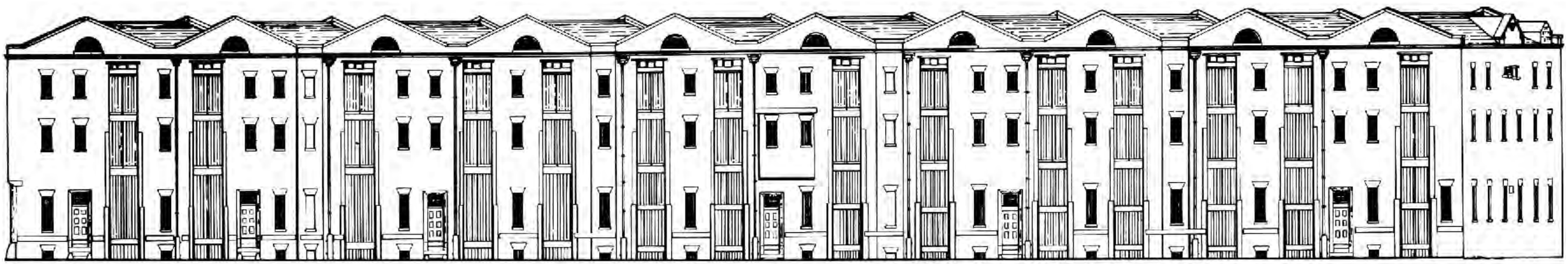
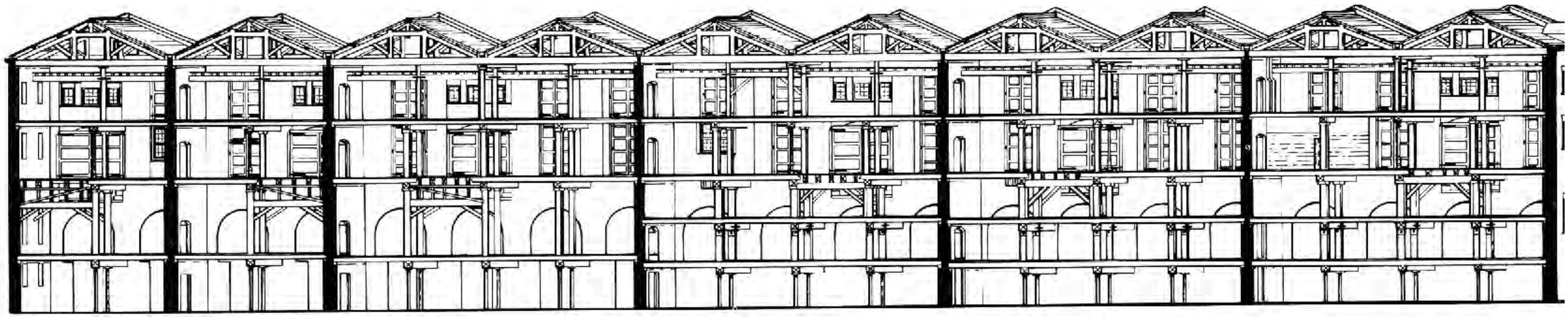
Proposals for Urgent Repair Works to the 1830 Warehouse, the Science and Industry Museum, Manchester

Design & Access Statement June 2019/Updated February 2020



NORTH ELEVATION



SECTION

Studio Downie Architects LLP

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1: Introduction

This Design & Access Statement report has been prepared for and on behalf of the client, the Science and Industry Museum(SIM) Manchester for proposed works which are part of a large capital spend by the museum on their estate of historic buildings. This includes an important programme for inspection, repairs and maintenance to bring the buildings back to where they should be and to ensure their continued enhancement and long term well being as an important part of the visitor experience.

As part of this programme Studio Downie Architects LLP have been working with SIM from August 2018 coordinating a team of experienced consultants and specialists to provide a series of Conditional and Measured surveys for the Grade 2 Power Hall, the Grade 1 Viaduct and the Grade 1 1830 Warehouse including an Historic Environment Assessment. The team has developed a detailed understanding of the historic buildings both individually through their history, construction details and current maintenance/ defect issues and collectively their importance within the wider context of Manchester's townscape setting.

Studio Downie's varied experience includes historic buildings on challenging landlocked city sites and sensitive protected landscapes.

- The Grade 1 Parker Library, Corpus Christie College, Cambridge
- The Grade II* Royal Geographical Society, London
- The Cass Sculpture Foundation, South Downs National Park.
- The Grade 2 Lyme Regis Museum, Unesco World Heritage Site
- The Grade II Stanley Building, Kings Cross, London awarded best Heritage-led project, London Planning Awards.

The client instructed Studio Downie to prepare and submit this application and the proposals have been reviewed with the historic building consultants Heritage Collective who have prepared a full Heritage Statement which with this document provides an overview of the site, its context, the client's needs and the proposals. Heritage Collective have also prepared a statement for the 1830 Warehouse itself, the proposed works and the specific primary details.

Reviewing the Conditional and Measured Surveys resulted in a schedule of works required for the 1830 Warehouse including items indentified as requiring more immediate action towards achieving weathertightness - the Urgent Repair Works. These cover maintenance, repair and some structural matters and form the basis of this application.

The client's aim is to avoid a repeat of the serious build-up of maintenance, fabric damage and safety issues experienced on the Power Hall (particularly the roof where general monitoring access is not possible and led to it's closure to the public) by putting in place a practical strategy to allow them to safely and efficiently monitor the historic buildings. Consequently to support this a separate application is being made for a Safe Access proposal to the roof of the 1830 Warehouse. A further separate application was submitted by the client and approval obtained to carry out trial pits and bore holes to the basement area.

As part of the planning pre-application process useful meetings were held at the museum with the Senior Planner David Brettel and Conservation Officer John Whyard from the City Centre Team, Manchester CC

26 February 2019:
SDA tabled an Introductory Overview document and initial Draft Schedule of Urgent Repair Works showing where access had been possible, existing details requiring repairs or upgrade and proposed approach.

29 May 2019:
Taking the comments and guidance received an updated Draft Schedule of Urgent Repair Works with general arrangement drawings cross referencing the location of the details on the buildings elevations and roof were presented and discussed and it was agreed these could form the basis for preparing the planning applications.

Historic England
The information presented to the planners was also issued to Andrew Davison, Inspector of Ancient Monuments, North West and a summary of his comments received 29.5.19 were:

- the proposed urgent repair works all appear to be justified.
- does not have a problem in principle with proposals to carry out slight modifications, such as introducing grilles to prevent access by pigeons, or amending some of the hopper designs.
- carried out carefully, using appropriate materials, the works would not have a harmful impact on the appearance of the building.

Once the application was submitted futher meetings were held:
21 November 2019: detailed review of pulley openings and internal wall restraints with John Whyard
20 February 2020: review of Futher Advice To Development document 14/2/20 with Chris Smith and John Whyard.

2: The site and its context

The buildings and the site

- As the world's oldest surviving passenger railway station and the world's first railway warehouse, the western end of the site has been extensively researched.
- Located within the Castlefield Conservation Area the large and complex former "Liverpool Road Railway Station" site contains a significant collection of Grade I and Grade II listed buildings.
- A Conservation Management Plan commissioned by the Museum, who are the owners of the site sets out policies which form a framework of philosophy and priorities for repair and conservation.

Planning, Heritage & wider context

- The Grade I 1830 Warehouse is an important building both individually and as a one of a collection with The Grade II Power Hall, the Viaduct structure and Station Buildings forming a landmark historical townscape within the Conservation Area. The site reflects the beginning of Britain's Railway Heritage, industrial development, and the growth of trade in the C19th.

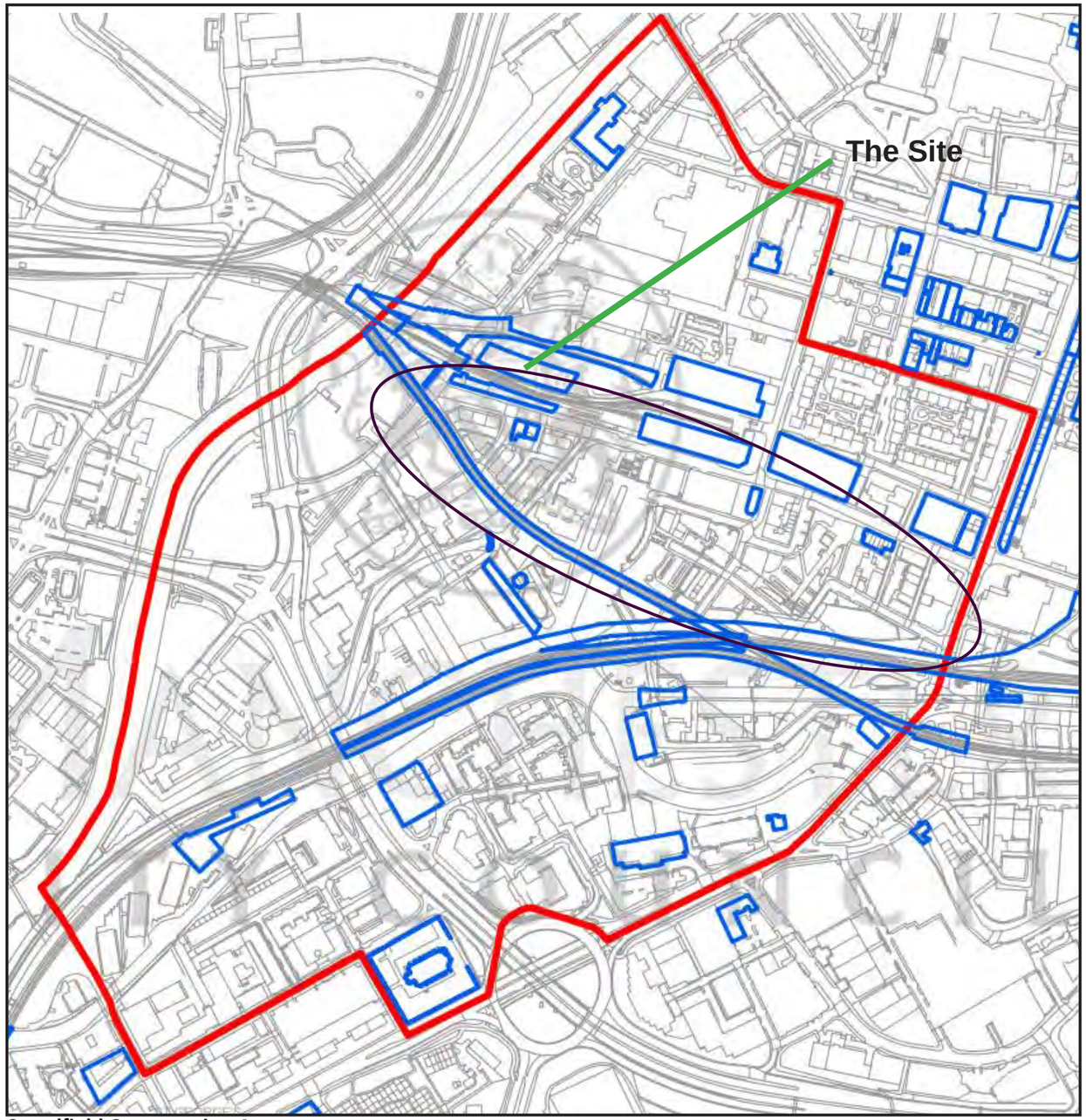
- A Heritage Report was compiled in October 2018 by the consultants Heritage Collective based on The Conservation Plan, The Gazetteer and Archival Findings which forms the basis of the Assessment of Significance for the Heritage Statements accompanying this submission.

- The Science & Industry Museum is the steward of these historic buildings. A scope of works based upon sensitive repair and restoration and medium to long term safeguarding of the buildings has been prepared and was the basis for discussion with the Local Planning Authority through Pre-Application meetings. Included in these works is a proposal providing safe access to the roof of the building which as the largest continuous space at high at the highest risk will be submitted as a separate application.

- Using traditional techniques the works will ensure the longevity and utility of the heritage building with no harm to, indeed enhancing it's significance. The works will contribute to access improvement for the public, will 'better reveal' the significance of the heritage asset and will be in accordance with the NPPF 2018.

- The museum is obliged to ensure the external fabric of the 1830 Warehouse is fit for purpose as an important part of the museum's estate with its continued current and future use both as a space for exhibtions and valuable commercial income earning functions.

