Appendix B

Approved dismantling sequence and extents



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(	CONTRACTURAL RES	IDUAL CDM RISK	
ASBESTOS CONTRACTOR BRIEF IS BEING ASBESTOS TO REMOVAL BY S	TO NOTE ASBESTOS MAY BE ; PROVIDED BY HEREFORD A BE REPORTED TO PRINCIPAI PECIALIST CONTRACTOR.	PRESENT ON SITE. A WAT SBESTOS. ANY SUSPECTE DESIGNER/CLIENT FOR	'Ching 'D
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SECTION THROUGH CONCRETE SILO AND HIGH ORCHARD KILN (SCALE 1:100)



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	1. DO NOT SCALE THIS DRAWING. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS ON SITE PRIOR TO COMMENCING THE WORKS.
	<ol> <li>THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.</li> <li>ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRIC UNLESS NOTED OTHERWISE.</li> </ol>
	<ol> <li>ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.</li> </ol>
	REFER TO JACKSON PURDUE
	LEVER DRAWING RDL00415-030 FOR PROPOSED DEMOLITION
	SEQUENCING
CONTRACTURAL RESIDUAL CDM RISK	
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CROSS SITE SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS TRAFFIC & PEDESTRIANS	
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STABILITY OF THE EXISTING STRUCTURE. TO BE AGREED WITH JACKSON PURDUE LEVER BEFORE COMMENCEMENT OF WORKS ON SITE.	
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	2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.	
	3. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES UNLESS NOTED OTHERWISE.	
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	Rokeby Developments MERCHANT	
	Project Title	
	BAKERS QUAY, GLOUCESTER	
	Description	
	DOWNING MALTHOUSE BASEMENT LAYOUT SHOWING	
	STRUCTURE ABOVE	
	Date     OCT 2019     Drawn     CE       Scale     1:100 @A1     Authorised     DA       JPL Ref.     RDL00415     DMA Date	
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	BAKERS QUAY, GLOUCESTER
	Description DOWNING MALTHOUSE GROUND FLOOR LAYOUT SHOWING STRUCTURE ABOVE
	Date     OCT 2019     Drawn     CE       Scale     1:100 @A1     Authorised     DA       JPL Ref.     RDL00415
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Rev.     Date     Revision Description     Drawn     Autro       Client       Project Title       BAKERS QUAY, GLOUCESTER       Description       Description       Description       Description       Description       Description       Description       Description       Description       Date       OCT 2019       Drawn       CE       Scale       1:100 @A1       JPL Ref.       Project     Orig     Vol.       Level     Type       Role	
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Description       Description         Description       DOWNING MALTHOUSE FIRST FLOOR LAYOUT SHOWING STRUCTURE ABOVE         Date       OCT 2019       Drawn       CE         Scale       1:100       @A1       Authorised       DA         JPL Ref.       RDL00415       UNING Type       Role       Number         OVALUE       Vol.       Level       Type       Role       Number	
Project Title         BAKERS QUAY, GLOUCESTER         Description         DOWNING MALTHOUSE FIRST FLOOR LAYOUT SHOWING STRUCTURE ABOVE         Date       OCT 2019       Drawn       CE         Scale       1:100 @A1       Authorised       DA         JPL Ref.       RDL00415       BIM Ref.       Vol.       Level       Type       Role       Number         000416       UDL       VX       VX       DD       X       00022	
BAKERS QUAY, GLOUCESTER         Description         DOWNING MALTHOUSE FIRST FLOOR LAYOUT SHOWING STRUCTURE ABOVE         Date       OCT 2019         Date       OCT 2019         Date       1:100 @A1         Authorised       DA         JPL Ref.       RDL00415         BIM Ref.       Vol.         Project       Orig.         Vol.       Level       Type         Role       Number         OOO 415       IDI	
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Scale     1:100 @A1     Authorised     DA       JPL Ref.     RDL00415     BIM Ref.       BIM Ref.     Orig.     Vol.     Level     Type     Role     Number       OOO/115     IDI     VV     VV     DD     V     OOO2	
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## CLOSE PROXIMITY OF EXISTING RESIDENTIAL STRUCTURES CONTRACTOR TO NOTE CLOSE PROXIMITY OF EXISTING INHABITED BUILDINGS. CARE TO BE TAKEN TO PROTECT EXISTING COTTAGES WHILE ENABLING WORKS ARE CARRIED OUT. CONTRACTOR TO PROVIDE DETAILED METHODOLOGY OF CONSTRUCTION

SEQUENCING OF WORKS ON SITE SO AS NOT TO COMPROMISE THE STABILITY OF THE EXISTING STRUCTURE. TO BE AGREED WITH JACKSON PURDUE LEVER BEFORE COMMENCEMENT OF WORKS ON SITE.

FOR EXTENT OF EXISTING SCAFFOLD RESTRAINT SYSTEM AND SCAFFOLDING TO PERIMETER OF DOWNINGS MALTHOUSE TO BE RETAINED AND PROTECTED DURING WORKS SEE SEVERNSIDE SCAFFOLDING DRAWINGS AND JPL DRAWING RDL00415/030.

## CONTRACTOR TO ENSURE ALL SUITABLE PLANNING CONDITIONS AND LISTED BUILDING CONDITIONS HAVE BEEN APPROVED PRIOR TO WORKS COMMENCING

Suitability

S2 - Suitable for Information

purdue lev

Revision

P03

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	© Jackson Consulting Engineers Limited A1
	1. DO NOT SCALE THIS DRAWING. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS ON SITE PRIOR TO COMMENCING THE WORKS.
	2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND
	<ol> <li>SPECIFICATIONS.</li> <li>ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL</li> </ol>
	<ol> <li>4. ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.</li> </ol>
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	Rev.     Date     Revision Description     Drawn     Auth'd       Client
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	Date     OCT 2019     Drawn     CE       Scale     1:100 @A1     Authorised     DA       JPL Ref.     RDL00415
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![](_page_7_Figure_0.jpeg)

	© Jackson Consulting Engineers Limited A1
	1. DO NOT SCALE THIS DRAWING. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS ON SITE PRIOR TO COMMENCING THE WORKS.
	2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND
	3. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL
	4. ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE
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ASBESTOS CONTRACTOR TO NOTE ASBESTOS MAY BE PRESENT ON SITE. A WATCHING BRIEF IS BEING PROVIDED BY HEREFORD ASBESTOS. ANY SUSPECTED ASBESTOS TO BE REPORTED TO PRINCIPAL DESIGNER/CLIENT FOR REMOVAL BY SPECIALIST CONTRACTOR.	
ROSS SITE SERVICES OCATE, DEMARK AND PROTECT OR MAKE SAFE ALL EXISTING ON SITE / ROSS SITE SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS	
RAFFIC & PEDESTRIANS ONTRACTOR TO NOTE SITE IS BOARDED BY PUBLIC PARKING, ROAD AND OOTPATHS. CONTRACTOR TO PROVIDE ROAD CLOSURES & SUITABLE RAFFIC MANAGEMENT PROCEDURES DURING WORKS WHERE DEEMED IECESSARY.	
ECAY OF EXISTING STRUCTURE HE EXISTING STRUCTURE WITHIIN THE MALTHOUSE IS IN A STATE OF ARTIAL COLLAPSE. THERE IS SIGNIFICANT DECAY TO TIMBER STRUCTURES T ALL LEVELS LEAVING FURTEHR AREAS SUSCEPTIBLE TO COLLAPSE. NDER NO CIRCUMSTANCES SHOULD THE CONTRATOR ENTER THE UILDING. IT IS RECOMMENDED THAT THE DISMANTLING IS UNDERTAKEN SING LONG REACH METHODS TO REDUCE TEH RISK TO SITE OPERATIVES.	
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	Client Rokeby Developments MERCHANT PLACE DEVELOPMENTS
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	DOWNING MALTHOUSE THIRD FLOOR LAYOUT SHOWING STRUCTURE ABOVE
	Date     OCT 2019     Drawn     CE       Scale     1:100 @A1     Authorised     DA       JPL Ref.     RDL00415       BIM Ref.
	Project Orig. Vol. Level Type Role Number 000415 JPL XX XX DR X 0025
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![](_page_8_Figure_0.jpeg)

Standards on baseplates on sole boards on firm level ground.		@ 1200 c/c max.	Denotes new window locations. Indicates board bearers	Intermediate guard rail at 1200mm above boarded level to be fitted to all framed lifts.	Denotes Ledger bracing as shown secured using 90° couplers.	Denotes Facade bracing as indicated, secured using load bearing couplers.	Boarded lifts to have double guard rail and toe board throughout.				CUPLOCK STARCASE		Cuplock stair tower to be installed and tied as per manufacturers instructions.								Construction	Approved For	Drawing Status:
Job Description: Raking Shore & Access Scaffold. Scale: Drawing Title: Drawn:HS 1:100 ISO A1 IN Drawn Title: Drawn:HS 19/ORYX/02/051-4 Checked:LS IN Drawn IN Date: Rev: JUN Drawn:HS Drawn:HS Drawn:HS Date: Rev: JUN Drawn:HS Date: Rev: JUN Drawn:HS Drawn Drawn HS Drawn HS Dra	Drawing Title: Downings Malthouse, Gloucester.	client: Severnside Scaffolding Ltd.	Longwell Green, Bristol. BS30 9DU. Tel: 01173 290050 Email: harry@oryxdesignltd.co.uk	SCAFFOLD DESIGN ©2019 24c Shellards Road,		Severnside Scaffolding Ltd	CDM This drawing constitutes the design risk assessment in accordance with regulation 8,9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination of general risk in the use of temporary works.For guidance please see the relevant codes as provided in HSE publications.	Dimensions All Dimensions are in Millimeters.Written dimensions will take precedence over scaled dimensions. Contractor should note all site dimensions and notify Oryx Scaffold Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.	<u>Modifications</u> No major alterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Designs.	<u>Temporary Roofs</u> No roof is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.	<u>Sheeting/fans</u> No additional wind protection, sheeting or fans etc, to be added to the scaffold structure unless otherwise stated on this drawing.	Shoring work Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.	Tie Loads Where scaffold has been designed to be tied to adjacent structure, tests may be required to ensure structure is suitable. TG4:17 to be used for best practice guidance Tie load to structure = 3.66kN TG4:17 Test Load = 4.58kN (1.25FOS)	<u>Foundations/supports</u> The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection. Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Load to Twin Standards = 49.50kN Maximum Load To Single Spreader (Kentledge Bays) = 105.70kN	<u>Working platforms</u> All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.	Design loads This scaffold has been designed for the following: 1 no lift @ 2 kN/m <sup>2</sup> 1 no lift @ 1 kN/m <sup>2</sup>	All scaffold materials forming this structure are to comply with BS EN:12811-1 & BS: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.	BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.	BS EN:12811-1 & BS EN:12811-2 Working at Height Regulations 2005; BS EN 1991-1-4:2005+A1:2010 BS EN 1991-1-3:2003	This drawing has been prepared in accordance with the following:	Basis of design This drawing has been prepared from the information supplied to us by, or on behalf of the contractor, who should check that the requirements have been correctly interpreted and that loading, dimensions, lift heights, bay sizes and erection sequences etc, are as required and practicable.	<u>Property</u> This drawing remains the property of Oryx Scaffold Design Ltd. No unauthorised use, copy or disclosure may be made without written permission from Oryx Scaffold Design Ltd.	General notes:

![](_page_9_Figure_0.jpeg)

Drawing Status:

# General notes:

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This drawing has been prep following: ared in ac with the

BS EN:12811-1 & BS EN:12811- 2 Working at Height Regulations 2005; BS EN 1991-1-4:2005+A1:2010 BS EN 1991-1-3:2003

Reference has been made to the following Docun ientation

BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.

All scaffold materials forming this structure are to comply with BS *EN*:12811-1 & *BS*: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.

<u>Design loads</u> This scaffold has been designed for the following: 1 no lift @ 2 kN/m<sup>2</sup> 1 no lift @ 1 kN/m<sup>2</sup>

Total number of boarded lifts are as shown

Working platforms All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.

<u>Foundations/supports</u> The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection. Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Single Leg Load = 6.30kN Maximum Dual Leg Load To Single Spreader (Kentledge Bays) = 39.06kN

<u>Tie Loads</u> Where scaffold has been designed to be tied to adjacent structure, tests may be required to ensure structure is suitable. TG4:17 to be used for best practice guidance Tie load to structure = 3.66kN TG4:17 Test Load = 4.58kN (1.25FOS)

Shoring work Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.

<u>Sheeting/fans</u> No additional wind protection, sheeting or fans etc, to be added to the scaffold structure unless otherwise stated on this drawing

Temporary Roofs No roof is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.

<u>Modifications</u> No major alterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Designs.

Dimensions All Dimensions are in Millimeters.Written dimensions will take precedence over scaled dimensions. Contractor should note all site dimensions and notify Oryx Scaffold Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.

CDM This drawing constitutes the design risk assessment in accordance with regulation 8,9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination of general risk in the use of temporary works.For guidance please see the relevant codes as provided in HSE publications.

![](_page_9_Picture_35.jpeg)

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 Date:

 1:100
 19/ORYX/02/051-5
 Checked:LS
 25/10/19

Rev\_

Raking Shore & Access Scaffold.

-**\*** 350 Beams on flat to be - secured using Class B 90° Couplers throughout.

![](_page_10_Figure_0.jpeg)

Drawing Status:

![](_page_10_Picture_2.jpeg)

# General notes:

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Basis of design This drawing has been prepared from the information supplied to us by, or on behalf of the contractor, who should check that the requirements have been correctly interpreted and that loading, dimensions, lift heights, bay sizes and erection sequences etc, are as required and practicable.

This drawing has been prep following: ared in ac with the

BS EN:12811-1 & BS EN:12811- 2 Working at Height Regulations 2005; BS EN 1991-1-4:2005+A1:2010 BS EN 1991-1-3:2003

Reference has been made to the following Docun

nentation

350 Beams on flat to be - secured using Class B 90° Couplers throughout.

BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.

All scaffold materials forming this structure are to comply with BS *EN:12811-1* & *BS: 5973:1993;* All proprietary equipment must be used in accordance with the manufacturers information.

<u>Design loads</u> This scaffold has been designed for the following: 1 no lift @ 2 kN/m<sup>2</sup> 1 no lift @ 1 kN/m<sup>2</sup>

Total number of boarded lifts are as shown.

<u>Working platforms</u> All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.

Foundations/supports The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection.Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Leg Load = 30.48kN

Tie Loads Where scaffold has been designed to be tied to adjacent structure, tests may be required to ensure structure is suitable. TG4:17 to be used for best practice guidance Tie load to structure = 3.66kN TG4:17 Test Load = 4.58kN (1.25FOS)

Shoring work Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.

<u>Sheeting/fans</u> No additional wind protection, sheeting or fans etc, to be added to the scaffold structure unless otherwise stated on this drawing.

Temporary Roofs No roof is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.

<u>Modifications</u> No major alterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Design

Dimensions All Dimensions are in Millimeters.Written dimensions will take precedence over scaled dimensions. Contractor should note all site dimensions and notify Oryx Scaffold Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.

CDM This drawing constitutes the design risk assessment in accordance with regulation 8,9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination of general risk in the use of temporary works.For guidance please see the relevant codes as provided in HSE publications.

![](_page_10_Picture_34.jpeg)

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ghts to match ndows from

Denotes Ledger bracing - as shown secured using 90° couplers.

Adjustable base jacks positioned in transoms to butt wall. Transoms to be secured to horizontal ladder beams with Class B 90° Couplers. All transoms to be square cut max jack extension = 300mm.

![](_page_11_Figure_0.jpeg)

Drawing Status:

![](_page_11_Picture_2.jpeg)

Approved For Construction

Live load allowance: 1No lift @ 2kN/m² 1No lift @ 1kN/m²

Scaffold has been designed to be uncladded.

![](_page_11_Figure_6.jpeg)

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Basis of design This drawing has been prepared from the information suppled to us by, or on behalf of the contractor, who should check that the requirements have been correctly interpreted and that loading, dimensions. If heights, bay sizes and erection sequences etc, are as required and practicable.

This drawing has been prepared in accordance with the following:

BS EN:12811-1 & BS EN:12811-2 Working at Height Regulations 2005; BS EN 1991-1-4:2005+A1:2010 BS EN 1991-1-3:2003

ce has been made to the following Docu

rentation

BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.

All scaffold materials forming this structure are to comply with BS EN:12811-1 & BS: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.

Design loads This scaffold has been designed for the following: 1 no lift @ 2 kN/m<sup>2</sup> 1 no lift @ 1 kN/m<sup>2</sup>

lotal number of boarded lifts are as shown.

Working platforms AI working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.

Foundations/supports The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold back without undue deflection. Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold back. Maximum Leg Load = 30.48kN

TIGL Loads Where scaffold has been designed to be tled to adjacent structure, tests may be required to ensure structure is suitable. TG4:171 ob e used for best practice guidance TIe load to structure = 3.68KN TG4:17 Test Load = 4.58KN (1.25FOS)

Shorting work of Design Ltd cannot and will not pass comment on Onyx Scattard Design Ltd cannot and will not pass comment on the building being shored. It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.

Sheeting/fans No additional wind protection, sheeting or fans etc, to be added to the scaffold structure unless otherwise stated on this drawing

Temporary Roofs No roof Is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.

Modifications No major afterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Designs.

Dimensions are in Millimeters. Written dimensions will take PL Dimensions are in Millimeters. Written dimensions for the all precedence over scaled dimensions. Contractor should note all stell dimensions and notify Oryx Scaffadd Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.

CDM This drawing constitutes the design risk assessment in accordance with regulation 8.9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination of general risk in the use of remnorary works? To guidance please see the relevant codes as provided in HSE publications.

![](_page_11_Picture_37.jpeg)

Appendix F

**Proposed Structure details** 

![](_page_13_Figure_0.jpeg)

![](_page_14_Figure_0.jpeg)

![](_page_14_Figure_1.jpeg)

![](_page_15_Figure_0.jpeg)

![](_page_15_Figure_1.jpeg)

![](_page_15_Picture_2.jpeg)

![](_page_16_Figure_0.jpeg)

![](_page_16_Figure_1.jpeg)

NOTE :- ALL LINTELS SUBJECT TO FINISHES TO BE CONFIRMED BY ARCHITECT ALL TIMBER REPAIRS SUBJECT TO

CONFIRMATION FOLLOWING INVESTIGATION BY SPECIALIST

![](_page_16_Picture_4.jpeg)

![](_page_17_Figure_0.jpeg)

![](_page_17_Figure_1.jpeg)

TO BE CONFIRMED BY ARCHITECT

ALL TIMBER REPAIRS SUBJECT TO CONFIRMATION FOLLOWING INVESTIGATION BY SPECIALIST

![](_page_17_Picture_4.jpeg)

Appendix E

**Elevation remedial works drawings** 

![](_page_19_Picture_0.jpeg)

PICTURE 1

![](_page_19_Picture_2.jpeg)

ORIGINAL BRIDGE LOCATION. ALLOW FOR REPAIR AT - JUNCTION AND REMOVAL OF OLD STEELWORK.

PICTURE 2

![](_page_19_Picture_5.jpeg)

PICTURE 5

![](_page_19_Picture_7.jpeg)

PICTURE 7

![](_page_19_Figure_9.jpeg)

OF A FULL STRUCTURAL SURVEY

![](_page_19_Picture_11.jpeg)

PICTURE 8

PICTURE 9

![](_page_19_Picture_14.jpeg)

PICTURE 3

GOODS HOIST REMOVED DURING SCAFFOLD

HOIST TO MATCH ON SECOND GABLE (PICTURE 4)

![](_page_19_Picture_16.jpeg)

![](_page_19_Picture_18.jpeg)

100% B
50% BF
100% E

PICTURE 10

PICTURE 11

PICTURE 12

![](_page_20_Picture_0.jpeg)

![](_page_20_Picture_1.jpeg)

![](_page_20_Figure_2.jpeg)

SOUTH EAST ELEVATION

![](_page_20_Picture_4.jpeg)

PICTURE 5

![](_page_20_Picture_5.jpeg)

PICTURE 6

![](_page_20_Picture_7.jpeg)

PICTURE 9

![](_page_20_Picture_9.jpeg)

GABLE BRICKWORK DAMAGED

DURING DEMOLITION

PICTURE 10

![](_page_20_Picture_11.jpeg)

![](_page_20_Picture_12.jpeg)

PICTURE 3

![](_page_20_Figure_14.jpeg)

![](_page_20_Figure_15.jpeg)

![](_page_20_Figure_16.jpeg)

![](_page_20_Figure_17.jpeg)

ALL WORKS SUBJECT TO PLANNING AND LISTED BUILDING CONSENT

EXTENT OF BRICK REPAIR AND REPOINTING HAS BEEN DEFINED BASED ON THE FINDINGS OF AN INSPECTION FOR GROUND LEVEL WITH NO ACCESS TO HIGH MASONRY, CONSEQUENTLY FINDINGS MAY VARY SUBJECT TO THE FINDINGS OF A FULL STRUCTURAL SURVEY

![](_page_20_Picture_21.jpeg)

ALLOW FOR MAKING GOOD OLD JOIST HOLES AND WALL PLATE LOCATIONS

![](_page_20_Picture_23.jpeg)

![](_page_20_Picture_24.jpeg)

![](_page_20_Picture_26.jpeg)

![](_page_20_Picture_27.jpeg)

Appendix D

H&R timber survey retained HO Warehouse

# Hutton + Rostron Environmental Investigations Limited

# Bakers Quay, Gloucester: Investigation of retained roof and floor timbers

Site note 1 for 14 May 2020, job no. 151.97

## CONTENTS

- 1 Introduction
- 2 Staff on site and contacts
- 3 Observations and Recommendations
- 4 H+R work on site
- 5 Proposed action by H+R
- 6 Information required by H+R
- 7 Administrative requirements

## Attachments

- A Photographs
- B Plans

Distribution:

File: 151.97

### **1 INTRODUCTION**

### 1.1 AUTHORITY AND REFERENCES

Hutton + Rostron Environmental Investigations Limited carried out a site visit to Bakers Quay, Gloucester on 14 May 2020 in accordance with instructions from Adrian Goodall by email dated 13 May 2020 11:54 with attached Order Form. Drawings provided by the client were used for the identification of structures. For the purpose of orientation in this report, the entrance to the building was taken as facing east onto High Orchard Street

### 1.2 AIM

The aim of this investigation was to establish the construction type and condition of the timber elements to the roof and floor structures, and, where necessary, give remedial advice

#### **1.3 LIMITATIONS**

This survey was confined to the accessible structures. Only demolition or exposure work can enable the condition of timber to be determined with certainty, and this destroys what it is intended to preserve. Specialist investigative techniques are therefore employed as aids to the surveyor. No such technique can be 100 per cent reliable, but their use allows deductions to be made about the most probable condition of materials at the time of examination. Structures were not examined in detail except as described in this report, and no liability can be accepted for defects that may exist in other parts of the building. We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect or in the event that such part of the property is not free from defect it will not contaminate and/or affect any other parts of the property. No formal investigation of moisture distribution was made

## **2 STAFF ON SITE AND CONTACTS**

#### 2.1 H+R STAFF ON SITE

2.2 PERSONNEL CONTACTED

### **3 OBSERVATIONS AND RECOMMENDATONS**

Note 1: The locations and observations are shown on the Photographs at Attachment A and Plans at Attachment B

Note 2: Decay already marked on the plans with a red line sent by the client was not commented upon further in this site note

## 3.1 EXTERIORS

The exteriors were not examined for the purpose of this site note

## 3.2 TIMBER CONDITION

#### 3.2.1 Roof

A pitched roof spanned from north to south with a large dormer structure at the south-west corner and was constructed from softwood timber. Approximately 31no. rafters were seen to each pitch and were generally supported by timber plates at the head of the walls with additional support provided by way of purlins. 2no. trusses were identified. The roof structure comprised of the following timber elements:

- 1 Principal rafters: 200 x 150 mm
- 2 Common rafters: 100 x 50 mm at 380 mm centres
- 3 Rafter plate: 70 x 220 mm
- 4 Purlins: 170 x 130 mm
- 5 Posts: 200 x 200 mm
- 6 Tie beams: ? x 200 mm

Generally, roof timbers were free from structurally significant decay, and deep moisture contents were below, but close to, the threshold of 22 per cent at which decay can occur. However, the following defects were identified (shown in detail on the Plans at Attachment B):

- a) Structural decay to 1no. principal rafter foot and 1no. tie beam bearing end at the south-east corner both for a length of approximately 500 mm each
- b) Structural decay to the mid-section of 1no. principal rafter for a length of approximately 1.0 m and to 1no. purlin for a length of 500 mm at the southeast corner
- c) Structural decay to the mid-section of 1no. valley rafter for a length of approximately 300 mm and to 1no. purlin for a length of 300 mm at the southwest corner
- d) Structural decay to 1no. principal rafter foot and 1no. tie beam bearing end at the middle of the west pitch both for a length of approximately 500 mm each
- e) Structural decay to 1no. common rafter for its entire length to the north pitch of the dormer structure
- f) All timbers in contact with masonry had elevated moisture contents of around 20 per cent, providing the conditions for timber decay to start or worsen

All decayed roof timbers should be replaced with new timber of suitable properties. This may be done by cutting back decay to rafter feet/beam ends to sound timber and partnering with new timber secured with coach bolts. It may be prudent to reinforce significant joints with steel plates. Where decay is seen at mid-sections, consideration should be given to replacing the full length of the timber with new. All new timbers should

be isolated from the masonry by way of an appropriate plastic damp-proof membrane, plastic packing pieces or hangers, ensuring there is an air-gap between the end grain and the masonry. All repairs should be under the direction of the Structural Engineer and/or Conservation Officer

Allowance should be made for the following quantities for QS purposes:

- At least 1no. valley rafter
- At least 1no. common rafter
- At least 1no. principal rafter
- At least 1no. principal rafter bearing end for a length of 750 mm
- At least 2no. tie beam ends for a length of 750 mm each
- At least 1.0 m of purlins

All other timbers free from structurally significant decay may be retained at the discretion of the Structural Engineer, subject to the prevention of water penetration in the future and drying down of any currently damp areas

## No chemical remedial treatments are either necessary or recommended for fungal decay or wood-boring insect infestation

## 3.2.2 Third floor

The timber elements to the retained floor structure were constructed from softwood timber. Approximately 31no. floor joists spanned from east to west and were either supported onto timber wall plates or onto primary beams. 4no. primary beams were identified (2no. single beams and 2no. twin beams with no flitch plate) with the beams in the main room having additional support provided by timber posts. The primary beams were supported into the masonry and on top of either stone or timber pads. The floor structure comprised of the following timber elements:

- 1 Floor joists: 200 x 70 mm at 400 mm centres
- 2 Joist plate: 190 x ? mm
- 3 Timber pads: 140 x ? mm
- 4 Primary beams: 340 x 340 mm (single)
- 5 Primary beams: 300 x 120 mm (twin no flitch)
- 6 Floorboards: 25 x 220 mm

Generally, floor timbers were found to be free from structurally significant decay, and deep moisture contents were below, but close to, the threshold of 22 per cent at which decay can occur. However, the following defects were identified (shown in detail on the Plans at Attachment B):

- a) Structural decay to the mid-section of 2no. floor joists for a length of approximately 300 mm at the south end
- b) Structural decay to approximately 300 mm wall plate beneath the tie beam at the south-east corner
- c) All timbers in contact with masonry had elevated moisture contents of around 20 per cent, providing the conditions for timber decay to start or worsen

All decayed floor timbers should be replaced with new timber. Timber plate should be cut back to sound timber and replaced with new timber or by 'bricking in' of the resulting void. Where decay is seen at mid-sections, consideration should be given to replacing the full length of the timber with new. If the timber is to be retained, repairs should be done by cutting back decay to the joists to sound timber and partnering with new timber secured with coach bolts. It may be prudent to reinforce joints with steel plates. All new timbers should be isolated from the masonry by way of an appropriate plastic damp-proof membrane, plastic packing pieces or hangers, ensuring there is an air-gap between the end grain and the masonry. All repairs should be under the direction of the Structural Engineer and/or Conservation Officer

Allowance should be made for the following quantities for QS purposes:

- At least 2no. floor joists
- At least 0.5 m of timber plate

All other timbers free from structurally significant decay may be retained at the discretion of the Structural Engineer, subject to the prevention of water penetration in the future and drying down of any currently damp areas

## No chemical remedial treatments are either necessary or recommended for fungal decay or wood-boring insect infestation

#### 3.2.3 Second floor

The timbers to the second floor were similar in construction and dimensions to those of the third floor, described in 3.2.1 above

Generally, floor timbers were free from structurally significant decay, and deep moisture contents were below, but close to, the threshold of 22 per cent at which decay can occur. However, the following defects were identified (shown in detail on the Plans at Attachment B):

- a) Structural decay to the mid-section of 2no. floor joists for a length of approximately 300 mm at the north end
- b) Structural decay to 4no. joist bearing ends at the middle of the east wall
- c) All timbers in contact with masonry had elevated moisture contents of around 20 per cent, providing the conditions for timber decay to start or worsen

All decayed floor timbers should be replaced with new timber of suitable properties. This may be done by cutting back decay to the joist ends to sound timber and partnering with new timber secured with coach bolts. Where decay is seen at mid-sections, consideration should be given to replacing the full length of the timber with new. If the timber is to be retained, repairs should be undertaken as described above. It may be prudent to reinforce joints with steel plates. All new timbers should be isolated from the masonry by way of an appropriate plastic damp-proof membrane, plastic packing pieces or hangers, ensuring there is an air-gap between the end grain and the masonry. All repairs should be under the direction of the Structural Engineer and/or Conservation Officer

Allowance should be made for the following quantities for QS purposes:

- At least 2no. floor joists
- At least 4no. joist ends for a length of approximately 400 mm each

All other timbers free from structurally significant decay may be retained at the discretion of the Structural Engineer, subject to the prevention of water penetration in the future and drying down of any currently damp areas

No chemical remedial treatments are either necessary or recommended for fungal decay or wood-boring insect infestation

### 3.2.4 First floor

The timbers to the first floor were similar in construction and dimensions to those of the third floor, described in 3.2.1 above

Generally, floor timbers were found to be free from structurally significant decay, and deep moisture contents were below, but close to, the threshold of 22 per cent at which decay can occur. However, the following defects were identified (shown in detail on the Plans at Attachment B):

- a) Structural decay to the mid-section of 1no. floor joist for a length of approximately 300 mm at the north end
- b) Structural decay to 3no. joist bearing ends and approximately 750 mm of underlying plate at the north-east corner
- c) Structural decay to 2no. joist bearing ends at the south-west corner
- d) Structural decay to 2no. primary beam bearing ends at the south wall
- e) The north bearing end of the westernmost primary beam at the north wall showed deep moisture contents of around 30 per cent
- f) All timbers in contact with masonry had elevated moisture contents of around 20 per cent, providing the conditions for timber decay to start or worsen

All decayed floor timbers should be replaced with new timber. This may be done by cutting back decay to the joist ends to sound timber and partnering with new timber secured with coach bolts. Where decay is seen at mid-sections, consideration should be given to replacing the full length of the timber with new. If the timber is to be retained, repairs should be undertaken as described above. It may be prudent to reinforce joints with steel plates. Repairs to the 2no. primary beam ends should also be undertaken as described above. However, due to the structural nature of the beams, consideration should be given to additional reinforcement using steel beams, plates or brackets. All new timbers should be isolated from the masonry by way of an appropriate plastic damp-proof membrane, plastic packing pieces or hangers, ensuring there is an air-gap between the end grain and the masonry. All repairs should be under the direction of the Structural Engineer and/or Conservation Officer

Allowance should be made for the following quantities for QS purposes:

- At least 1no. floor joist
- At least 5no. joist ends for a length of approximately 400 mm each
- At least 1.0 m of timber plate
- 2no. primary beam ends for a length of approximately 400 mm each

All other timbers free from structurally significant decay may be retained at the discretion of the Structural Engineer, subject to the prevention of water penetration in the future and drying down of any currently damp areas

## No chemical remedial treatments are either necessary or recommended for fungal decay or wood-boring insect infestation

## 3.2.5 Ground floor

There were no timber elements to the ground floor structure

No action needed at this stage

## 3.2.6 Moisture management

The majority of timbers were sufficiently damp for post-refurbishment deterioration to occur and measures are therefore required to mitigate this

- During structural repairs and alterations, all retained timbers should be maintained in well-ventilated environments
- The envelope of the building should be restored as soon as is possible or temporary roofs provided
- Timber should not be concealed with insultation materials, finishes or vapour check layers etc until adequate drying of timbers and associated masonry structures is complete
- Moisture levels in these materials should be formally measured and monitored by a suitably qualified specialist and certified as fit for service prior to any concealing works
- Repairs and alterations should account for the inevitable shrinkage that will occur in timber members as the building dies down

## 3.3 TIMBER SPECIES EXAMINATION

Visual timber species recognition was undertaken on site and the 9no. samples taken on the day were examined visually with a x10 magnification hand lens to determine their gross characteristics. Thin sections were also cut from each sample in the laboratory and examined microscopically. The anatomical features of each sample were compared with published information and, where applicable, with reference timber samples

## 3.3.1 Timber species

Sample reference	Common name	Botanical name
Principal rafter (roof)	European redwood	Pinus sylvestris
Common rafter (roof)	European redwood	Pinus sylvestris
Purlin (roof)	European redwood	Pinus sylvestris
Primary beam (3 <sup>rd</sup> floor)	European redwood	Pinus sylvestris
Floor joist (3 <sup>rd</sup> floor)	European redwood	Pinus sylvestris
Primary beam (2 <sup>nd</sup> floor)	European redwood	Pinus sylvestris
Floor joist (2 <sup>nd</sup> floor)	European redwood	Pinus sylvestris
Primary beam (1st floor)	European redwood	Pinus sylvestris
Floor joist (1 <sup>st</sup> floor)	European redwood	Pinus sylvestris

## 3.3.2 Strength grading

Strength grading was not undertaken as part of this investigation. However, European redwoods may achieve strength classes of either C16 or C24 depending on the outcome of strength grading using British Standard 4978:2007+A2:2017 Visual strength grading of softwood, Specification and British Standard EN 1995-1-1:2004+A2:2014 Eurocode 5: Design of timber structure. General. Common rules and rules for buildings.

It should be noted that, whilst designated strength properties for individual members meeting the criteria can be assumed, the same cannot be assumed for individual members failing to meet the grade standards

### 4 H+R WORK ON SITE

- **4.1** H+R inspected all structural roof and floor timbers by deep drilling and probing, as necessary, so as to determine their decay state and deep moisture content
- **4.2** Decayed timbers were sprayed at the time of survey with water-soluble red paint for quick and easy identification

## **5 PROPOSED ACTION BY H+R**

- **5.1** H+R will undertake detailed further investigations when full access allows and if instructed
- **5.2** H+R will advise on repair and conservation of timber elements, so as to minimise the risk of decay after refurbishment if instructed
- **5.3** H+R will advise on remedial detailing, so as to minimise the risk of damp and decay problems after refurbishment if instructed
- **5.4** H+R will advise on conservation of original fabric with regard to damp, decay and salt damage, as necessary if instructed
- 5.5 H+R will review proposed remedial details as these become available if instructed
- **5.6** H+R will liaise with building guarantors, as necessary, so as to ensure the issuing of collateral warranties and building guarantees at practical completion, if required

## 6 INFORMATION REQUIRED BY H+R

- **6.1** H+R require copies of up-to-date copies of project programmes, as these become available
- **6.2** H+R require copies of up-to-date lists of project personnel and contact lists as these become available
- **6.3** H+R require copies of proposed remedial details for comment as these become available
- **6.4** H+R should be informed as a matter of urgency if further significant water penetration occurs onto site; so that advice can be given on cost-effective remedial measures, to minimise the risk of cost or programme overruns and so as to minimise the risk of damp or decay problems during the latent defect period

### **7 ADMINISTRATION REQUIREMENTS**

- **7.1** H+R require formal instructions for further investigations and consultancy on this project
- **7.2** H+R require confirmation of distribution of digital and printed copies of reports and site notes

# Attachment A

![](_page_32_Picture_0.jpeg)

## Fig 1 :

Interior, roof; showing a general view of the roof structure at the south-east corner. Rafters were supported onto a timber plate at the head of the wall. There was no significant decay identified at the south-east corner

![](_page_32_Picture_3.jpeg)

## Fig 2 :

Interior, roof; showing a view of structural decay identified to the bearing ends of the principal rafter and tie beam at the south-east corner

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 Photographs

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![](_page_33_Picture_0.jpeg)

## Fig 3 :

Interior, roof; showing a view of structural decay to the midsection of the same principal rafter described in fig. 2

![](_page_33_Picture_3.jpeg)

## Fig 4 :

Interior, roof; showing an alternative view of the decay to the principal rafter which also extended to the purlin at the same joint

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## Fig 5 :

Interior, roof; showing a view of the middle of the east pitch which was free from structural decay at the time of the survey

![](_page_34_Picture_3.jpeg)

# Fig 6 :

Interior, roof; showing a view of the middle of the east pitch which was free from structural decay at the time of the survey

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![](_page_35_Picture_0.jpeg)

## Fig 7 :

Interior, roof; showing a view of the roof structure at the north-east corner. All timbers in this area were found to be free from structurally significant decay. However, deep moisture contents were approximately 20 per cent. This percentage was seen throughout all roof timbers which left them vulnerable to decay in the future

![](_page_35_Picture_3.jpeg)

## Fig 8 :

Interior, roof; showing a view of a purlin bearing into the masonry at the north end. There was no structurally significant decay identified at the time of survey

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## Fig 9 :

Interior, roof; showing a view of the north-west corner. A large part of the timber roof structure was not in place which was allowing water into the structure which may be hastening timber decay in this area



# Fig 10 :

Interior, roof; showing a view of extensively decayed roof structure already previously identified before H+R's arrival

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## Fig 11 :

Interior, roof; showing a view of structural decay to the principal rafter bearing end and tie beam bearing end at the middle of the west pitch



## Fig 12 :

Interior, roof; showing a view of structural decay to the entire length of 1 no. common rafter within the large dormer at the south-west corner

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#### Fig 13 :

Interior, roof; showing a view at the south-west corner where timbers were found to be free from structurally significant decay on inspection



## Fig 14 :

Interior, roof; showing a view of structural decay to approximately 300mm of valley rafter and 300mm of purlin at their mid-sections



#### Fig 15 :

Interior, roof; showing a general view of the roof structure



## Fig 16 :

Interior, third floor structure from below; showing a view of structural timber decay to the timber plate beneath the decayed tie beam and principal rafter above

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## Fig 17 :

Interior, third floor structure from below; showing a view of the floor structure towards the south-east corner. Joists and plate were found to be free from structural decay at the time of the survey. However, moisture contents were around 20 per cent leaving them vulnerable to decay in the future



# Fig 18 :

Interior, third floor structure from below; showing a view of the floor structure towards the south-east corner. Joists and plate were found to be free from structural decay at the time of the survey. However, moisture contents were around 20 per cent leaving them vulnerable to decay in the future

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#### Fig 19 :

Interior, third floor structure from below; showing a view of the floor structure at the north-east corner. No structurally significant decay was identified on inspection



## Fig 20 :

Interior, third floor structure from below; showing a view of one of the twin elements primary beam at the north end. There was no structurally significant decay identified to the bearing ends of this beam

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## Fig 21 :

Interior, third floor structure from below; showing a view of one of the twin elements primary beam at the north end. There was no structurally significant decay identified to the bearing ends of this beam



# Fig 22 :

Interior, third floor structure from below; showing a view of bearing end of single element primary beam. There was no structurally significant decay at the time of the survey



#### Fig 23 :

Interior, third floor structure from below; showing a view of the twin element primary beam where no structurally significant decay was identified on inspection



## Fig 24 :

Interior, third floor structure from below; showing a view of a section of floor structure that had been removed at the north-west corner to allow scaffold access



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## Fig 25 :

Interior, third floor structure from below; showing a view of floor structure that had already been determined as decayed and was not part of the H+R survey



# Fig 26 :

Interior, third floor structure from below; showing a view of a primary beam bearing into a wall where no structurally significant decay was identified



## Fig 27 :

Interior, third floor structure from below; showing a view of a primary beam bearing into a wall where no structurally significant decay was identified



## Fig 28 :

Interior, third floor structure from below; showing a view of the timber post and primary beam in the centre of the room

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## Fig 29 :

Interior, third floor structure from below; showing a view of the timber post and primary beam in the centre of the room



## Fig 30 :

Interior, third floor structure from below; showing a view of decay to 2 no. floor joists at their mid-section caused by water ingress from above

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## Fig 31 :

Interior, third floor structure from below; showing an alternative view of the timber decay described in fig. 30 above



#### Fig 32 :

Interior, third floor structure from below; showing a view of location where a timber sample was extracted for analysis for species ID

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## Fig 33 :

Interior, third floor structure from below; showing a view of location where a timber sample was extracted for analysis for species ID



## Fig 34 :

Interior, third floor structure from below; showing a view of location where a timber sample was extracted for analysis for species ID



#### Fig 35 :

Interior, second floor as seen from below; showing a general view of the floor structure



# Fig 36 :

Interior, second floor as seen from below; showing a view of timber floor structure that had been removed at the north-west corner to allow scaffold access

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#### Fig 37 :

Interior, second floor as seen from below; showing a close-up view of a twin element primary beam bearing into the masonry wall sat on top of a stone pad. There was no timber decay identified in this area



## Fig 38 :

Interior, second floor as seen from below; showing a view of the floor structure at the north-east corner. Floor joists were supported into the wall and onto a timber plate and in this location additional support was provided by a steel I beam. There was no structural decay identified in this area



#### Fig 39 :

Interior, second floor as seen from below; showing a view of beneath the area described in fig. 38



## Fig 40 :

Interior, second floor as seen from below; showing a general view of the floor structure at the north end being supported onto the primary beam

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## Fig 41 :

Interior, second floor as seen from below; showing a view of the primary beam bearing end at the north end and no structurally significant decay was identified on inspection



## Fig 42 :

Interior, second floor as seen from below; showing a view of a large section of decayed floor joists already identified prior to H+R's site survey



#### Fig 43 :

Interior, second floor as seen from below; showing a view of a large section of timber flooring that had been removed prior to H+R's survey



#### Fig 44 :

Interior, second floor as seen from below; showing a view of floor joists at the south-west corner which had already been identified as being structurally decayed prior to H+R's inspection

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## Fig 45 :

Interior, second floor as seen from below; showing a view of the two primary beam bearing ends at the south wall both of which were free from structurally significant decay



# Fig 46 :

Interior, second floor as seen from below; showing a view of the floor joists at the south-east corner which were free from structural decay at the time of survey



#### Fig 47 :

Interior, second floor as seen from below; showing a view of 4 no. floor joist bearing ends at the middle of the east wall. These had succumbed to structurally significant decay and will need repair



#### Fig 48 :

Interior, second floor as seen from below; showing a view of 2 no. floor joists that were decayed at their mid-section

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#### Fig 49 :

Interior, first floor as seen from below; showing a general view of the floor structure from beneath



# Fig 50 :

Interior, first floor as seen from below; showing a view of floor timbers at the north-west corner which had been removed to allow scaffold access



## Fig 51 :

Interior, first floor as seen from below; showing a view of a twin beam primary beam at the north-west corner. There was no structurally significant decay identified at the time of the survey. However, deep moisture contents were found to be around 30 per cent leaving the timber very vulnerable to decay starting



#### Fig 52 :

Interior, first floor as seen from below; showing a view of timber decay to 1 no. joist at its mid-section

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#### Fig 53 :

Interior, first floor as seen from below; showing a view of primary beam and floor joists at the north end, all of which were free from structurally significant decay



#### Fig 54 :

Interior, first floor as seen from below; showing a view of structural decay to 3 no. floor joists and bearing ends and approximately 750mm of underlying wall plate. These were located at the northeast corner



## Fig 55 :

Interior, first floor as seen from below; showing a view of timber floor structure already designated as decayed prior to H+R's inspection



## Fig 56 :

Interior, first floor as seen from below; showing a view of timber floor structure already designated as decayed prior to H+R's inspection

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## Fig 57 :

Interior, first floor as seen from below; showing a view of structural decay to the bearing end of the primary beam at the south wall



#### Fig 58 :

Interior, first floor as seen from below; showing a view of structural decay to the bearing end of the primary beam at the south wall



#### Fig 59 :

Interior, first floor as seen from below; showing a view of the timber floor structure at the south-east corner. All timbers were found to be free from structurally significant decay at the time of the survey



## Fig 60 :

Interior, first floor as seen from below; showing a view of floor joists at the middle of the east wall. These were free from structurally significant decay

 Bakers Quay, Gloucester

 Photographs

 14 May 2020

 Not to scale

Hutton + Rostron Environmental Investigations Ltd, Netley House, Gomshall, Surrey, GU5 9QA

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## Fig 61 :

Interior, first floor as seen from below; showing a view of the bearing end of the single element primary beam. This was free from structurally significant decay at the time of the survey



#### Fig 62 :

Interior, first floor as seen from below; showing a view of superficial decay to the underside of the floorboards. Upon inspection this had not extended to structural decay of the floor joists



## Fig 63 :

Interior, ground floor; showing a view of the solid ground floor structure with no timber elements for inspection

 Bakers Quay, Gloucester

 Photographs

 14 May 2020

 Not to scale

Hutton + Rostron Environmental Investigations Ltd, Netley House, Gomshall, Surrey, GU5 9QA

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# Attachment B



Baker's Quay, Gloucester, Roof

Investigation of retained roof and floor timbers 14 May 2020

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 Investigations Ltd

 151.97
 Site Note 1
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 Hutton + Rostron
 Environmental Investigations Ltd

 Netley House, Gomshall, Surrey, GU5 9QA
 Image: Comparison of the second se

Appendix A

Post demolition survey drawings



Note: Areas of building facades under scaffolding at time of survey. All structural features and openings indicated where possible.		
N		
OS Noto:		
OS Note.         The Ordnance Survey tile is to be used as a guide only.         OS Buildings         Surveyed Buildings		
This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).		
A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models. The survey has been correlated to this point and a further one		
or more OSGB36(15) points established to create a true O.S. bearing for angle orientation. No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates		
which have a scale factor applied. Please refer to Survey Station Table to enable establishment of the on-site grid.		
Building Surve	by Legend:	
HHt 2.12 SL 51.03m HL 52.82m	Head Height from FFL. Sill Level from defined datu Head Level from defined d	um. atum.
Susp CHt: 2.00 Struct CHt: 3.00	Suspended Ceiling Height Structural Ceiling Height fr	from FFL. om FFL.
Susp Ceil: 30.00m Struct Ceil: 31.00m	Suspended Ceiling Level Structural Ceiling Level fro Internal Floor Level (Gene	from datum. m datum. ral).
+100.00m     Internal Floor Level (Specific).       Insertion     Insertion Point for overlay drawings of other floors or details.		
Incoming Services		
Topographica	Survey Lege	nd:
Wall Concrete edge Kerb line Tarmac edge Line marking Grass verge	Plnv Pipe invert IB III Gy Gully Bin R Bg Back gully Vp V	uminated bollard ubbish bin ent pipe
Centre line Canopy/Overhang Centre line Verge  Station and Name Station I evel	Dp     Down pipe     Grl     G       Pipe     Pipe above ground     Lbox     Li       MH     Manhole     Ldr     Li       WL     Water level     Sty     S	round light atter box adder ille
Constant Level     Constant Level     Constant Level     Area of Undergrowth	FI Flood light IFL In Lp Lamp post THL TI Tp Telegraph post Sp S En Electron	ternal floor level nreshold level ign post
R: Ridge Level	Exectricity post     TH     Ti       TI     Traffic light     BH     B       Bus     Bus stop     ELC     E       Sv     Stop valve     BT     B	ramole prehole lectric ritish Telecom
F: Flat Roof Level Gate Fence types:	St     Stop tap     C'box C       Er     Earth rod     TT     Tr       Wm     Water meter     BP     B       Gase     Case units     Case and table     Case and table	ontrol box actile rick paved
IR Iron Railings WM Wire Mesh PIR Post & Rail	case     case value     CPS     C       Av     Air value     CVR     C       ICU     Undentified inspection     IC     In       Wo     Wash out     R/wall     R	oncrete paving slabs over spection chamber etaining wall
PW Post & Wire CL Chain Link WP Wooden Panels	Re         Rodding eye         UTL         U           BB         Belisha beacon         TCL         T           CTV         Cable tv         G:         G           Mkr         Marker post         Mc         Mc	nable to lift ree canopy level irth ulti girth
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greenhatch <sup>G</sup> e		
group		
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CLIENT		
Jackson Purdue Lever Consulting		
PROJECT Downings Malthouse Gloucester Docks		
TITLE Existing Site Blan		
SCALE         DATE           A1@ 1: 200         27/08/2020		
DRAWN JL	QUALITY R GH824	EF <b>9</b>
Level datum Se Grid orientation Se	OS notes above	
Job number 28774B		
Drawing No. Rev. 28774B_01_P 0		
Comments This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client. All dimensions should be checked on site prior		
Some services may have been omitted due to parked vehicles. Drainage information (where applicable) has been visually inspected from the surface and therefore		
visually inspected from the surface and therefore should be treated as approximate only. Notes:		
















Datum: 11.00m. Section 1.



Datum: 11.00m. Section 1.



Datum: 11.00m. Section 1.



Datum: 11.00r Elevation 4.



Datum: 11.00m. Section 1.

OS Note: The Ordnance Survey tile is to be used as a guide only. OS Buildings Surveyed Buildings This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS N A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models. The survey has been correlated to this point and a further one or more OSGB36(15) points established to create a true O.S. bearing for angle orientation. No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied. Please refer to Survey Station Table to enable establishme of the on-site grid. Building Survey Legend: SHt 1.00 HHL 2.12 Sill Height from FFL. Head Height from FFL SI 51.03m HL 52.82m Sill Level from defined datum. Head Level from defined datum. Susp CHt: 2.00 Struct CHt: 3.00 Suspended Ceiling Height from tural Ceiling Height fro Susp Ceil: 30.00m Struct Ceil: 31.00m IFI : 100.00m +100.00m ernal Floor Level (General) ernal Floor Level (Specific) Insertion Point for overlay draw of other floors or details. oming Service Water Elec opographical Survey Legend: 
 Buildings
 Overhead Cable

 Wall
 Concrete edge

 Kerb line
 Tarmac edge

 Line marking
 Grass verge

 Drop kerb
 Canopy/Overhang

 Centre line
 Verge
IC Inspection chamber Plnv Pipe invert 
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Note:

Areas of building facades under scaffolding at time of survey. All structural features and openings indicated where possible.





# STRUCTURAL CONDITION SURVEY, STABILISATION RECOMMENDATIONS AND STRUCTURAL PROPOSALS FOR DOWNINGS MALTHOUSE, BAKERS QUAY FOR ROKEBY MERCHANT (GLOUCESTER) LTD

RDL00415/F

#### **REPORT DETAILS**

Rev	Report Type	Author / Approved	Issue Date
F	Structural Report	DA	22/04/2022

## REVISIONS

Survey Rev	Details of Revision	Initials	Date
А	First Issue	DA	07/08/2015
В	Updated to reflect latest survey Aug (2016) and addition of preliminary proposals	DA	16/09/2016
С	Updated to reflect current building condition	DA	09/12/2019
D	Structural alteration details to HO warehouse and extent of dismantling plans added	DA	19/12/2019
Е	Updated Appendix E	DA	06/04/2020
F	Updated to reflect dismantling & new planning application	DA	22/04/2022

**REPORT INDEX** 



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- Appendix A Post demolition survey drawings
- Appendix B Approved dismantling sequence and extents.
- Appendix C Restraint system for gable walls and kiln north wall
- Appendix D H&R timber survey retaining HO Warehouse
- Appendix E Elevation remedial works drawings
- Appendix F Proposed Structure details



## **1.0 TERMS OF REFERENCE**

- 1.1 The purpose of the report is to support a planning application for the redevelopment of the Downings Malthouse for a residential use. This has been undertaken by assessment of its existing condition and the viability of the required alterations.
- 1.2 To assess the structural and fabric condition of the building visual inspections have been undertaken. No intrusive investigations were carried out during the survey.
- 1.3 A survey of the building was initially carried out in July 2015 by David Allott of Jackson Purdue Lever with a subsequent survey undertaken in August 2016.

Monitoring of the building continued until the last building survey in November 2019. The survey dates noted below are highlighted as pertinent surveys which enabled a greater understanding of the building:-

- On 13/10/17 a high level access survey using MEWP allowed much improved understanding of roof condition.
- Access scaffolding was provided to the gable ends in February 2019 which facilitated inspections of the Malthouse floors on all levels.
- In November 2019 access to the High Orchard floors was made possible through the existing window openings.

Due to concern arising from collapses identified to the internal structure a scaffold restraint system was installed during 2019/2020.

Early in 2020 permission was granted to remove the unstable dangerous internal structure and the adjoining concrete silo to preserve the external walls and adjacent HO warehouse.

1.4 This structural report has been prepared for Rokeby Merchant (Gloucester) Ltd; no liability is accepted to any third party for all or part of this report in connection with this or any other property.



## 2.0 SITE DESCRIPTION

#### 2.1 Bakers Quay

Downings Malthouse is located to the South West of central Gloucester in a wider area known as Bakers Quay which is to the South of the main basin of Gloucester Docks.



The site is bound to the west by Merchants Road and to the east by High Orchard Street and the Gloucester Quays outlet centre. Bakers Street runs to the south of the site and to the north lies the recently regenerated area of the Gloucester Quays.

As shown in fig 1 below the Malthouse consists of a collection of interconnected building which are referenced as Downings Malthouse, Downings Malthouse Kiln and High Orchard warehouse. These are separated by a lightwell from the remains of the kiln (high Orchard Kiln) belonging to a second malthouse which was historically located in the location of the concrete silo. To the north the High Orchard warehouse is abutted by a terrace of cottages which were recently re-developed.





## 2.2 **Description of Downings Malthouse**

The building consists of three constituent parts being the Malthouse, the Kiln and the High Orchard St Warehouse which are linked by a circulation core. The building is configured as shown on the aerial plan below.

Much of the footprint is the large open plan Malthouse to the centre which originally had 5 stories (including basement). The building had load bearing perimeter walls which reduce in width as the building height increases and continuous cast iron internal columns set on a regular grid of three columns at approximately 3.15m centres. These supported pairs of timber beams running north to south which in turn support timber floors joists sat on top of the beams. On the first and second floors the timber floors had a concrete topping laid onto the floorboards. The central line of columns continued through the upper floor to support a valley with duo pitched timber trusses either side.

The building suffered from significant water ingress to the perimeter walls and central valley. This made the floors difficult to access with a visual inspection only initially possible from the link bridge in the western corner and at ground floor level in the eastern corner. Since the original survey additional access was made possible through both installation of scaffolding and a MEWP. The surveys identified areas of collapsed and unsafe floors at all levels and significant decay to the trusses on the central valley line and along the perimeter walls.

The basement was very damp and poorly ventilated which has led to significant decay of timber elements and some corrosion to cast iron columns. There were large areas of collapsed floor to the eastern and western ends of the building which extended to the floors above which limited inspections due to the risk of further collapses.

Following dismantling the external walls of the building have largely been retained due to the early erection of scaffold restraint systems which will remain in place until a suitable internal structure has been erected. The exception to this is part of the southern elevation which has been partially removed to allow long reach machinery into the building. In additional part of the internal wall between the kiln and warehouse has been removed as it was left unrestrained following the collapse of the floors.

To the north of the main building is a former kiln area of similar height. It was largely open plan with drying levels at first and second floor levels. The first floor level was constructed from a steelwork grid and clay block flooring with pairs of columns supported off the kiln walls below. The second floor was a later additional (or had been replaced during the buildings life and was formed by steel beams at approx. 2.4m centres which spanned the width of the building supporting a lightweight open mesh steel floor. Semi arch walkways were present in the basement to the perimeter with central kiln. An internal diaphragm wall is present approximately one third of the distance along the building which forms a significant proportion of the lateral stability of the external walls. There was a timber roof structure consisting of trusses, purlins and rafters which were supported by the perimeter walls.

It has been possible to retain the western end of the kiln and internal wall where it fronts onto Merchant Street including the trusses and kiln arches. Based upon observations from ground level the trusses have found to be intact on the internal (southern) wall however this will need to be confirmed by a high level survey.

The High Orchard St warehouse is a 3 storey structure on High Orchard St that has been constructed in two phases. Access was originally only currently possible to the ground floor



level due to the collapsed staircase that links the building to the 5 storey Malthouse. Recently access has been provided to the upper floor by removing the brick infill to the original window openings. The structure is noted to be of load bearing masonry perimeter walls with timber beams and joists. The beams are propped at third points by steel columns that appear to be later addition. At roof level two timber roof trusses span west to east and are propped by timber columns at second floor level. Water ingress to this building is generally limited to the western elevation where the roof form an internal gutter against the eastern kiln gable. The decayed circulation staircase and unstable decayed floor and decayed roof in the north west corner have been removed.

## Pre demolition general photos (scaffold restraint system obscures elevations)



Merchant Street elevation

High Orchard Street elevation

## **Property Plan**





## 3.0 SURVEY SUMMARY

Following an initial survey of the building in 2015 Jackson Purdue Lever were asked to undertake a watching brief of the structure to monitor its condition and undertake additional surveys to further our understanding of the condition of the building where access was not previously possible.

Our initial surveys undertaken in 2015 were limited to the basement and third floor due to the collapse of the only staircase to the upper floors. At this time localised floor collapses were identified on the High Orchard Street side of the building and at third floor under the roof valley. This appeared to have been caused by water ingress where the lead had been removed from the roof valleys allowing water to penetrate the building.

Further high level surveys of the roof were undertaken in 2017 during the redevelopment of the cottages on High Orchard street. These inspections were undertaken via scaffolding provided to redevelop the cottages and with the benefit of MEWP access. Inspections identified that the line of the roof ridges was very uneven increasing concerns over the condition of the bearings of the roof trusses. High level drone surveys were undertaken following this survey which confirmed these findings without providing any further significant detail. It was agreed that an access scaffold would be required to allow a visual inspection of the floor and roof structure at each level.

On 7th February 2019 we attended site to agree the location and extent of scaffolding to facilitate an inspection. At this time the entrance to the basement of the Malthouse was reopened to confirm the current condition within the basement and possible further access points in the building to undertake further exploratory works. Further significant deterioration and areas of collapsed flooring were encountered within the basement to both the High Orchard and Merchant Street elevations at this time and it was agreed to erect the scaffold at the earliest opportunity.

Site photographs provided during the erection of the scaffold by Severnside scaffolding revealed further significant areas of collapse on the upper floors thus a site meeting was arranged for the 28th February with Toby Murphy (Historic England) and Adam Smith (GCC) and Charlotte Bowles-Lewis (GCC). At this time all parties agreed that the building was in an extremely poor state of repair. We advised at this time that the building had fallen into a dangerous state with further collapses of the floors having occurred since our previous report and collapse of the roof structure appeared imminent due to decayed timber and unrestrained columns which dependent upon the direction of collapse could cause collapse of the gable walls. These existing collapses had removed much of the lateral restraint afforded to the elevations by the floors with the gable elevations largely free standing.

A number of shoring options were considered following this meeting with the preferred option being a scaffold restraint system designed by Severnside as this was considered the only way to stabilise the building without having to enter the structure. It was agreed that the High Orchard Street restraint would be installed first followed by Merchant Street as it was considered that the extent of collapse was currently greater on that elevation. These were erected in May 2019 and September 2019 respectively.

Upon completion of the scaffolding a further high level inspection was undertaken in October 2019 of the roof from Merchants Road. This revealed that a central pitched roof feature (assumed to be historic valley access) had rotated significantly from previous surveys. It was also clear that the truss ends and valley beam tie are extensively decayed and therefore prone to collapse. The internal wall between the kiln and malthouse was also viewed from a third floor window and from roof level. Water ingress was occurring on both side of this wall which caused decay to the truss ends bearings. Collapse of these trusses would have lead to instability and possible collapse of the north wall to the rear of the cottage development. A scaffold restraint system was installed on this elevation to reduce the risk of this event.



Approval was granted in early 2020 to remove the unstable internal structure of the Malthouse and the adjoining concrete silo. Surveys following demolition were undertaken to confirm the condition of the remaining structure. During stabilisation works a significant area of the malthouse floor collapsed which ultimately led to limited recovery rates and some minor damage to remaining structural walls. At this time 18 intact columns have been salvaged and set aside together with 10,000 palletized bricks as shown in the photographs below.



Within the kiln the western portion adjacent to Merchant street has been retained including the arches and trusses. Those in the eastern portion which were lost due to the demolition sequence to make the building safe and that significant structural cracks were encountered to the kiln walls during the works.

The High Orchard Warehouse was largely unaffected by the stabilization works with the exception of the removal of the floors in the NW corner which were unstable. This has allowed an access staircase to be installed in this location to provide safe access to all levels.



## 4.0 OBSERVATIONS

4.1 West Elevation















#### 4.1 West elevation (Continued)









Description: Historic photographs used in part for clarity due to scaffold restraint system.

Masonry elevation consisting of three gable ends with brick parapet and stone copings. The Kiln building to the north has a louvered upstands at the ridge which formed part of the ventilation. There are bricked up windows at first floor levels and boarded up openings to the basement at ground floor level.

The malthouses have recessed brick panels with brick arched windows between brick piers. A protruding timber goods hoist remains on the central gable at 3<sup>rd</sup> floor level. A bricked up opening on the southern building is present at a similar level to the adjacent hoist denoting where a similar feature was once present.

There is much vegetation growth surrounding the parapets and significant spalling to the stone copings. Water staining due to failed water goods has led to efflorescence and spalled brickwork.



## 4.2 East Elevation















## 4.2 East elevation (Continued)



Description: Masonry elevation consisting of the rear of the gables ends of the malthouse which are partly obscured by the historic warehouses on Orchard Street. The masonry consists of recessed brick panels with brick arched windows between high masonry piers.

There is significant water staining due to failed water goods leading to spalling brickwork and loss of mortar.

There is much vegetation growth surrounding the parapets and spalling to the stone copings.

During the demolition process the left hand gable has been damaged with cracking and horizontal displacement noted. The right hand gable has also been partially lost over the access door into the circulation core.



## 4.3 North elevation















4.3 North Elevation (Continued)







Description: Historic external photographs due to restraint scaffold. Roof over left hand side has been removed.

Masonry elevation consisting of recessed brick panels between brick piers.

There are bricked up arched windows at first floor level. These have been opened to provide tie locations for the restraint scaffold. Additional openings have also been created in locations close to proposed windows to minimise damage to existing building.

The masonry generally appears structurally sound and is in fair condition with the exception for the eaves where repointing and some rebuilding will be required due to water damage, vegetation growth and the demolition works.



#### 4.4 South elevation













#### Description:

Masonry elevation consisting of recessed brick panels with masonry arched windows between brick piers. The elevation was originally part of a light well opposite a similar building where the concrete silo was situated.

An opening has been formed through the elevation to provide access for the demolition works. The remaining elevation has been tied to a restraint system with the high orchard kiln.

At eaves level the masonry is in very poor condition due to extensive water ingress. The remaining elevation is in reasonable condition but will require significant repair, repointing and cleaning.



High Orchard Street Warehouse Elevations 4.5















## 4.6 High Orchard Street warehouse elevations (Continued)









- Description: Photographs largely historic due to access scaffold. Plain brick elevations built in a number of phases.
  - On the south gable elevation there is a significant vegetation growth at the connection to Downings Malthouse therefore extensive rebuilding and general repointing will be required.
  - The gable only has two small windows at high level that has spalled stone cills with vertical spanning bars. The elevation will require repointing.
  - The east elevation appears to consist of original warehouse to the south with a latter infill to the cottages to the north.
  - There are cracks in the masonry between the windows as identified in appendix B. Much of the elevation will require repointing and then stone cills are spalling.
  - The walls appear structural around however considerable repair works are required.
  - The north elevation extends above the adjacent cottages. The parapet coping stones are in poor condition and will require replacing.



















4.7 Kiln Roof (Continued)









#### Description:

Only the front third of the roof remains following the demolition works. The roof over steeply pitched and slate tiled which has been covered in bitumen. There is a projecting central section which originally provided ventilation to the kilns below.

The steeply sloping sections are generally well protected by the roof finishes however where this shed water onto a concealed gutter on the south side adjacent to the malthouse the gutter failed allowing water to penetrate below. There was vegetation growth in the valleys and parapets and it is considered likely that there is decay to the truss ends however they cannot currently be observed as there is no high level access within the remaining kiln.

The parapet coping stones are generally in a poor condition and are dislodged on the old internal wall line.















## 4.8 Kiln (Continued)



Description: There were two separate kiln areas one smaller on to the west and a larger on to the east. The larger area has been demolished.

A perimeter walkway if formed by semi-arches that span onto perimeter walls. There are windows on the north wall which are at high level as the external level is circa 1.5m above the basement. The arches are retained in



the remaining kiln and at the base of the eastern wall to act as a buttress to the internal arches.

A separating wall has been retained and the southern internal elevation. The wall does not extend to the basement and is supported by a brick pier and steel beams.

The internal walls are generally in a reasonable condition. There is a vertical crack between the northern wall and internal wall. There are numerous openings in the southern wall either from doorways or service holes some of which have failed lintels.

The significant water ingress on the old valley line may have caused some decay to the two remaining truss ends however this is not clear from ground level or the external scaffold.



#### 4.9 High orchard Street Ground floor



Description:

The floor consists of two rooms both with concrete ground floors and exposed timber floors beams and joists above.

The timber beams in the southern room are propped steel CHS columns which appears to be a later modification.

The northern room has no internal columns and the floor joists are supported by a pair of timber beams.

The floor joists between the NE internal wall and first supporting timber floor beam have been removed as they were decayed. A scaffold stair tower has been installed to provide access to all levels.





Description:

The floor consists of two rooms both with timber floors and exposed timber floors beams and joists above.

The timber beams in the southern room are propped steel CHS columns which appears to be a later modification.

There is a large opening to the floor above in the middle of the west wall. There is a vertical crack in the brickwork in the south western corner of the room due to vegetation growth.

The northern room has no internal columns and the floor joists are supported by a pair of timber beams.

The floor joists between the NE internal wall and first supporting timber floor beam have been removed as they were decayed. A scaffold stair tower has been installed to provide access to all levels.



4.11 High Orchard Street Second Floor















4.11 High Orchard Street Second Floor (Continued)



Description: The floor consists of two rooms both with timber floors and exposed timber floors beams and joists above.

The timber beams in the southern room are much smaller than the floor below and may have been added at a late date. These are propped by timber posts to the columns below.

There is a large opening to the floor in the middle of the west wall.

There is a vertical crack in the brickwork in the south western corner of the room and decay to the floor below. It is thought the cracking is caused by the external vegetation growth.

The northern room has no internal columns and the floor joists are supported by a pair of timber beams.

The floor joists between the NE internal wall and first supporting timber floor beam have been removed as they were decayed. A scaffold stair tower has been installed to provide access to all levels.

















4.12 High Orchard Street Third Elevation (Continued)





Description: The floor consists of two rooms both with timber floors and exposed timber roof structure above.

In the southern room two trusses span west to east supporting purlins running perpendicular at midspan of each roof pitch. The rafters span from a timber wall plate in the wall up to a ridge board. The floor joists below do not span onto the bottom chord of the roof truss and the floor level is set circa 40mm below the top of the bottom chord. A perpendicular interconnecting ridge line runs into the main roof between the two trusses which extends to the east over the circulation staircase. The north eastern purlin has been cut short of the wall to the north leaving the rafter inadequately supported.

There is access to the floor via a loft hatch however there are no ladders below. There is a vertical crack in the brickwork in the south western corner of the room and decay to the floor below.

In the northern room the purlins span north to south between masonry wall and the rafters span from a timber wall plate in the wall up to a ridge board.

The floor joists and rafters between the NE internal wall and first supporting timber floor beam have been removed as they were decayed. A scaffold stair tower has been installed to provide access to all levels. There is also water ingress in the south west corner of the larger room causing decay to timber purlins and localised decay to roof rafters.

Neither roofs are tied to the masonry gables.

The masonry surrounding the door to the original circulation core has been damaged during the demolition works. This will require rebuilding during the refurbishment works.



#### 4.13 High Orchard Street Roof



Description: The roof is duo pitched over the warehouse with a return duo pitched roof to the rear over the staircase.

The roof is slate tiled but has been over painted with a bitumen covering. Some loose tiles were noted to the rear near vegetation growth. The roof generally appears in fair condition however the western internal valley gutter has failed where it adjoins the malthouse kiln. The decayed timber has

been removed in the NW corner and a staircase installed in the void.




















4.14 High Orchard Kiln Elevations (Continued)









Description: Painted masonry elevations to original kiln of demolished second malthouse. The western wall was removed during demolition of the adjacent concrete silo. The remaining gable ends are restrained by a scaffold restraint system.

A concrete ring beam located at eaves level ties the top of the three walls together. All windows have been bricked up.

The masonry consists of recessed brick panels with brick arched windows between regularly spaced masonry piers. There is water staining, spalling brickwork and loss of mortar to all elevations.

There is much vegetation growth particularly at high level below the concrete ring beam.

On the east elevation a number of doorways and openings have been formed through the original wall some through the main structural piers. This has left a patchwork of new and old openings some of which are poorly supported.

The concrete ring beam is generally in a reasonable condition however a few localised areas of spalling concrete were noted caused by corrosion of the reinforcement bars.



4.15 High Orchard Kiln Internal Elevations





















Description: Painted internal masonry elevations with concrete beam at eaves level. Very few original openings and doorways remain and significant alterations have occurred during the life of the building.

The gable walls and eastern elevation remain. The walls are in a Fair condition however there is much vegetation growth particularly below the ring beam which will require extensive rebuilding. The junction between the old western wall and northern gable is in poor condition and should be dismantled.

There is concrete pit in the south east corner which will need filling/backfilling to suit the development proposals.



## 5.0 CONCLUSIONS

## 5.1 Condition summary

The ongoing surveys and opening up works enabled a much improved understanding of the condition of this building since the first inspection in 2015. The Malthouse was found to be extremely unstable which in turn could destabilise the adjacent kiln and to a lesser extent the High Orchard Warehouse. The High Orchard warehouse is in a reasonable condition with the exception of localised repairs primarily on the western wall where the gutters have failed.

The completion of the scaffold restraint system to the gables (Full details included in appendix C) stabilised the external walls and enabled the subsequent demolition of the concrete silo, Malthouse and kiln internal structure and removal of silos within the HO kiln in 2020.

Much of the decayed timber in High Orchard warehouse has been removed in the NE corner allowing an access scaffold to all levels to be constructed. This in turn has allowed a timber survey to be undertaken. Generally the timber was found to be in reasonable condition however the historic water ingress has caused decay to some of the timber wall plates and beam ends where they bear into the masonry.

A survey of the remaining structure has been undertaken and is attached in appendix A together with the original approved demolition drawings and timber survey in appendix B & D respectively.

Generally the remaining masonry structure is restrained by the scaffold system and is in fair condition however there are localised areas which will require removing and/or rebuilding.

- The south western gable wall was damaged during demolition works and will require rebuilding as part of the redevelopment.
- The remains of the internal wall between the malthouse and kiln are in a poor condition largely due to a diagonal crack that is present on the right hand wall. It is not considered safe to repair its current condition and should be removed early in the redevelopment works.
- The remains of the western wall of the high Orchard kiln where it joins the northern gable are in a poor condition with significant cracking. It is recommended that the wall should be removed early in the redevelopment works.
- The western wall of the HO warehouse has been damaged around the doorway into the old circulation staircase. This should be rebuilt at part of the redevelopment.

As noted above the timber elements have now been surveyed and the report is attached. The remaining trusses and beams forming the kiln roof have not been surveyed and are currently inaccessible. It is possible that the truss ends are decayed and these will require inspecting by a timber specialist. Much of the decayed timber in HO warehouse has already been removed however some repair will be required to timbers embedded in the damp masonry as noted in the H&R report and localised repair of floor joists.

# 5.2 Additional Stabilization and dismantling proposals

We would therefore recommend that the next phase of stabilisation should consist of the following steps



1. Removal of remaing cracked and unstable masonry as noted in 5.1.

2. Prior to installation of an internal scaffold within the kiln, access is to be provided to the truss ends to enable an assessment of their condition to be made.

3. Repair of defective timber as identified in the H&R report and JPL structural drawings.

4. The final stage of stabilisation will form part of the redevelopment when the new internal frame is tied to the external walls to allow the scaffold restraint system to be removed. Sequencing of the new build should consider the stability of the existing walls at all stages.

5.3 Re-development options

#### Malthouse and kiln

Given the condition of the internal structure and collapses that have occurred it is clear that as previously outlined there is no option to repair or retain the existing structure in situ. It is also not considered feasible to use the salvaged material to rebuild the internal structure in a load bearing capacity given the collapses that have occurred and the limited recovery rate of timbers and cast iron columns.

Therefore the only viable option remaining is to erect a frame within the internal walls which will be supported by new foundations to provide suitable support for the new floors to the apartments. Vertical loading of the walls will be avoided due to the uncertainty over its capacity and to limit further alterations of the walls, however the walls will be tied back to the new frame to ensure lateral stability is maintained. The frame could be of either steel or concrete construction and the most cost-effective solution is currently considered to be a concrete transfer structure at ground floor level with a cold rolled framing solution above.

# Retained kiln

It has been possible to retain the western end of the kiln and internal wall where it fronts onto Merchant Street including the trusses and kiln arches. Based upon observations from ground level the trusses have found to be intact however given the historic water ingress the truss ends may be decayed on the internal wall. This is to be confirmed by a high level survey.

New internal floors will be added to match the wider floor footprint together with a duplex apartment in the roof space which will require some amendments to the existing trusses to provide access. Floor plans and sections of the proposals are included in appendix F.

#### High Orchard warehouse

Except for the circulation staircase and localised areas of decay the High Orchard Warehouse is in a reasonable condition. Where floor structures have been measured at second and third floor levels they have been found suitable for supporting residential loads without the need for further strengthening and will be repaired on a like for like basis. New timber floors will be provided on each level of the current circulation staircase which has largely collapsed.

It is suggested that trial holes are provided to confirm the footing details for the internal columns which have been added to strengthen the original long span timber beams.

The roof structure is in a reasonable condition however as noted in the drawings in appendix D there are areas of decay where it is proposed to replace timbers on a like for like basis.



Where members have been found insufficient to support the increased loadings from the new ceiling finishes they have been strengthened by the addition of extra purlins.

The current form of the roof support does not facilitate access into and throughout the roof space due to the trusses having a horizontal chord at a height of 1.5m. It is proposed that the two trusses will be altered as shown in appendix F and a new flat roof section added near the entrance to the apartment.

Historical photographs indicate that there was originally a hoist dormer between the two trusses on the east elevation. This ties into the central openings on the east elevation and matches the structural variations noted in the central bay. It is proposed that this feature will be reintroduced as part of the development.

#### High Orchard Kiln

Our previous report highlighted that there were no existing floors within this building and therefore only masonry elevations remains. During demolition of the silo the historic internal wall with the old malthouse has been lost due to its tight bond with the concrete silo. Stability of the remaining walls is being secured by erecting scaffold restraint systems which are now nearing completion.

Given the condition of the building it is considered that the only viable option for the redevelopment of the building is to provide a new frame constructed within the internal walls of the kiln which will be supported by new foundations. The new frame with provide lateral restraint to the remaining walls and vertical support to the new floors and roof.

# JACKSON PURDUE LEVER

DECEMBER 2022

Appendix A

Post demolition survey drawings

Appendix B

Approved dismantling sequence and extents

Appendix C

Restraint system for gable walls and kiln north wall

Appendix D

H&R timber survey retained HO Warehouse

Appendix E

**Elevation remedial works drawings** 

Appendix F

**Proposed Structure details** 





PICTURE 1



EXTENT OF BRICK REPAIR AND REPOINTING HAS BEEN DEFINED BASED ON THE FINDINGS OF AN INSPECTION FOR GROUND LEVEL WITH NO ACCESS TO HIGH MASONRY, CONSEQUENTLY FINDINGS MAY VARY SUBJECT TO THE FINDINGS OF A FULL STRUCTURAL SURVEY





PICTURE 3

PICTURE 3



ORIGINAL HOLES FOR BEAMS TO **BE REPAIRED** 



© Jackson Consulting Engineers Limited

ALL WORKS SUBJECT TO PLANNING AND LISTED BUILDING CONSENT

PICTURE 3

PICTURE 4

PICTURE 5

leve

purdue





PICTURE 1



STEELWORK STUBS, FLOORING AND 3No BEAMS TO BE REMOVED AND SUROUNDING BRICKWORK TO BE REPAIRED.

PICTURE 5

REPAIR BRICKWORK AT OLD FLOOR AND ARCH JUNCTIONS

ALL WORKS SUBJECT TO PLANNING AND LISTED BUILDING CONSENT

EXTENT OF BRICK REPAIR AND REPOINTING HAS BEEN DEFINED BASED ON THE FINDINGS OF AN INSPECTION FOR GROUND LEVEL WITH NO ACCESS TO HIGH MASONRY, CONSEQUENTLY FINDINGS MAY VARY SUBJECT TO THE FINDINGS OF A FULL STRUCTURAL SURVEY



PICTURE 6







PICTURE 8



PICTURE 3

PICTURE 4

# EXISTING NE ELEVATION DOWNING'S MALTHOUSE (SCALE 1:100)



REPAIR BRICKWORK AT JUNCTION WITH OLD OUTBUILDINGS TO COTTAGES





PICTURE 10

PICTURE 9



PICTURE 11





















Appendix C

Restraint system for gable walls and kiln north wall





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This drawing has been prepared in acc following: ce with the

BS EN:12811-1 & BS EN:12811- 2 Working at Height Regulations 2005; BS EN 1991-1-4:2005+A1:2010 BS EN 1991-1-3:2003

Reference has been made to the following Documentation

BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.

All scaffold materials forming this structure are to comply with BS EN:12811-1 & BS: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.

Design loads This scaffold has been designed for the following: 1 no lift @ 2 kN/m<sup>2</sup> 1 no lift @ 1 kN/m<sup>2</sup>

Total number of boarded lifts are as shown.

Working platforms All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.

<u>Foundations/supports</u> The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection. Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Leg Load = 30.48kN

<u>Tie Loads</u> Where scaffold has been designed to be tied to adjacent structure, tests may be required to ensure structure is suitable. TG4:17 to be used for best practice guidance Tie load to structure = 3.66kN TG4:17 Test Load = 4.58kN (1.25FOS)

Shoring work Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.

<u>Sheeting/fans</u> No additional wind protection, sheeting or fans etc, to be added to the scaffold structure unless otherwise stated on this drawing.

<u>Temporary Roofs</u> No roof is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.

Modifications No major alterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Designs.

Dimensions All Dimensions are in Millimeters.Written dimensions will take precedence over scaled dimensions. Contractor should note all site dimensions and notify Oryx Scaffold Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.

CDM This drawing constitutes the design risk assessment in accordance with regulation 8,9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination of general risk in the use of temporary works.For guidance please see the relevant codes as provided in HSE publications.



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This drawing has been prep following: ared in ac with the

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Refer ence has been made to the following Docum nentation

BS: 5975: 2008 BS: 5973: 1993 NASC Document TG20:13.

14,905

All scaffold materials forming this structure are to comply with BS EN:12811-1 & BS: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.

Design loads This scaffold has been designed for the following: 1 no lift @ 2 kN/m<sup>2</sup> 1 no lift @ 1 kN/m<sup>2</sup>

Total number of boarded lifts are as shown

Blacktop

<u>Working platforms</u> All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.

Foundations/supports The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection.Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Leg Load = 30.48kN

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Shoring work Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated.

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 Checked:LS
 25/10/19

J Rev:

Raking Shore & Access Scaffold.



Denotes 350 Steel beams. Beams to be laced and braced as noted and secured to standards with Class B 90° Couplers to top and bottom chords with supplementary coupler beneath.	Denotes 24.40kN/m (2487.7kg/m) of kentledge to the inside standards. Denotes 350 steel ladder beam to bridge lightwells. Maximum span on ladder beam to be 2m.	Additional standards as indicated to kentledge bays.	Adjustable base jacks positioned in transoms to butt wall. Transoms to be secured to horizontal ladder beams with Class B 90° Couplers. All transoms to be square cut max jack extension = 300mm.	Denotes 350 Steel beams on flat to support the horizontal load from the jacks.	Denotes Plan bracing secured using 90° couplers to standards/uprights.	Denotes Facade bracing using load bearing couplers. Denotes Ledger bracing as shown secured using 90° couplers.		Denotes 2.73kN/m (278.5kg/m) of kentledge to the inside standards.				Scaffold to be butted every 16m².	Denotes Plan bracing secured using 90° couplers to standards/uprights.					350 Beams on flat to be secured using Class B 90° Couplers throughout.		Construction	Approved For	Drawing Status:
Downings Malthouse, Gloucester.         Job Description:         Raking Shore & Access Scaffold.         Scale:       Drawing Title:         Scale:       Drawing Title:       Drawn:HS       Date:       Rev:         1:100       19/ORYX/02/051-3       Checked:LS       25/10/19       J	Client: Severnside Scaffolding Ltd. Drawing Title:		SCAFFOLD DESIGN ©2019		Scaffolding Ltd	please see the relevant codes as provided in HSE publications.	CDM This drawing constitutes the design risk assessment in accordance with regulation 8,9 & 11 of the current CDM regulations 2015. Good practice is to be used in the elimination	Dimensions All Dimensions are in Millimeters.Written dimensions will take precedence over scaled dimensions. Contractor should note all site dimensions and notify Oryx Scaffold Design Ltd of any discrepancies. The contractor is responsible for accurately setting the position of the scaffold structure.	Modifications No major alterations are to be made to the scaffold detailed in this drawing without written permission to Oryx Scaffold Designs.	to the scatfold structure unless otherwise stated on this drawing. <u>Temporary Roofs</u> No roof is guaranteed to be 100% watertight. Additional preventative measures must be looked into if required.	Oryx Scaffold Design Ltd cannot and will not pass comment on the building being shored.It is the contractors responsibility to ensure that the existing structure will safely span between our supports and can be safely shored in the way indicated. <u>Sheeting/fans</u> No additional wind protection, sheeting or fans etc, to be added	Tie LoadsWhere scaffold has been designed to be tied to adjacentstructure, tests may be required to ensure structure is suitable.TG4:17 to be used for best practice guidanceTie load to structure = 3.66kNTG4:17 Test Load = 4.58kN (1.25FOS)Shoring work	Foundations/supports The contractor must prepare all foundations and ensure that they are capable of taking the imposed scaffold loads without undue deflection.Where equipment is supported or suspended from an existing structure the contractor must ensure that the existing structure is adequate to safely support the imposed scaffold loads. Maximum Single Leg Load = 6.66kN Maximum Dual Leg Load To Single Spreader (Kentledge Bays) = 36.02kN	<u>Working platforms</u> All working platforms must comply with the statutory regulations at all times. SG4:15 to be used for best practice guidance.	<u>Design loads</u> This scaffold has been designed for the following: 1 no lift @ 2 kN/m <sup>2</sup> 1 no lift @ 1 kN/m <sup>2</sup> Total number of boarded lifts are as shown.	All scaffold materials forming this structure are to comply with BS EN:12811-1 & BS: 5973:1993; All proprietary equipment must be used in accordance with the manufacturers information.	BS: 5975: 2008 BS: 5973: 1993 NASC Document <i>TG20:13</i> .	<i>BS EN:12811-1 &amp; BS EN:12811-2</i> <i>Working at Height Regulations 2005;</i> <i>BS EN 1991-1-4:2005+A1:2010</i> <i>BS EN 1991-1-3:2003</i> Reference has been made to the following Documentation	This drawing has been prepared in accordance with the following:	Basis of design This drawing has been prepared from the information supplied to us by, or on behalf of the contractor, who should check that the requirements have been correctly interpreted and that loading, dimensions, lift heights, bay sizes and erection sequences etc, are as required and practicable.	<u>Property</u> This drawing remains the property of Oryx Scaffold Design Ltd. No unauthorised use, copy or disclosure may be made without written permission from Oryx Scaffold Design Ltd.	General notes: