = -$
 $\gamma_K = -$

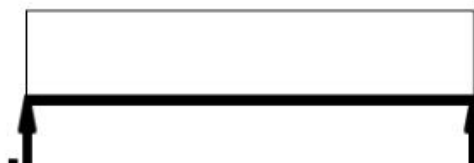
Input UD loads (kN/m)		Enter LOAD details
Ref.	w1	
Dead	0.5	
Live	1.5	
Start (m from Left)	0.000	
End (m from Left)	3.000	

Input point/KE loads (kN)		Input trapezium loads (kN/m)		NOTE 2: Input loads NOT multiplie by Partial Loa Factors when calculating moments and reactions)
Ref.		Ref.		
Dead		Dead		
Live		Live		
Pos'n (m from Left)		Pos'n (m from Left)		

NOTE 1:
Input loads
entered as
characteristic
values

NOTE 2:
Input loads
NOT multiplie
by Partial Loa
Factors when
calculating
moments and
reactions)

LOADING DIAGRAM:

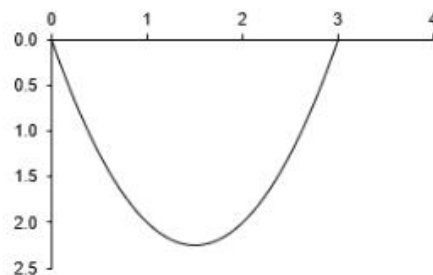


(Span = 3.000 m)

$R_L = 3.0$ kN
(Char: 0.8, 2.3 kN [D,L])

$R_R = 3.0$ kN
(Char: 0.8, 2.3 kN [D,L])

BM DIAGRAM:



STEEL
section chooser

TIMBER
section chooser

Maximum moment = 2.25 kNm, @ 1.500 m from left-hand end

Beam comprises 1 no. 138 × 145 mm C16 member, part of load-sharing system

Service Class: 1; Load duration: Long term; Basic stress = 5.3 N/mm²

Part of load-sharing system, therefore $K_8 = 1.1$

M.R = $5.3 \times 1 (K_3) \times 1.083 (K_7) \times 1.1 (K_8) \times 483.6 \text{ e}3 \text{ mm}^3 = 3.1 \text{ kNm}$

Timber I_{xx} = 0.484 e6 mm⁴; E = 8800 N/mm²

Max'm deflection from (D+L) loads = 6.8 mm = 0.0023 × span

LOADINGS FOR: Floor joists - paired

Span = 3.000 m

Partial load factors: $\gamma_G =$ - $\gamma_Q =$ -

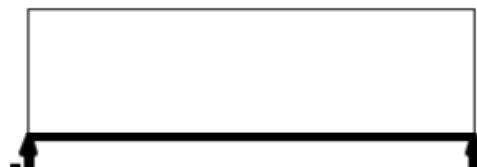
Input UD loads (kN/m)		Enter LOAD details
Ref.	w1	
Dead	0.5	
Live	5.0	
Start (m from Left)	0.000	
End (m from Left)	3.000	

Input point/KE loads (kN)		Input trapezium loads (kN/m)	
Ref.		Ref.	
Dead		Dead	
Live		Live	
Pos'n (m from Left)		Pos'n (m from Left)	

NOTE 1:
Input loads entered as characteristic values

NOTE 2:
Input loads NOT multiplied by Partial Load Factors when calculating moments and reactions

LOADING DIAGRAM:

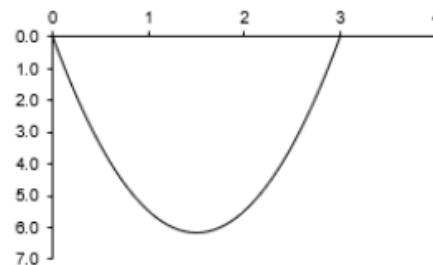


(Span = 3.000 m)

$R_L = 8.3 \text{ kN}$
(Char: 0.8, 7.5 kN [D,L])

$R_R = 8.3 \text{ kN}$
(Char: 0.8, 7.5 kN [D,L])

BM DIAGRAM:



Maximum moment = 6.19 kNm, @ 1.500 m from left-hand end

Beam comprises 1 no. 270 x 150 mm C16 member, part of load-sharing system

Service Class: 1; Load duration: Long term; Basic stress = 5.3 N/mm²

Part of load-sharing system, therefore $K_8 = 1.1$

$M.R = 5.3 \times 1 (K_3) \times 1.079 (K_7) \times 1.1 (K_8) \times 1,012.5 \text{ e}3 \text{ mm}^3 = 6.4 \text{ kNm}$

Timber $I_{xx} = 1.013 \text{ e}6 \text{ mm}^4$; $E = 8800 \text{ N/mm}^2$

Max'm deflection from (D+L) loads = 8.7 mm = 0.0029 x span

STEEL section chooser

TIMBER section chooser

3.3 Lintels for internal masonry walls:

Table from Naylor concrete lintels – other manufacturers available

Hi-Spec Range		P100	S4	R6	R9	R12
Load Table Units suitable for 100mm wide walls						
Fire Resistance Available (mins)		30	30	30	30	30
Suitable for Foundation Use		yes	yes	yes	yes	yes
Maximum Stock Length Available		2400mm	3000mm	3600mm	3600mm	3600mm Longer lengths available on request - up to 4800mm
Available Range Finish			Faced	Faced	Faced	Faced
UNFACTORED LOADS IN kN/m						
Length	Clear Span	100x65	100x100	100x140	100x215	100x290
900mm	700mm	12.97	18.00	48.90	78.18	100.05
1100mm	900mm	7.96	14.20	39.00	62.44	79.90
1200mm	1000mm	6.47	12.80	34.23	56.72	72.57
1500mm	1200mm	4.50	11.25	24.38	48.57	60.85
1800mm	1500mm	2.86	7.25	15.96	36.27	49.65
2100mm	1800mm	1.95	5.02	11.21	25.78	41.91
2400mm	2100mm	1.21	3.66	8.27	19.21	31.70
2700mm	2400mm	n/a	2.77	6.32	14.83	24.53
3000mm	2700mm	n/a	2.15	4.97	11.76	19.49
3300mm	3000mm	n/a	n/a	3.99	9.53	15.83
3600mm	3200mm	n/a	n/a	3.48	8.36	13.49
Lintel Weight kg/m		16	23	34	53	70

Based on loading from 1.0m height of brick over (conservative estimate) and 1.5m of first floor

Unfactored load – $2.75\text{KN/m}^2 \times 1.0\text{m} \times 1.5\text{m} + (5.0\text{KN/m}^2 + 0.5\text{KN/m}^2) \times 1.5\text{m} \times 1.5\text{m} = 16.5\text{KN}$

For openings up to 1.5m wide: Use R6 lintels