- To it's currrent position the 1830 Warehouse building in particular has been subject to organic and not-so-organic change in use, appearance and function. Further appropriate change could be considered to be in keeping with that part of its character, particularly if such change addressed long term failures and 'design faults'.



Castelfield Conservation Area

Heritage Category: Listed Building.

Grade: I. List Entry Number: 1282991. Date first listed: 08-May-1973.

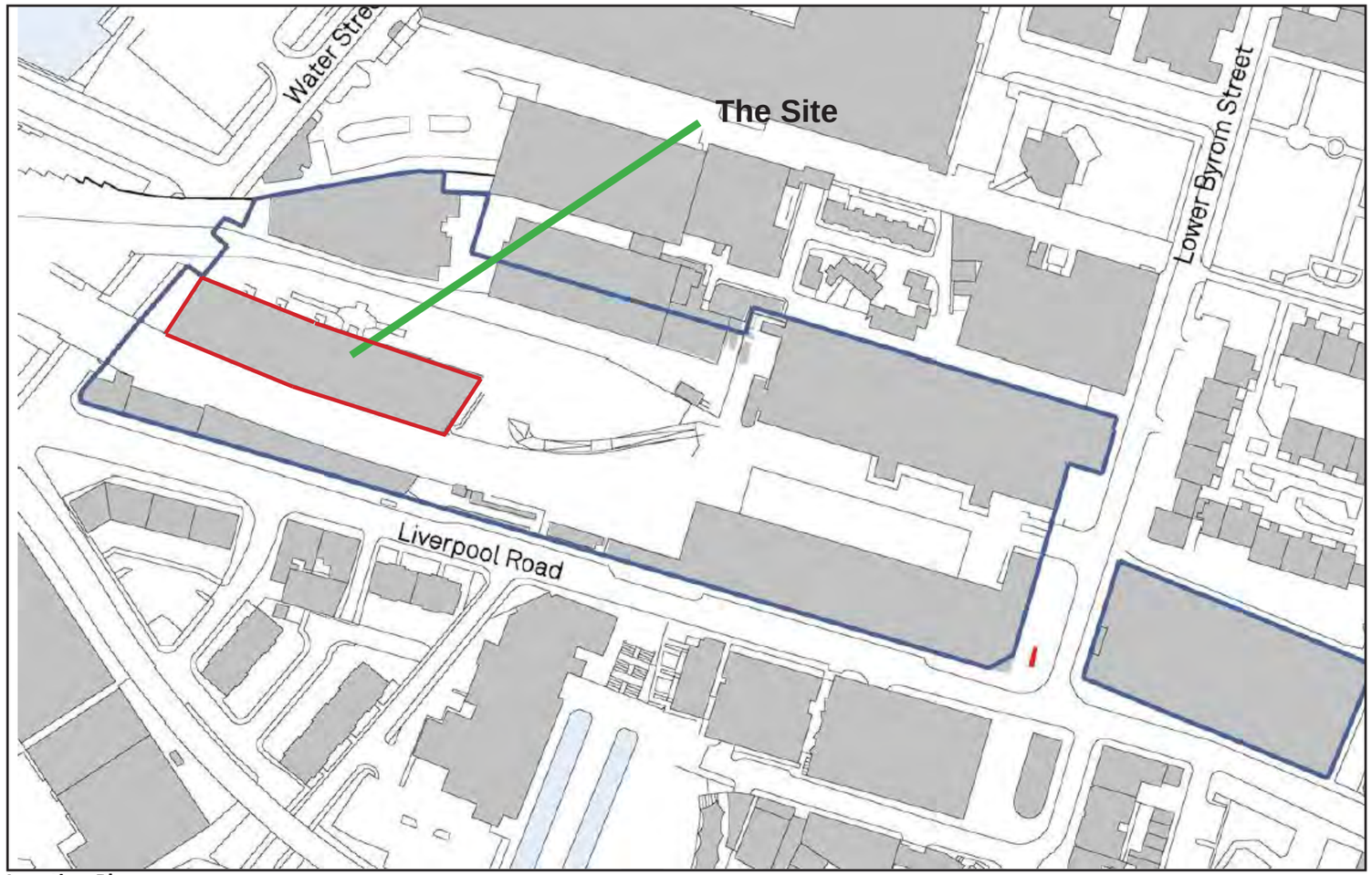
Statutory Address:
OLD WAREHOUSE TO NORTH OF FORMER LIVERPOOL ROAD RAILWAY STATION, LIVERPOOL ROAD.

Details MANCHESTER

SJ8297 LIVERPOOL ROAD 698-1/18/208 (North side) 08/05/73 Old Warehouse to north of former Liverpool Road Railway Station

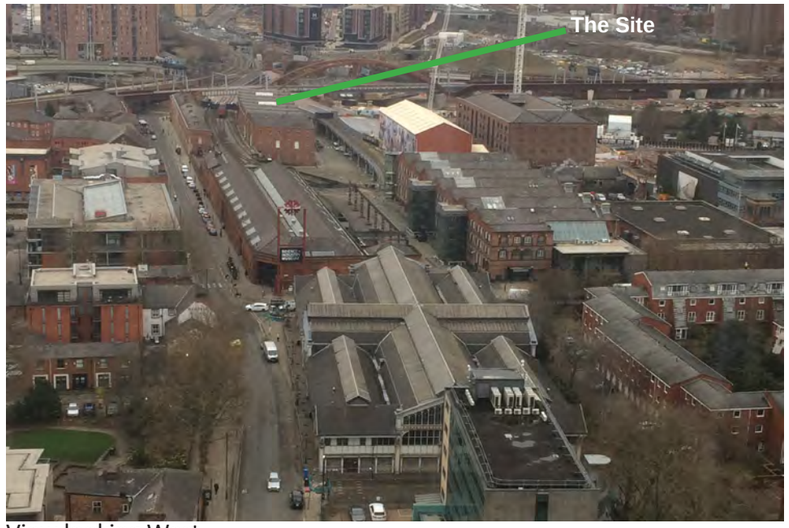
GV I Listing NGR: SJ8299097886.

Railway warehouse. c.1830, together with Liverpool Road Railway Station (q.v.), by George Stephenson and his son Robert; altered. Red brick in Flemish bond, with sandstone dressings and slate roofs. Long slightly curved plan, convex to the railway line and concave to the rear. Three storeys but presenting only 2 storeys to the raised level of the track, 10 individually gabled bays arranged in pairs, with slotted pilasters between each pair and at both ends, a moulded stone cornice (carried round the whole), a small lunette on the cornice in the centre of each bay, and stone gable copings linked by short flats. In each pair of bays (except the 5th pair, at the right-hand end), one bay has a segmental-headed wagon archway with stone surround, 3 small segmental-headed barred windows above the archway with linked sills and wedge lintels (except the 4th bay where the wagon entrance has been raised so as to leave only the heads of the windows) and one 2-stage loading slot to left or right, and the other bay has 2 loading slots. The last pair of bays both have the wagon-archway form. The right-hand loading slot in the 3rd bay has a hoist pulley over the lintel, and apparently altered brickwork over the other loading slots suggests that all were formerly equipped with similar hoists. The left hand return wall has (inter alia) a small pediment to the centre, with an oculus; the 3-storey 6-window right-hand return wall has a doorway with stone surround at the left end of the ground floor, 2 segmental-headed doorways at 1st floor level, and narrow rectangular windows diminishing in the height. The 3-storey rear, with cornice and lunettes like the front, and pilasters which have small windows, has 3-stage loading slots arranged singly or in pairs corresponding to those at the front, with hoists over all except one at the west end and 2 at the east end, doorways with stone surrounds next to the single slots, and small rectangular barred windows with wedge lintels. Interior: timber construction visible.



Location Plan

Photographs of the site and building



View looking West


View of the roof looking East



The East elevation


The North elevation


The South elevation

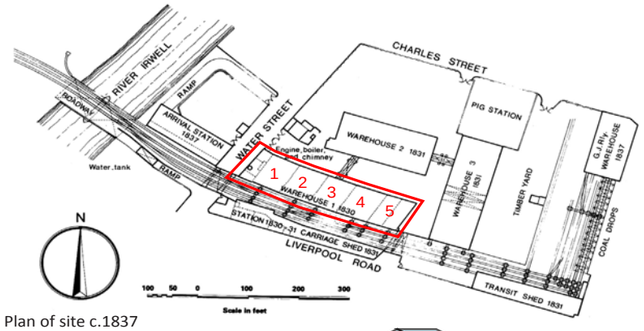

The West elevation

Bays to the building

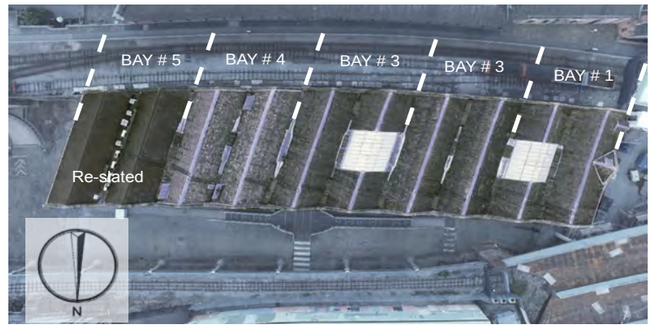
Description of 1830 warehouse

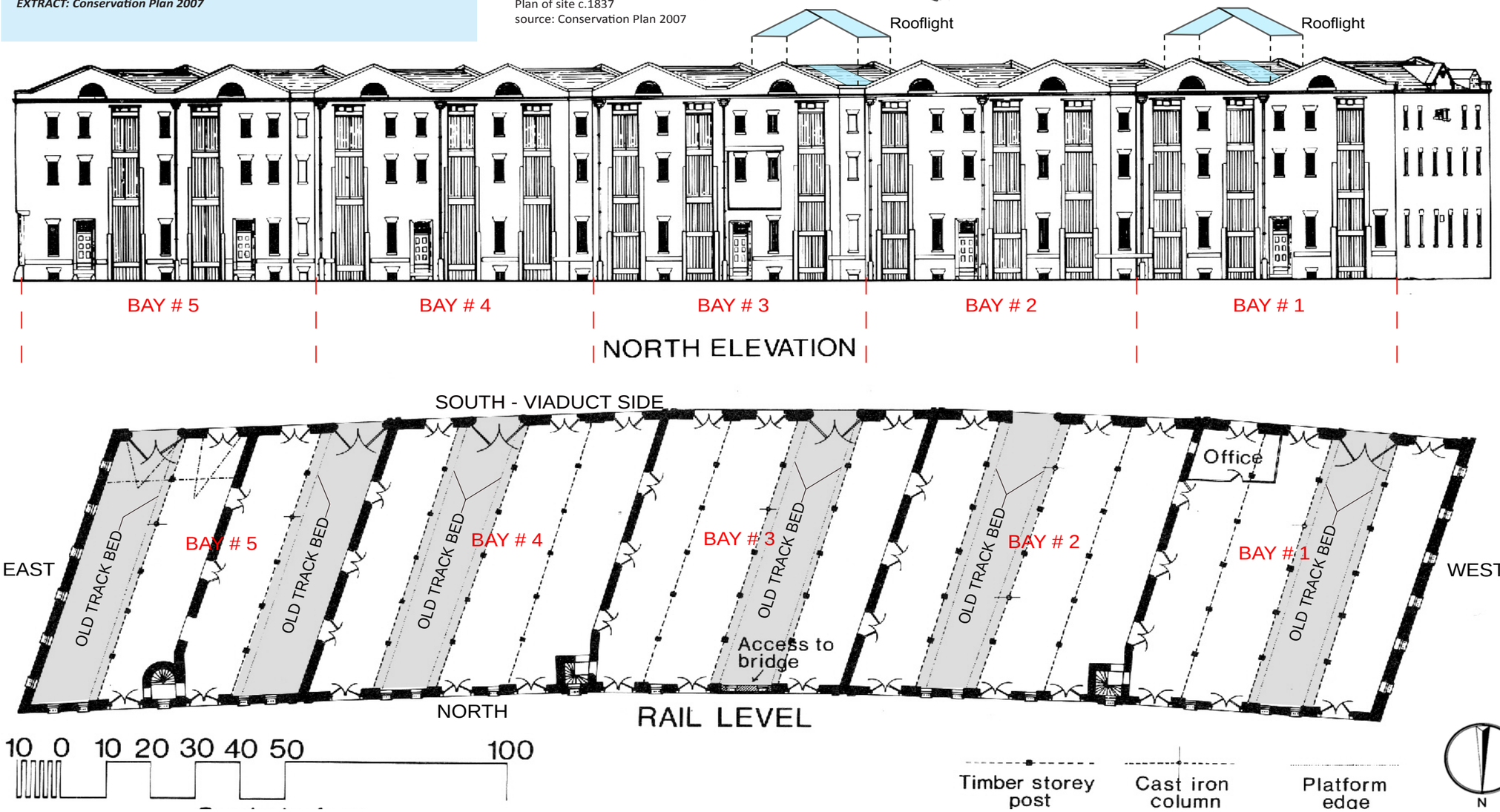
It is timber framed (with cast iron columns in the basement) with brick walls and a slate roof (with some glazing). Stone is used for the sills and lintels, cornice and coping blocks for the gable ends. It is of five storeys (including the basement), but presenting only two to the southern (rail) elevation. The main northern façade is characterised by the strong vertical lines of the brick pilasters and the vertical lines of the loading doors. The transverse gable roofs end in gables with stone copings, linked by short flats; the gables are accentuated by lunettes above the moulded cornice. The loading bays are surmounted by openings for the hoist jibs, which remain in varying degrees of repair.

EXTRACT: Conservation Plan 2007



Plan of site c.1837
source: Conservation Plan 2007





3: Analysis and approach

3.1 Planning, Heritage and the wider context

A Heritage Statement has been prepared by Heritage Collective based on The Conservation Plan, The Gazetteer, and Archival Findings and will form the basis of the Assessment of Significance to accompany this submission.

Conservation Plan, strategic objective, principles to repair+conservation
The Client's Conservation Plan will be updated to reflect the proposals:

Conservation Policy Aims

- Preserve the significance of the site for the benefit of the present and future generations.
- Set out priorities for repair and restoration.
- Identify specific requirements to retain or enhance the significance of the setting and the structures.
- Promote,provide interpretation of cultural significance of the site.
- Provide appropriate guidance manage to alterations and extensions.
- Provide guidance for the design of new buildings.
- Provide a maintenance strategy for the site once repaired

A Conservation Philosophy

- Existing significant elements of the buildings, structures or areas should be repaired rather than restored.
- Existing historic elements in good condition should be retained.
- Elements of historic structures or buildings should be replaced only where essential.
- New development or additions outside of the historic footprint should complement but not copy the historic structures.
- Interventions should be kept to the minimum to ensure a viable future use.
- Intrusive features of little historic interest may be removed.

3.2 Maintenance and Repair

The objectives are the production of a planned strategy to guide the present and future maintenance of the 1830 Warehouse exterior with the principles:

- The existing fabric should be retained and repaired as appropriate, according to best conservation practice.
- Disturbance should be minimised to retain authenticity and integrity and design should, where possible, allow for reversibility.
- The light cleaning of all brick, stone, windows, doors and other fabric would be undertaken in a sensitive manner.
- Any repairs should be designed to minimise impact on the fabric of the exterior, whilst ensuring its continued stability. Repairs should follow best practice as regard materials and techniques.
- A maintenance strategy will be prepared providing for regular and thorough inspection for the life of the buildings.

Fabric and Features

The objectives where practicable are to retain and repair/refurbish the historic existing fabric and notable features the 1830 Warehouse exterior with the principles:

- The implementation of a programme of building assessment, recording and historic analysis of the fabric and features should be secured before commencement of the works on site.
- Notable fabric and features as detailed in the Conservation Plan, should be retained in situ where possible within the scope of repair. Where that is not possible then they should be considered for re-use elsewhere or assigned to the Collection Team for recording and archiving.
- Removal of fabric and notable features should be justified in any Supporting Statements that accompany the planning submissions of detailed proposals including Listed Building Consent applications.
- The palette of elements to be repaired and conserved should respect and enhance the historic fabric of the building.

3.3 Conclusion and brief

The works to the 1830 Warehouse are necessary firstly to ensure an appropriate Health and Safety environment for visitors and staff of the Museum; and secondly the longevity and continued utility of the heritage asset (as part of the museum experience) by halting the continued degradation of the building which will continue if not resolved now.

All of the items require to be undertaken to enable the building and surrounding areas to be safely used. Options have been considered to phase part of the work to run in parallel with a full base build refurbishment of the building however a decison has been made that the Urgent Repair Works must be undertaken soon to prevent further deterioration and closure of the building. In summary the priorities are:

The first priority:
The repair of the existing historic external elements aiming for a weather tight fabric to arrest any further deterioration with details and materials repaired, upgraded and replaced on a like-for-like historically appropriate basis.

The second priority
is to remove intrusive elements which detract from the integrity of the buildings and replace original materials which have been damaged by alterations.

A further important and related consideration (as a separate application) is the provision of safe and convenient access to the roof of the building, cuurrently not available, with ladders, safety points and walkboards installed to to allow proper inspection and maintenance.

3.4 Design Philosophy, Conservation, Sustainability & Management

Responding to the Conservation Plan, we have sought to identify a measured response to the scope of repair work.

The understanding of the material and structural defects with visual inspections where possible(roof access is not available) has created a holistic overview of the issues. In response with the client a medium to long term view has been formulated to refurbish and replace key elements which are beyond their serviceable life to minimise maintenance issues in the long term.

The detailed Conditional and Measured Surveys of the building undertaken identified a schedule of works required, which for the most part are limited to localised relatively minor external repairs. However, as explained there were some items indentified as requiring more immediate action, the Urgent Repair Works where the aim for the client is for a weather tight fabric to arrest any further deterioration. This includes internal repair and refurbishment to the underside of the roof where the ceiling 'torching' has failed and small sections fallen, historic and current damp incursion as well as investigating the impact of change of utilisation of the buildings and internal spaces (notably increased condensation potential).

Additional studies carried out include mortar testing to confirm the composition and characteristics of original bedding mortar and historic repair mortars, a survey of the roof to establish material and structural condition identified in movement and vertical elevation alignment and a CCTV survey to trace subsurface drainage. A ground penetrating radar survey is proposed to establish any abnormalities/voids below ground and will assist in relation to scaffold installation loading points.

This has identified the need and processes required to enable adequate stewardship of the buildings and to safeguard their long term use as important historical assets of the Museum's collection and heritage and also to provide dry and safe interior spaces for varied uses.

Repair and restoration works is proposed using traditional techniques where possible and in accordance with the NPPF 2018 will ensure the longevity and utility of the building and will have a beneficial impact and result in no harm to the significance of any asset.

The opportunity should be taken to also assess whether replication of details in every case is the most sensible way forward. The buildings and structures were designed for widely different purposes and with differing aspirations for internal environmental management and maintenance needs. There are also some elements added to the building which are not original with the works providing opportunity to remove, improving safety and abringing a welcome clarity to the elevation e.g the cluttered collection of brickwork elements to the pulley openings at the top of the cargo bays.

3.5 Scope of Works overview

The Urgent Repair Works is the first phase of a programme of works which includes new Safe Access to the roof and a full repair. The majority of the items for this phase are localised repairs with a mixture of maintenance, repairs, external facade works , internal works, services and H&S matters. The primary aim of the works is to prevent further weather ingress and deterioration to the fabric where the more extreme weathering occurs at roof level and the high and low levels of the elevations. From high to low level the works include:

- New mastic to rooflights which are are beyond their serviceable life and require eventual replacement
- Checking roof slates around rooflights and reuse existing if possible.
- Remove redundant M&E plant from roof valley gutter to Bay 5
- Install automatic monitoring system to valley gutters to provide warn ing of water level build up
- Providing overflow at roof level to gutters at the upgraded chutes to prevent rainwater build-up/ingress if downpipes and or below ground drainage is partially blocked
- Non-structural defects, finishes, including defective lead flashings waterproofing details requiring replacement to safeguard the parapets and cornices
- Where appropriate and inconjuntion with the works to the localised areas removing cementitious pointing to brickwork above stone cornice level and re-pointin in lime mortar to reduce deterioration of bricks
- Repairing or replacing around incorrectly infilled pulley openings.
- Repairing cracked, spalling stonework through consolidation/ indenting
- Redecoration of wood elements with breathable painted coatings where urgent repairs have been carried out.
- All exernal doors adjusted to enable working locks, prevent movement due to wind / prevent pigeon ingress and remove guano throughout
- Re-secure protective timbers with stainless steel bolts, restraining loose pulleys with strapped bolted connections, repairing decay at windows due to water ingress and repair decayed internal floor boards and joists
- Improving rainwater collection to two below ground lightwells withh upgrading pipe connections direct to the below ground drainage considering cast iron pipework/fittings
- Extending rainwater pipes by modifying shoes base of downpipes to direct water straight into gullies and avoid splashing and saturating the building fabric
- Structural items: stitch repairs to brickwork and repointing, install restraint between timber structure and sections of masonry which is bowing out to first and second floor/North elevation
- Internal: The existing lime torching in Bay 04 will require removal and reinstated using the correct composition and application techniques

4: Schedule of works

INTRODUCTION

The order of the proposed works in this document is from the roof down with related items brought together in the same section with relevant specification notes.

Documents submitted with this application and to be read with this schedule are:

- Conisbee: Structural Specification/NBS V1.1
- Hutton and Rostron: Investigation of lime torching to the underside of the roof in bay 04 of the 1830 warehouse
- Hutton and Rostron: Timber decay survey of the facades of the 1830 warehouse

A large part of the proposed works are to the brickwork and the pulley openings/associated brickwork and as agreed once scaffold access is available for the main contractor/specialist sub-contractors investigatory work will proceed for both a single lintel and triple stepped lintel opening to establish a Method Statement (MS) to be submitted which will further inform these specification notes and set the approach for the remaining pulley openings and brickwork.

Item 9: Proposal for reusable scaffold fixing points

This is an interesting proposal and is being given positive consideration but the following additional information is requested:

The CDReview requests a condition to cover the issue of scaffolding.

(i) A comparison of a traditional scaffolding that has been designed to minimise wall ties (for example by using the structural strength given to scaffolding by returns at building corners) and the proposed permanent fixings designed with the same intent of minimising the number of fixings. This could usefully be achieved by annotated elevation drawings and details of the comparative size of fixings for each of the two approaches.

(ii) Greater detail regarding the need to adapt the facing bricks to accommodate the tie behind. Options for avoiding such adaptation are required, not least as it may be difficult to satisfactorily achieve given the age and condition of the original/historic brickwork.

4.1WORKS AT ROOF LEVEL

4.1.1 ROOFLIGHTS AND ASSOCIATED SLATE, PLANT REMOVAL AND ROOF LADDERS

SCOPE OF WORKS OVERVIEW

All debris,decayed wood walkways and vegetation will be removed from the gutters before repair works commence. Flashings and gutter linings have been extensively lined and coated in patches to extend their life and generally require repair, upgrade or replacement and works are proposed only to specific locations as indicated in this document and on the drawings such as the chutes at the end of the guttters. Other sources of current water ingress, trims to rooflights and flues and mechanical plant will also be checked and resealed/repaired including slates around the rooflights. An immersion- flow sensor will be located in the gutters to monitor and provide warning of high water levels

1.Rooflights: The rooflights are above the two lift and stair cores, were installed 1992-1996, are modern construction and the glazing is covered by an opaque film.

2. Slate: With scaffold access the perimeter seal to the slate roof will be inspected. The adjacent plasterboard and insulation build-up indicates that modern mastics will have been used to seal the perimeter of the metal frame to the substructure

At the critical junction of the slate to the rooflights, the intention is to check the integrity of any existing weatherproofing and if required to repair or to replace modern weatherproofing.

To determine the route of water ingress and to enable proper weatherproofing and seals to be installed, a narrow band of slates adjacent to the rooflights will be very carefully removed to enable investigation of the rooflight interface. The visible number of damaged and displaced slates appears relatively low. However, ageing or weathering defects to the unseen substrate will be a consideration.

3. Roof Ladders: There is no records of when the ladders were installed or their heritage significance but they are in a very poor state of repair, rotting in sections and not at all safe to use for current access requirements.

A separate safe access planning application it is proposes that these will be replaced with new lightweight steps providing appropriate access.

The proposal is that theladders are only removed once the roof access application is agreed and following appropriate recording. The record should include a plan identifying the locations of the ladders annotated to show where accompanying photographs have been taken from.

SPECIFICATION NOTES

1.Rooflights: The existing glazing panels and metal frame of the rooflights are to be retained and a check for any cracked glazing will be undertaken and replaced like for like.

The existing mastic sealant will be carefully removed and the base material cleaned and de-greased before re-application of the new seals which will be like for like.

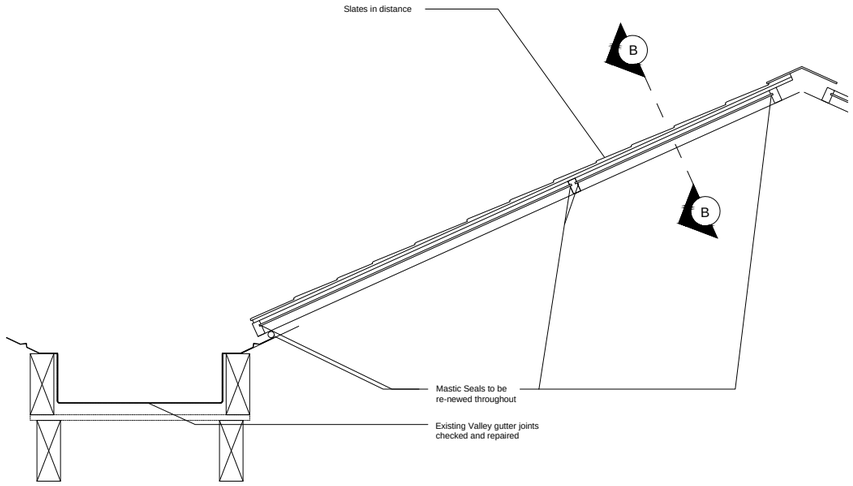
2. Slate: These will be carefully removed, ideally with a slate ripper, avoiding damage to the nail holes and tearing or puncturing the existing weatherproofing as found. The location for slate reinstatement will be logged to ensure holes re-align.

The slates will then be inspected by the skilled slate contractor for reuse with an initial visual examination to particularly ensure there is no excessive spalling to the nail holes and no sign of delamination.The slate should still “ring true” when struck and will be rejected if there is a dull thud or if the backs are powdery which is an indication of deterioration.

The existing re-used slates will be carefully re-laid with salvaged slates from a matching Welsh Slate source and profiled to cleave as closely as possible to the original design, matching the size, shape, colour, and texture of the existing slates.

4. Removal of redundant M&E plant from roof valley gutter to Bay 5. Any required repairs to the the roof will be established once access is available and the number and nature of penetrations to the roof and the removal approach considered and agreed with the services consultant/ main contractor. To be conditioned and information submitted to you for your agreement





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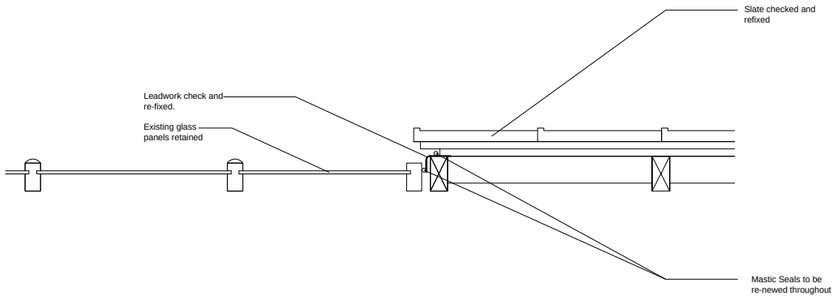

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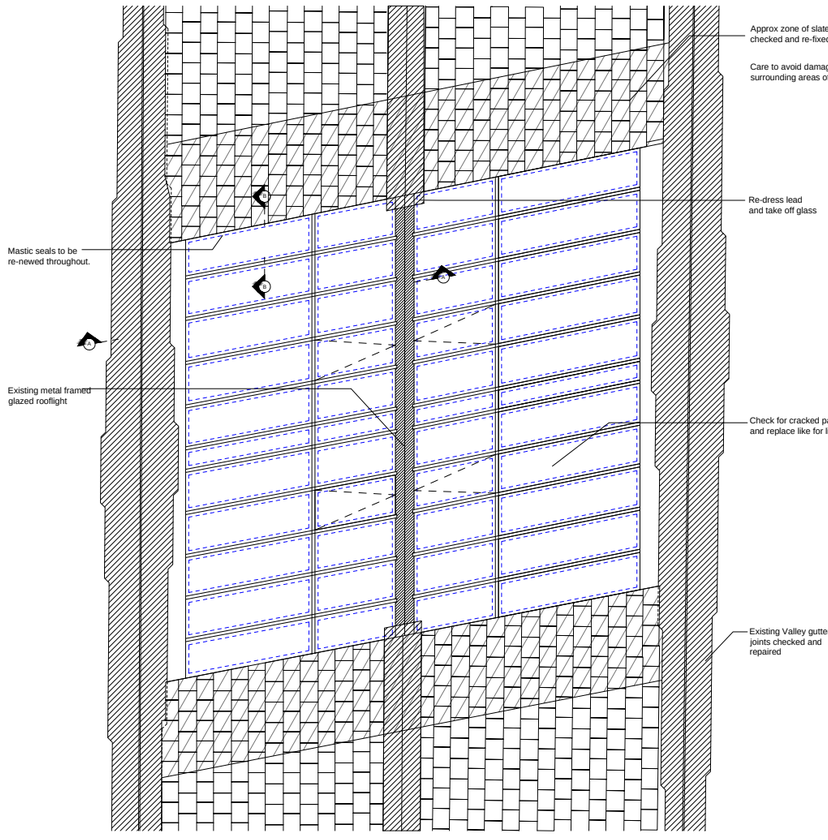
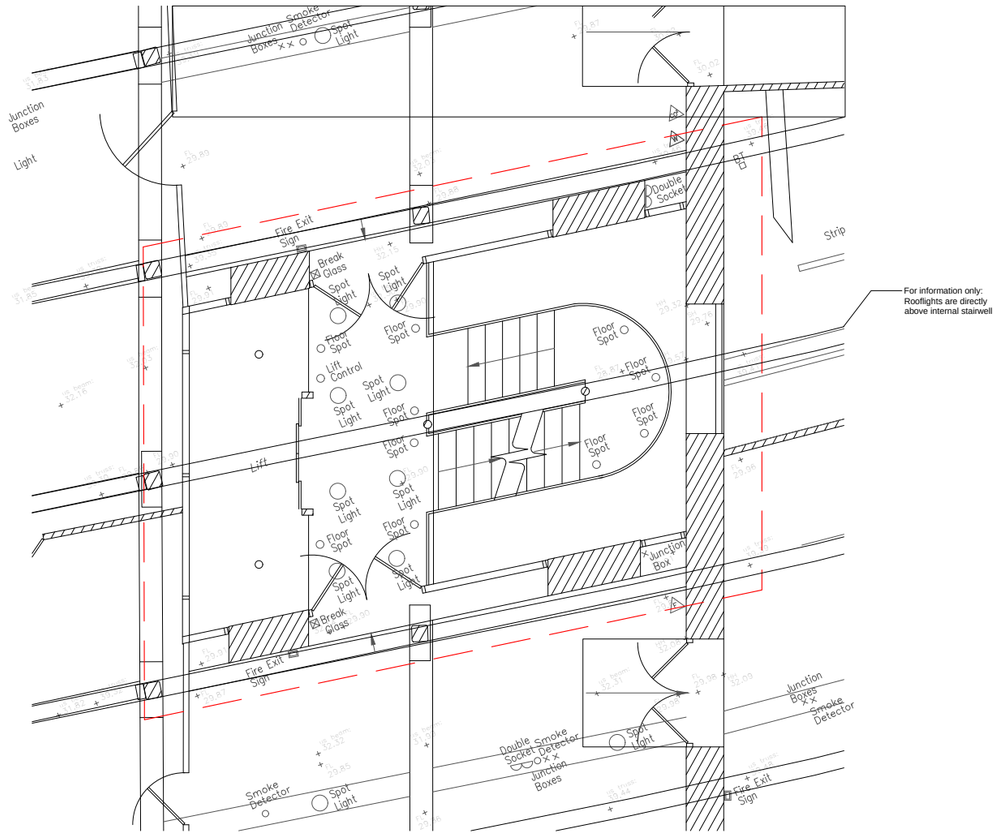
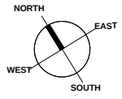
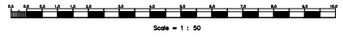


SECTION A1-A1



REFLECTED CEILING PLAN





PROPOSED DETAIL: TYPICAL ROOFLIGHT 1:50 @ A1 / 1:100 @ A3

Proposed

Drawing 261/PD/320A

Peter Deer and Associates Building Services ■ Consulting Engineers

SIM, 1830's Warehouse Building Urgent Repair Works (URW).



Proposed Roof valley gutter flood detection system

Automatic monitoring of valley gutters.
Provide in each of the 9 number valley gutters, a water level float switch arranged to indicate high water level in the valley gutter (in the event of blockage of the rainwater outlets or downpipes and initiate an alarm audible and or visual to be confirmed. Option to link to remote alarm in staffed area of the premises.

System details:-

Supplier:
Aquilar Ltd, Unit 30,
Lawson Hunt Industrial Park,
Broadbridge Heath,
Horsham, West Sussex RH12 3JR
Tel: 01403 216100
Email: info@aquilar.co.uk
www.aquilar.co.uk

The system components include water sensors with mounting brackets, an alarm panel and interlinking cable as described in the specification. See details of sensor and alarm panel below.

E

Flood detection system to roof gutters



AT-MZA
Multi Zone Alarm

The AquiTron MZA multiple zone alarm panel is designed for use with all TraceTek sensing cables and AquiTron sensors to detect liquid. The AT-MZA comes with 2 zones as standard, however with the addition expansion cards is capable of monitoring up to 8 individual sensing zones, making it a truly versatile panel. The AT-MZA provides both visual and audible indication when a leak or cable fault has occurred. There are relay contacts to connect each zone to other equipment such as BMS, PLC's, other alarm and monitoring systems.

SIMPLE OPERATION
The panel display includes LEDs for each zone. In the event of a leak, the alarm sounds and the LED indicates the zone where the leak has occurred. The operator silences the alarm by pressing the external MUTE button. The LED's located on the front faceplate indicate power, (mains or battery back-up), alarm, leak alarm and cable break. Once the alarm has been silenced, the red alarm LED will stop flashing to indicate the system has been acknowledged and the appropriate zone leak or cable break LED will also stay illuminated. Once the cause has been located and corrected the panel can be reset and the corresponding LED will automatically be extinguished. Pressing the reset button also resets the volt free alarm relay contacts. Any loss of system integrity, whether caused by an interruption of power or a break in a sensing circuit, will be indicated by the panel's display and the fault relay contacts.

VERSATILE DESIGN
The MZA metal enclosure can be easily mounted to a wall or other flat surface. A semi-flush mounting flange is also available. The enclosure is lockable, has an IP54 rating and a 90 decibel audible alarm. Easy connection via volt free relays to external equipment such as BMS or isolation valves. An auxiliary remote alarm (AT-RAP) can be added to the system for remote locations such as reception areas and security rooms. The AT-MZA unit operates on 230/120Vac (50/60HZ) and 12Vdc. A battery enclosure unit (AT-BU) for 24-hour operation is also available.

APPLICATIONS
The AT-MZA is ideally suited for multiple integration into centralised monitoring systems for computer rooms or large facilities, as well as interfacing into control systems for air conditioning and fan coil units, pump, booster and generator sets. There are individual volt free leak alarm relays for each of the 8 zones, additional summary relays are included for leak and cable break/power failure. Typical applications include monitoring leaks that would occur around individual air-handling units, water-cooled machinery, tanks, pumps, sumps or other locations.



AT-600A
Immersion-flow Sensor

The AT-600A sensor has been designed for use with all TraceTek and AquiTron leak detection systems. The probe is fully compatible with TT1000 system components and has been designed for seamless integration into TraceTek and AquiTron water detection systems, either with or without sensor cable, to provide a truly versatile sensor system.

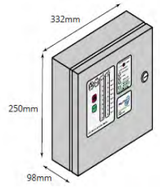
APPLICATION
Applications for the AT-600A sensor include: overflow pipes for boilers, heating systems, unvented hot water cylinders, blow down pipes, drainage, tank level control and applications using double containment pipe systems. For distributed applications, up to 100 probes may be interconnected by a single jumper cable (da chain) and monitored for leak location utilising either a TTDM-128 or TTSIM-1 / 1A, 2 alarm and locating modules providing leak location in either metres, feet or zone The AT-SZA and MZA panels can be used to provide a single or multi zone indicatio (see panel data sheets for maximum probe quantities).The AT-600A probe is not suitable for permanent submersion.

TECHNICAL INFORMATION

Type	AT-600A
Brass body	¾" (inches) BSP Male Thread
Maximum operating temperature	100°C
Probe Tips	Coated Stainless Steel
Mounting	Vertical and horizontal to suit application
Fly lead connection	2 metres
Fixing	Screw the brass body into a female 3/4" BSP fitting and se with an 'O' ring or PTFE/sealing tape
Resetting	Unscrew the brass body, dry and refit



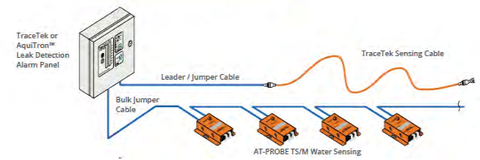
A



TECHNICAL INFORMATION

Sensing cable compatibility	All TraceTek sensing cable (TT1000, TT1100, 3000, 5000, 5001, 7000)
Detection Probes	Water detection probes, optical oil sensors and immersion sensors
Maximum sensing circuit	100 metres (328 ft) per zone, 10 x AT-PROBE-M/TS
Enclosure	Powder coated steel, colour RAL 7032, IP54, lockable
Humidity	5% to 95% non-condensing
Power supply	230/120Vac, 50/60Hz , 12Vdc, 7 watts
Relay Output	3A 250Vac / 24Vdc. SPDT. Volt free relay contacts activated by leak or cable fault (NC/COM or NO/COM), 1 leak relay per activated zone. 1 common Leak and 1 common Fault relay.
Status LED	Power (Mains-Green, Battery-Red), Alarm (red flashing), Leak (Red), Cable break (Yellow)

CONFIGURATION EXAMPLES



4.1.2 IMMERSION FLOW SENSOR

SCOPE OF WORKS OVERVIEW

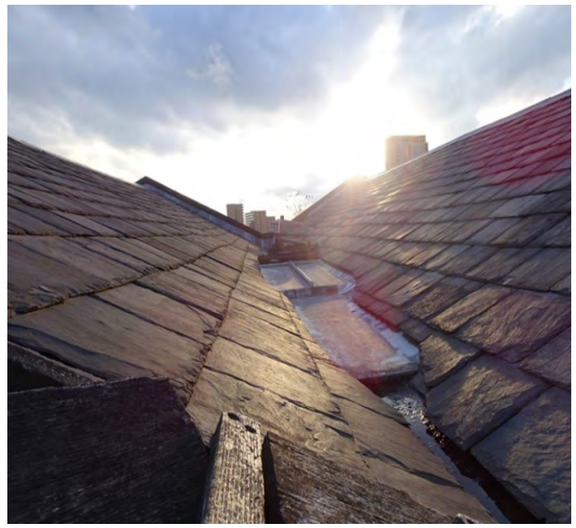
An immersion- flow sensor will be located in the gutters to monitor and provide warning of high water levels The proposals involve a series of small components carefully positioned and well concealed from view with small diameter cables connecting via the existing internal roof space service routes down to a control panel in the basement plant room.

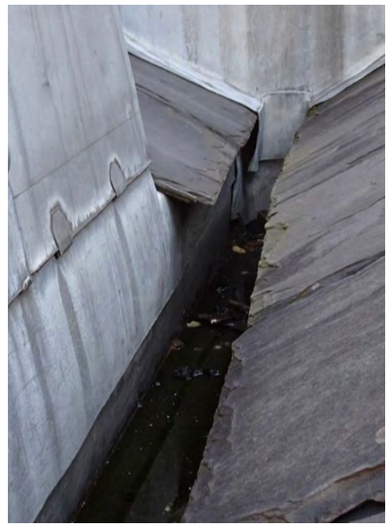
SPECIFICATION NOTES

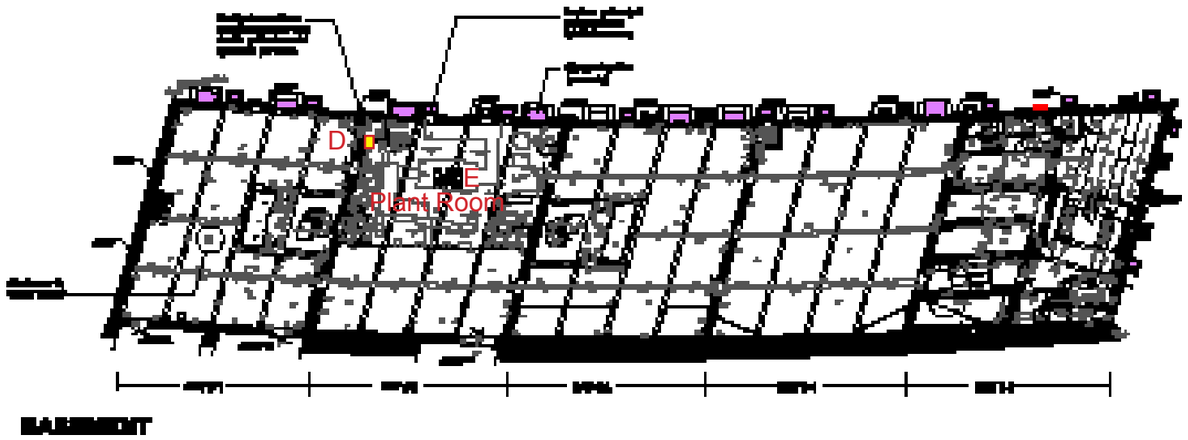
The specification and the locations/routes of the components are set out on the information included on these pages.

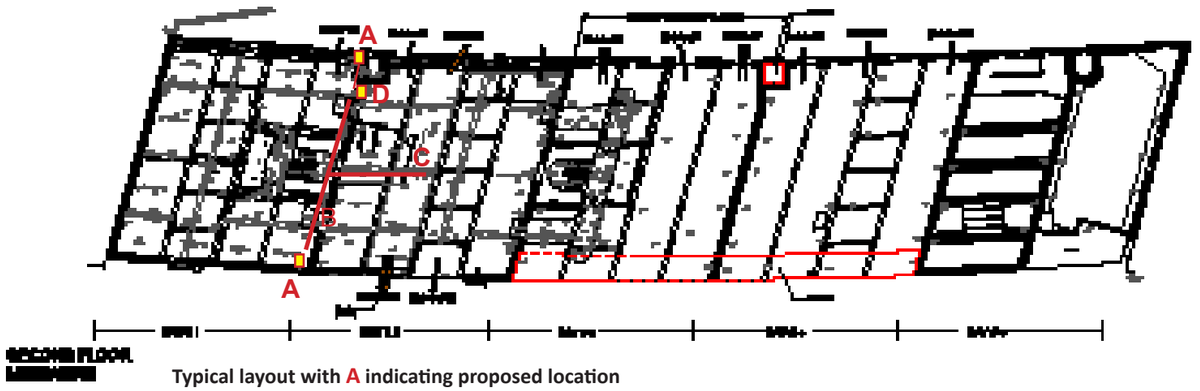


Existing Roof gutters





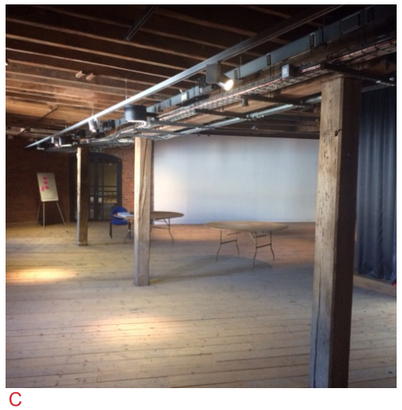




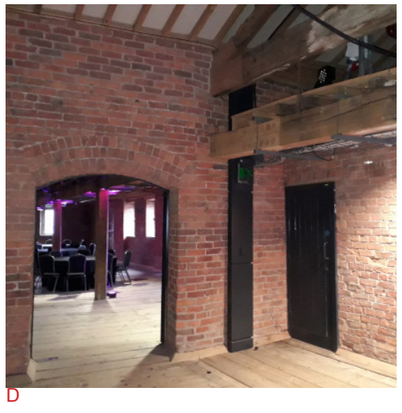
Typical layout with A indicating proposed location of sensor to the ends of each valley gutter.



B



C



D

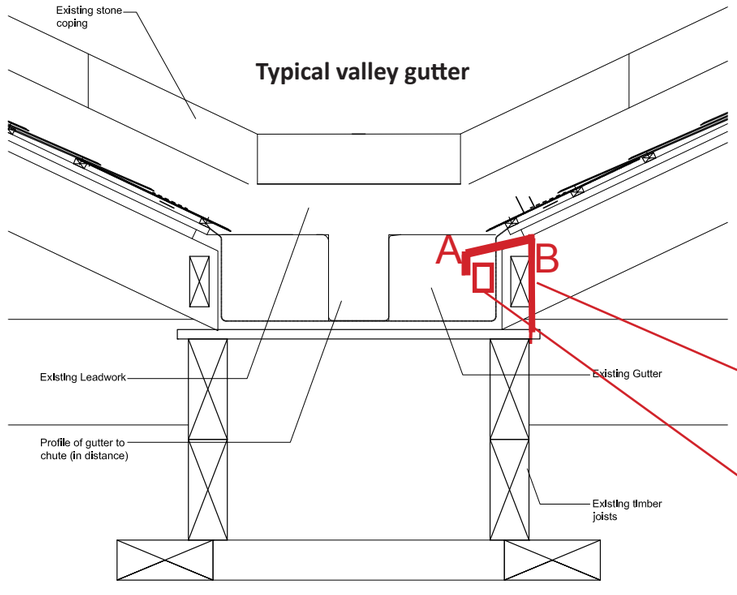
CABLE ROUTES AND EQUIPMENT LOCATIONS

A -Sensor Probe to end of each valley gutter.

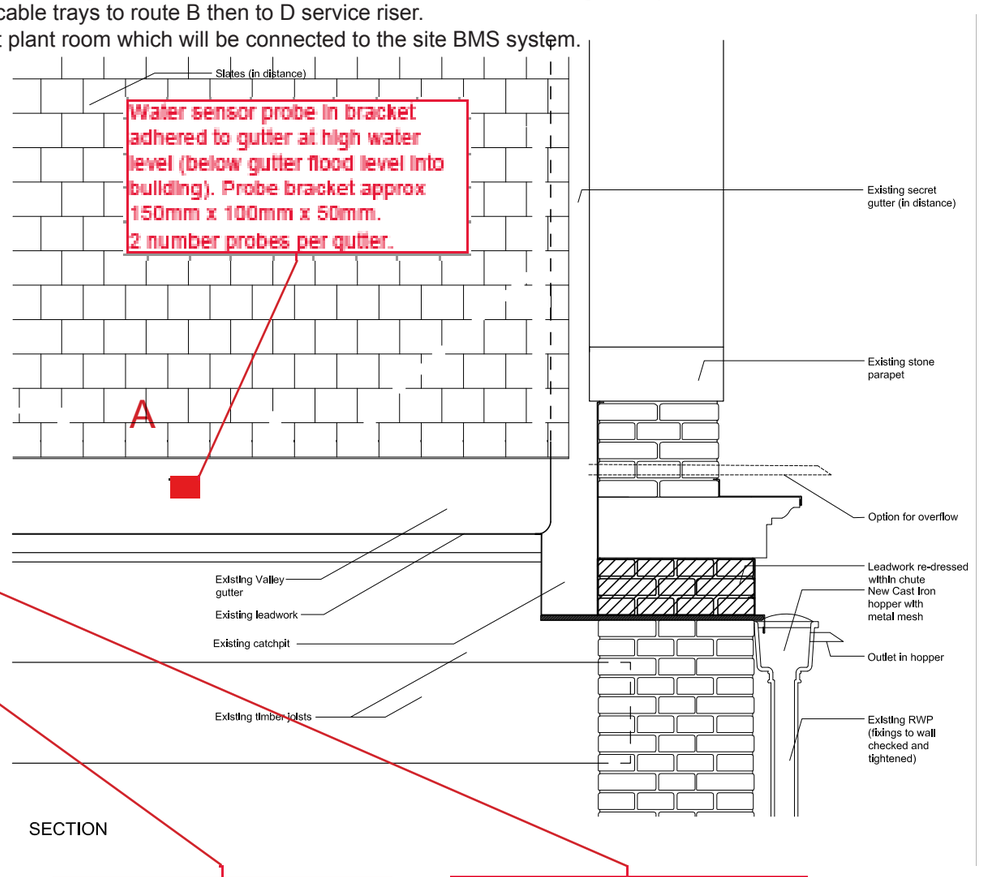
B- Cables run internally from probe under slates to run from A north/south concealed at high level on route B to D service riser down to lower ground plant room.

C- Cables from other valley gutters to run east west in existing high level routes/cable trays to route B then to D service riser.

D- Cables down service riser to E multi- zone alarm located in existing basement plant room which will be connected to the site BMS system.



ELEVATION



SECTION

PDA Notes
4311 191213 1 of 1

Water sensor probe in bracket adhered to gutter at high water level (below gutter flood level into building). Probe bracket approx 150mm x 100mm x 50mm.
2 number probes per gutter.

Sensor cable approx 5mm diameter runs from probe and is concealed at high level running north/south using existing internal conduit and tray routes to riser and down to multi zone alarm panel located in existing basement plant room

1830s Warehouse roof valley flood detection

4.2 RE-APPLICATION OF TORCHING TO BAY 4

SCOPE OF WORKS OVERVIEW

1. The existing exposed torched lime substrate and bedding for the slates above (a traditional technique used to protect from weather penetration and which should provide good bonding strength and vapour permeability) is understood to have been applied following the last major refurbishment of the roof finishes c.1992-96 when English Heritage requested Bay 4 to be maintained as the ‘unaltered’ bay. SDA noted visual staining, possible water ingress and signs of movement to the torching.
2. A specialist survey of the torching was completed by Hutton & Rostron/H&R and is included with this application; the client had reported falling debris in public access areas and H&R were called in as an emergency with areas of loose torching removed as a precaution and protective sheeting installed directly beneath.
3. The survey confirmed there was no fibre in the fallen pieces and several areas where the ‘torching’ to the underside of the roof finishes appeared to be in relatively poor condition. With closer inspection it was noted there were several loose areas where it had slipped and wedged into the purlins exposing the underside of the slate and overall its preparation and application were wholly inadequate.
4. The survey also noted that further areas of torching that are currently ‘sound’ are likely to fail and fall into the gallery space below and the proposal for public safety is for all the torching to be carefully removed from beneath the roof slates.

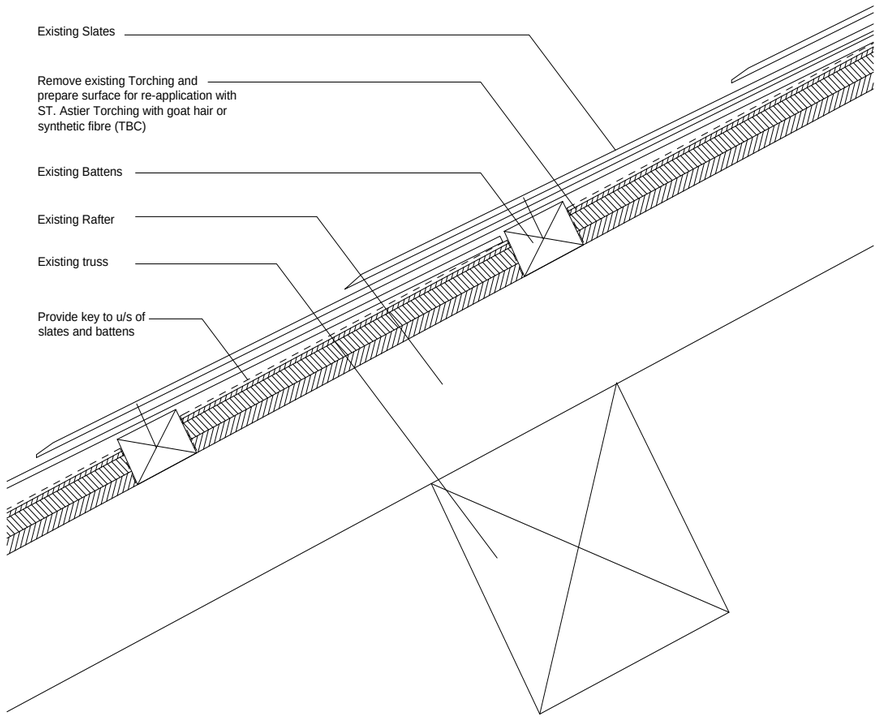
SPECIFICATION NOTES

1. A sample of the existing torching was sent for laboratory analysis and the results issued to the manufacturer who has prepared a specification for a like for like replacement with due regard to appropriate preparation.
2. The existing torching layers will be carefully removed by a specialist contractor using hand tools.
3. Re-instatement will consist of a first coat of 3 to 5 mm, a second coat of 10 to 12 mm and a final render coat of 5 to 10 mm. The final coat will be set flush with the underside of the timber battens matching the existing detail and colour with all work carried out in the correct working temperature. The render ratio will be lime: sand 1:2.5 in volume(NHL), well graded sand (0/mm) and hair or fibre reinforcing well distributed throughout the mix.

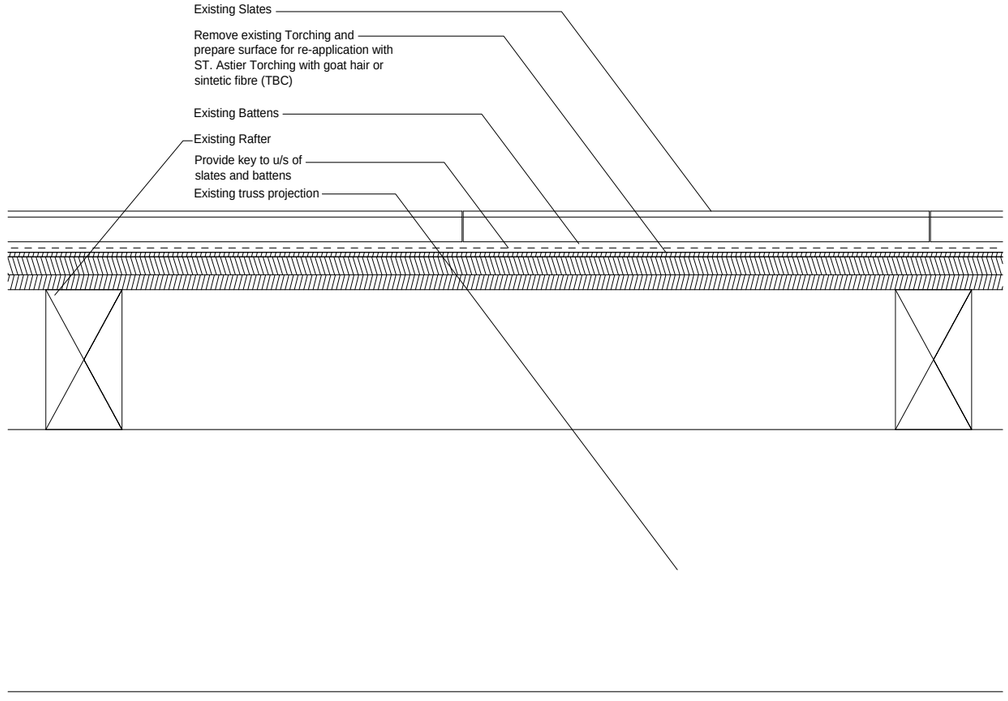




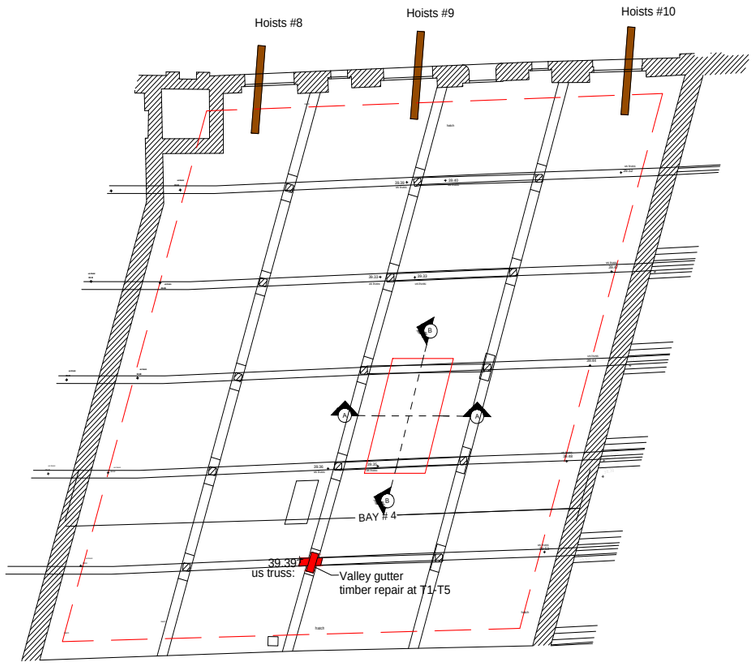
Existing



SECTION AA SCALE 1:2



SECTION BB SCALE 1:2



REFLECTED CEILING PLAN BAY 04 scale 1/100

BAY 4 TORCHING 1:10 @ A1 / 1:20 @ A3

Proposed

Drawing 261/PD/330A

4.3 ELEVATIONS



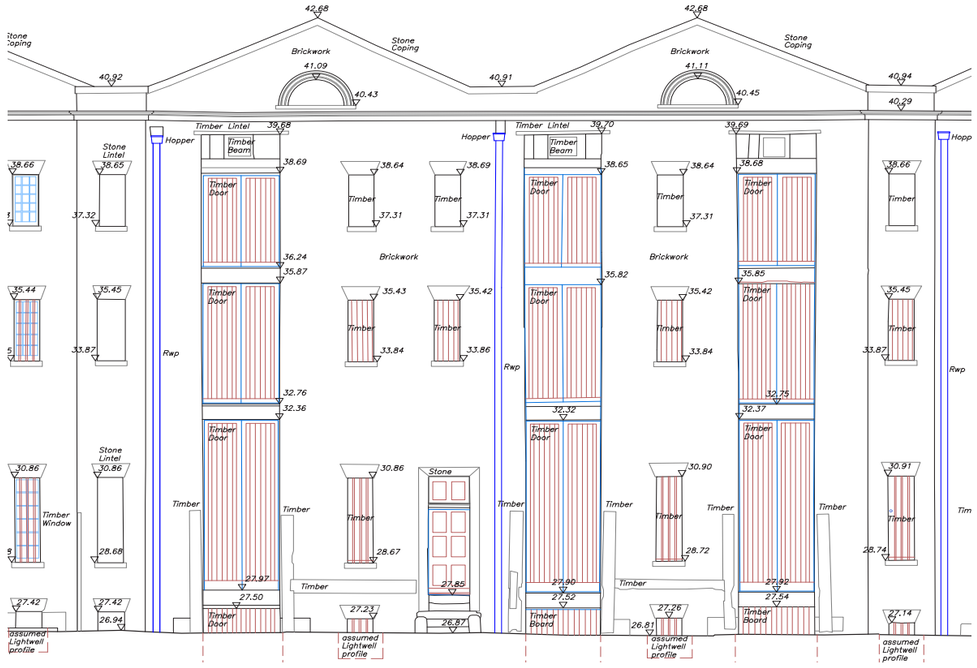
The East elevation



The North elevation



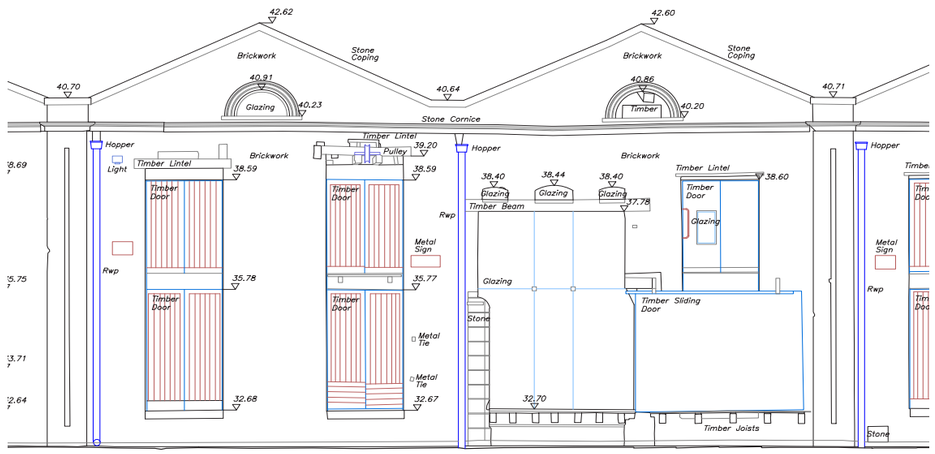




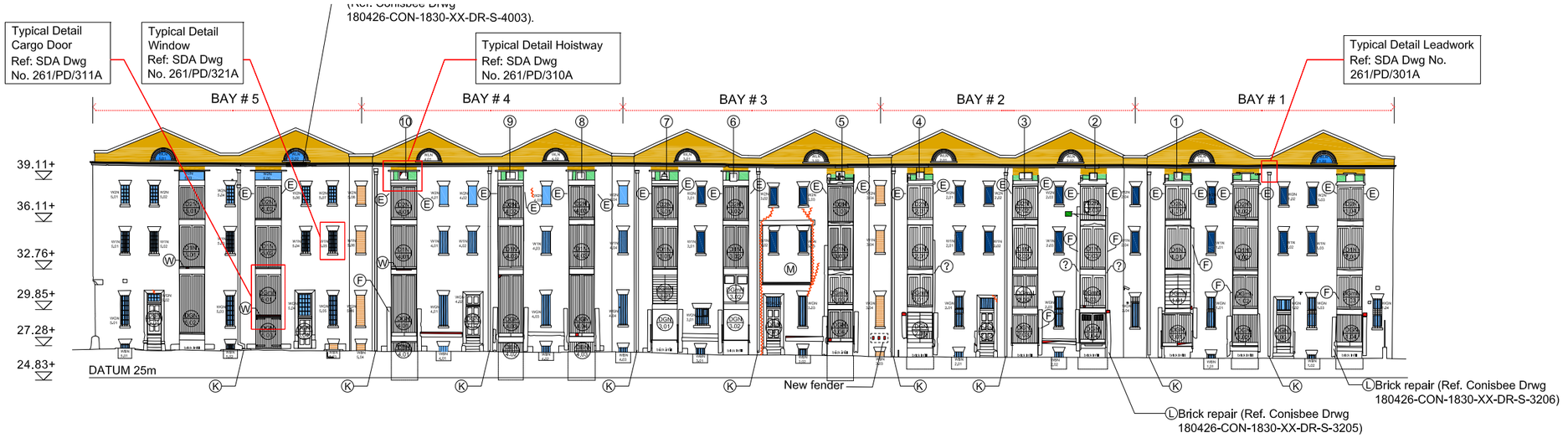
Works are proposed for the rwp hoppers and shoes, overflows, ground level lightwells, pulley openings, brickwork including strengthening, leadwork, cornice stones, wood repairs, fenders, cargo doors and windows.

Prior to the works proceeding there will be localised prepartion to the areas of the proposed repairs:

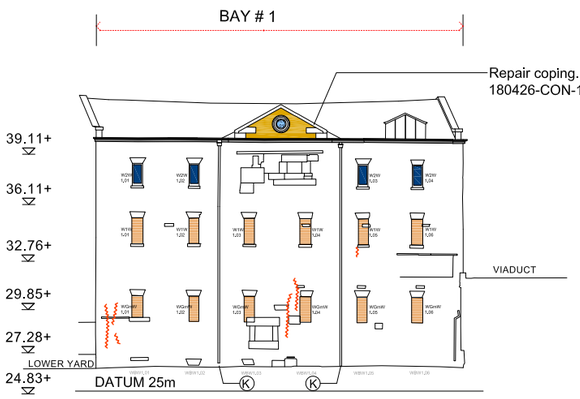
1. a light clean to the repective areas/elements and for brickwork the localised area just beyond the area of repair to enable visual blending and matching the existing adjacent fabric.
2. careful cleaning of ledges, sills or other items that do not require redecoration with due care to avoid disturbance of hazardous materials such as existing lead-based coatings
3. the method of cleaning will be only to remove some of the pollution staining and all organic growth . Where holes are to be infilled, the cavity will be cleaned of any organic growth or decayed matter.
4. Generally it will be a light gentle clean by hand with a fine wire brush with care to avoid removing the patina of age and a trial area will be prepared for inspection . This will better reveal the fabric and enable profiles, joints, colours to be accurately recorded prior to any repair work. Any loose materials will be tapped out and removed.



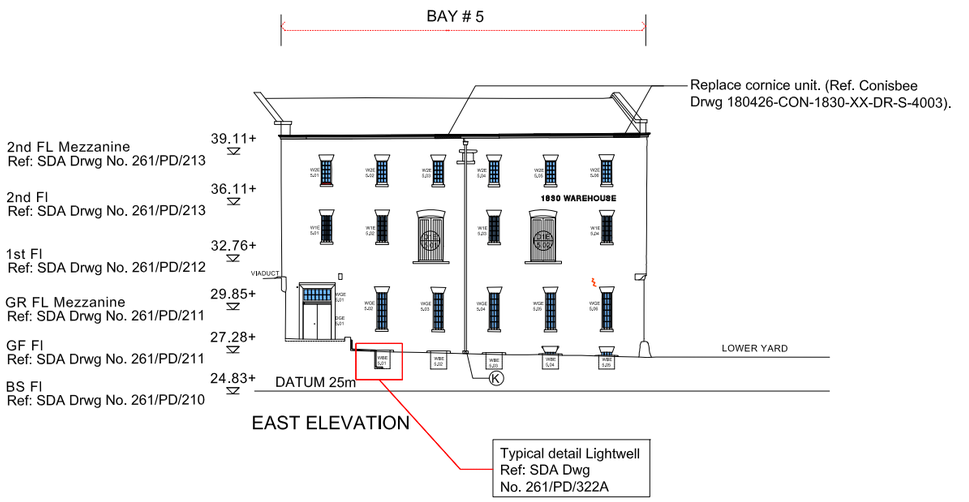
Existing



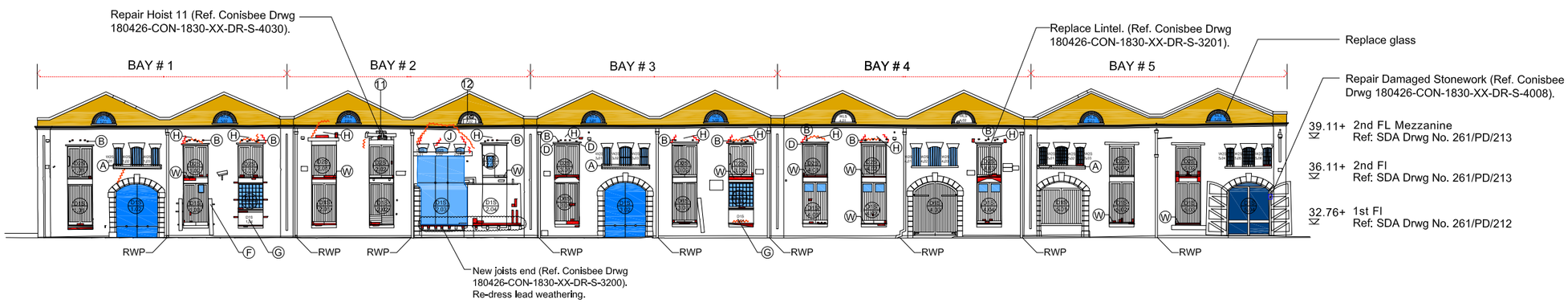
NORTH ELEVATION



WEST ELEVATION.



EAST ELEVATION



SOUTH ELEVATION **Proposed**

Drawing 261/PD/220A

GENERAL:
1. REMOVE NESTING MATERIALS
2. CLEAN AWAY GUANO

SCHEDULE:

EXISTING WINDOW TYPES

- Type 1: Three types of wooden framed glass.
  - Wooden frame glass
  - Wooden frame with metal grille
  - Wooden frame with wooden infill
- Type 2: Metal frame
- Type 3: Brick Infill
- Type 4: No glass

- Re-pointing with lime mortar.
  Re-secure + Seal all doors .
  (Ref SDA Drw No. 264/WD/311A)
- Re-dress weathering above cornice.
  Ref. SDA Drwg No. 261/WD/301A
- Remove Brick Piers to Hoistway (Ref. SDA Drwg 261//PD/310A)

H+R

- Decayed timber elements_(refer SDA DAS)
- Approx location of cracks Localised re-pointing

- (A) Corrosion of bars. Multiple cracks in stone sill.
- (B) Wood blocks above Lintel. Replace with bricks.
- (C) Re-Point open joints spalling to lunette blocks.
- (D) Re-Bed brick.
- (E) Restrain Quoins (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-4007).
- (?) Inspect restraint. Replace sill.
- (F) Inspect restraint. Refix fenders.
- (G) Restraint brickwork (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-4009)
- (H) Reinforcement of Brickwork (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-4000)
- (J) Reinforcement of Brickwork (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-4001)
- (K) RWP G-S; Replace gullies + modify shoes at base of downpipes and duct to gullies to avoid splashing.
- (L) Brick repair (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-3205/3206)
- (M) Repair + Restrain infill panel (Ref. Conisbee Drwg 180426-CON-1830-XX-DR-S-4005)
- (W) Replace weatherbar.
- (1) Hoists number 1

4.3.1 RWP:HOPPER,OVERFLOWS,SHOE, LIGHT-

SCOPE OF WORKS OVERVIEW

With the combination of increasing rainfall intensity and the limited often inadequate flow limits of existing gutters this is a particularly important detail to provide a further level of protection and warning for maintaining the historic fabric; it also an opportunity to correct a design ‘fault’ which would be to the long-term benefit of the building,

1. Overflows: A condition survey by Hutton & Rostron recommended that to protect the fabric and prevent further deterioration from the effect of water that overflow pipes should be fitted to both the hopperheads and ends of the valley gutters.This would drain water clear of the structure in case of blockage and should be installed at a level below that at which water would overflow the roof flashings.

2. Hoppers: The current hoppers are not original, possibly replaced with the 1980’s/1990’s works, they vary in form and cannot be adapted to accommodate an overflow pipe. Replacement hopper heads with a cast iron head with integral overflow are proposed with a design matching the original hopperheads on each elevation (evidenced from historic photograph below).



3. RWP Shoe: Where the RWP meets ground level the bottom of the downpipe does not connect through into the gullies and water splashes back onto the wall surface behind leading to wet and deteriorating brickwork as below



SPECIFICATION NOTES

1. Overflows: The proposed works showing the two overflows are indicated on drawing 261/PD/301A. The overflow pipes to the end of the valley guttter will project through the parapet above the cornice and installed by core drilling the existing brickwork without loss of materials.

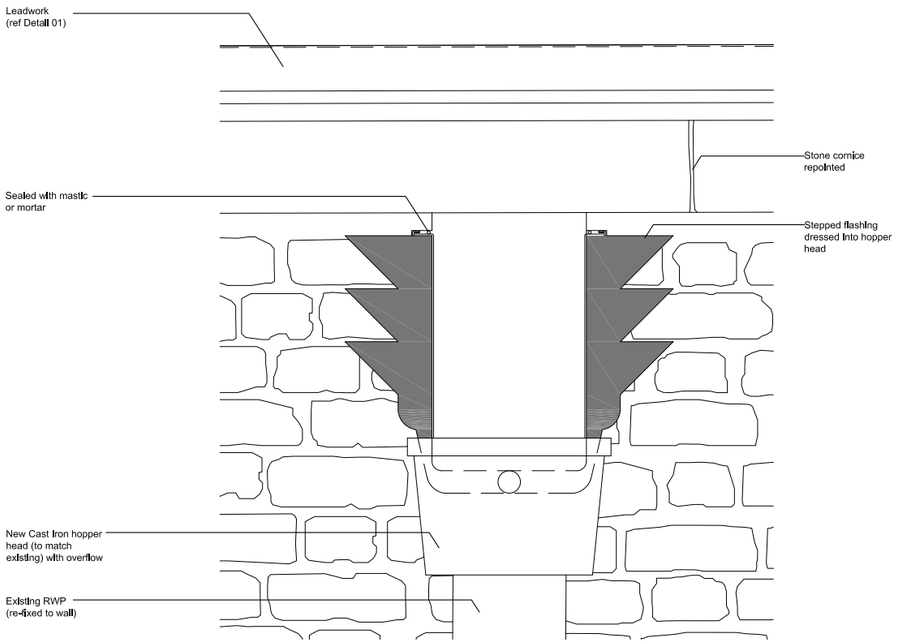
They will be finished in lead to match the existing chutes and similar to those existing on the west elevation as shown below. The overflow projections will be limited while minimising water splash back on the facade and as the picture shows when combined with the cornice has a very limited presence close-up and considerably less from ground level.



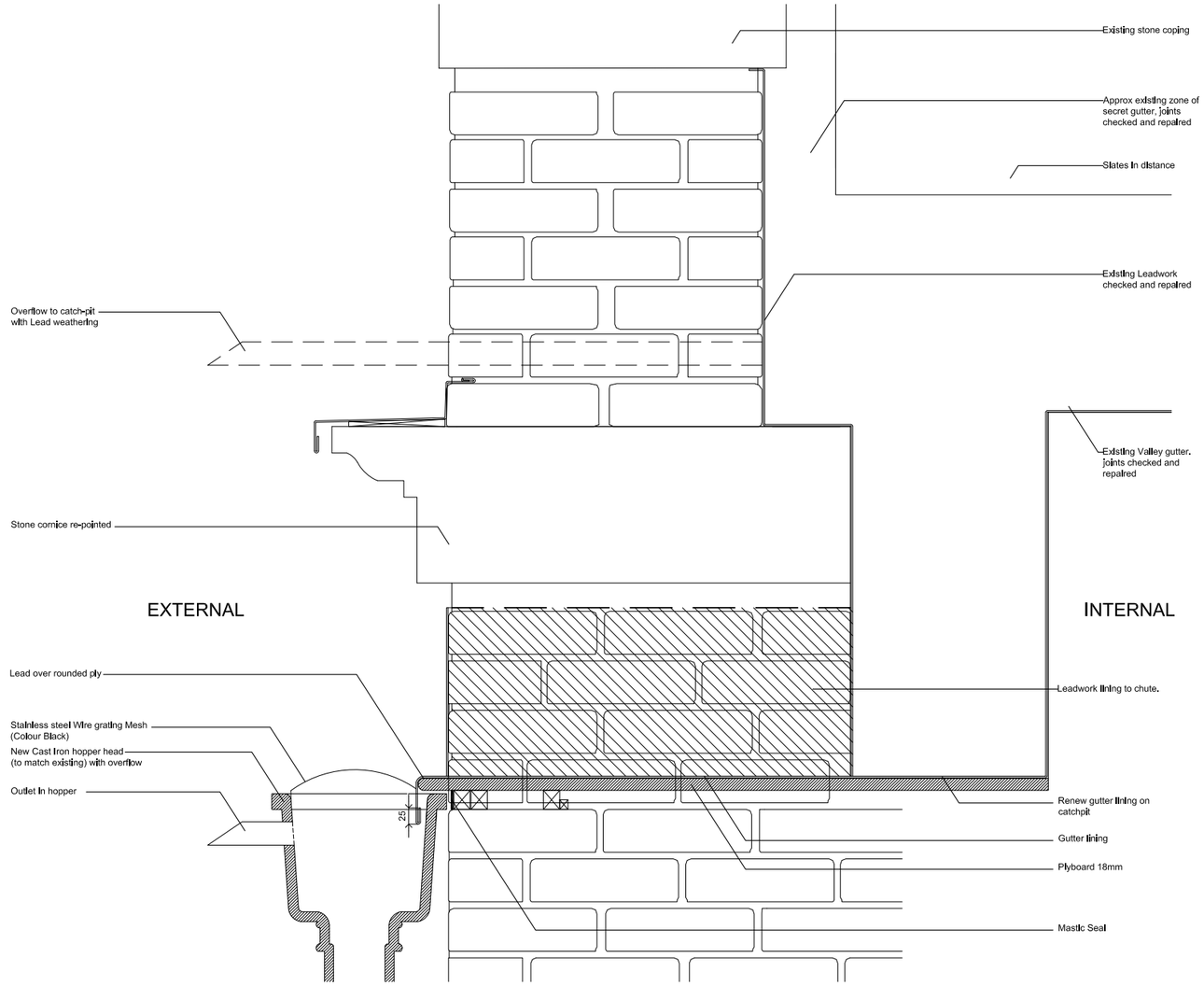
2. Hoppers: The proposed hopper head is a flat backED octagonal shape as the Britannia Cast Iron example below and will be supplied with an integrated overflow. The steel wire mesh grating to the top of the hopperhead will prevent rodents and debris falling down into and blocking the downpipe and will be black in colour.

3. RWP Shoe: The installation date of the existing pipework is unknown. The proposal is to extend the existing curved shoe section of pipe using the same profile/material/appearance which are available and will match an existing detail to the south trackside elevation as the picture below. This could be an addition rather than alteration but will be subject to a site survey of the condition of each shoe and its joint with the downpipe.





Detail 03
CHUTE / MESH EXTERIOR ELEVATION



Detail 04
OVERFLOW / MESH

PROPOSED DETAIL: LEADWORKS: DETAIL SHEET #1 1:5 @ A1 / 1:10 @ A3

Proposed overflows

Drawing 261/PD/301A



Extending the RWP shoe

These images and sketches illustrate the proposals for the modifications to the existing rainwater downpipes on the north east elevation of the building as the downpipes connect to the below ground drainage system.



Photograph 1 .RW downpipes (9 of) on the NE elevation connect to the buried drainage above grating covered gulley inlet pits photo 2 below.

Modify shoes at base of downpipes to direct water straight into gullies to avoid splashing and saturating of the fabric at the base of the building. Replace one no.small newer gullie to match larger.

Existing

Proposed

SCOPE OF WORKS OVERVIEW

The lightwells to the basement windows are protected by an open metal grate to prevent falling and rain-water is collected and drained by a gully. The side walls are brick and the base is a concrete screed and in most cases debris has collected within. Biological growth indicates the build up of very damp conditions with the base and sill of the windows highly vulner-able to decay.

SPECIFICATION NOTES

The gulley's will be cleaned and the grating will be checked to ensure it is secure and retained. Where existing rainwater pipework is ducted into the lightwell this will be adapted in a well-designed, visually mini-mal manner to feed directly into the gully rather than splash over the top or onto the concrete floor.
All the surfaces of the lightwell be cleaned and the brickwork walls re-pointed

Adjustments to lightwells

The proposed adjustment of the existing pipework indicated here is for two lightwells to the east and north elevation respectively where an above ground pipe connects into the them.
To the east the pipe will be connected to the gulley to avoid water over-flowing across the floor of the lightwell.
To the north where it stops and overflows at the grating level it will be extended down to the gulley to match the east lightwell and avoid water flow over the brick walls floor and dampness deterioration.



East light well where the existing extended pipe will be connected to the gulley



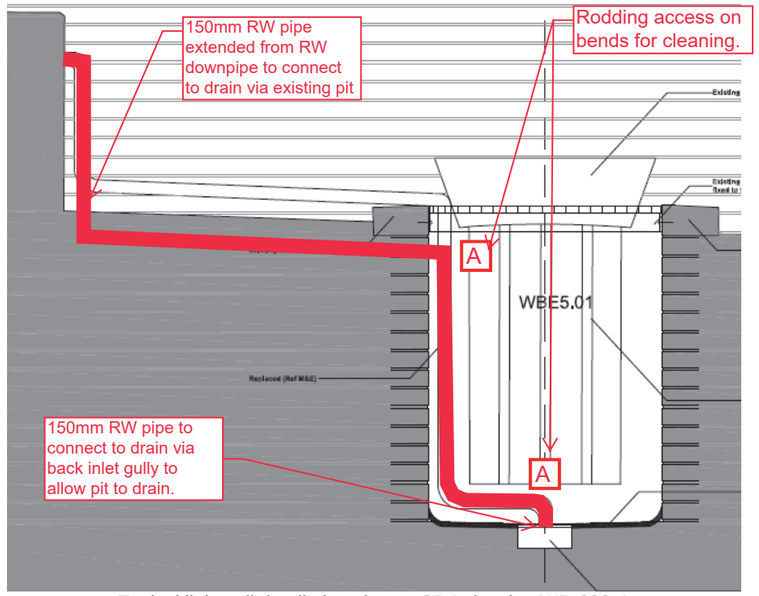
For all the other lightwells where there is no connecting pipe the floor and grille will be cleaned out ensuring the guley is secure and clear.

Existing

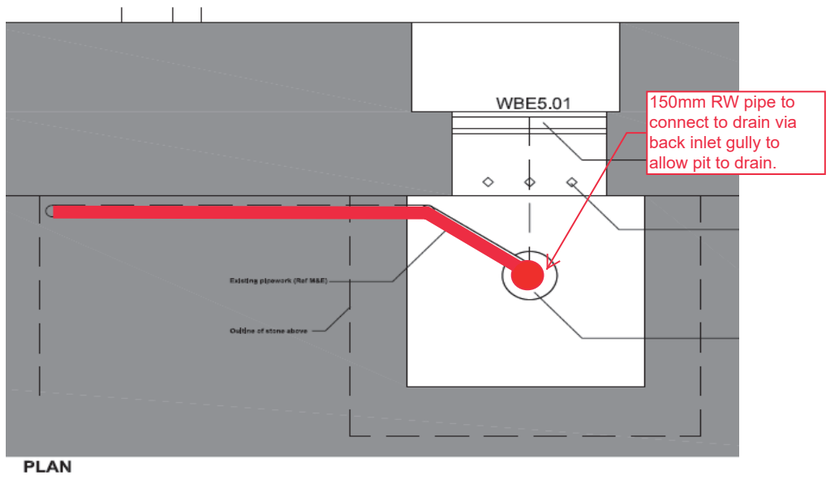


North light well where the existing pipe will be extended down to also connect to the gulley

The RW downpipes on the NE elevation connect to the buried drainage above grille covered gulley inlets as photograph 1 above.



Typical lightwell detail elevation as SDA drawing WD-322-A.



Proposed

Pulley Opening Document. Information discussed at meeting 21.11.19, 1830 Warehouse

Summary of the Historic Development and Significance of the Hoist Openings on the 1830 Warehouse

Introduction

This addendum to the heritage statement is intended to give further detail relating to the repair options for the hoist openings on the 1830 warehouse. The current arrangements has 2 designs:

A single lintel arrangement supported on brick stacks. The lintel is bowing and not structurally adequate.



A triple lintel arrangement that is structurally inadequate causing cracking and dropping of the brickwork above.



General Historical Background

Constructed by the Liverpool and Manchester Railway between 1829-1830 the warehouse as the first for a railway had no functional predecessors and alterations to the structure began almost immediately, such as installation of mezzanine floors in 1831 and the addition of a steam engine.

Lifting equipment

1830 Gravity Hoists

When constructed in 1830 the external hoists would have been 'gravity hoists', essentially a form of manual lifting of cargo from the yard to the upper stories with counterweights of iron. When constructed there were 24 gravity hoists but only 8 partially survive in situ with only one near it's complete construction.

1831 Steam Powered Hoists

By 1831 the gravity hoist system must have proved to be ineffective and steam power was introduced to power the existing hoists. Although the Greater Manchester Archaeological Unit (GMAU 1991) suggests not all the hoists may have been upgraded to steam power as it is suggested a steam engine would be unable to power all the hoists at once.

1850-1880 Hydraulic Jiggers

At some point between 1850-1880 the hoist system was again upgraded to a hydraulic system. This would have been more efficient than the manual and steam powered systems. There are 4 surviving hydraulic jiggers in the roof space and these would have utilised the existing gravity hoist external equipment.

1880-1970s

By the time of the earliest photographic evidence (c.1970s) the south elevation (rail side) had all its hoist openings bricked up leaving no evidence of the existing arrangements. The north elevation (yard side) had several of the existing hoist heads surviving and the box and lead caps had already been introduced on at least some of the equipment.

Although it is possible that the single and triple lintel arrangement relates to a historic change to steam or hydraulic power the GMAU (1991) archaeological survey suggests the crane heads are likely to have been adapted for re-use and not changed. The triple lintel arrangement also tends to be accompanied by 20th century brickwork to support it.

Mark Clifford, Science Museum Group 5.11.19



Originally the pulley boxes would have had a wheel on top of it to act as a pulley. After the warehouse fell out of use in the 20th century components of the hoists have been removed and a plywood box with a lead cap was installed in its place to protect the elements from the weather. Each opening has a different height, some 5 bricks high others 10. Those with the narrower openings meant that a lead box cap could not be installed so the lintel was removed along with a section of brickwork above and the brick stacks below were installed to support a new triple lintel arrangement.

There appears to be an original consistency in design across the façade of having 3 bricks high above the lintel and some openings were high enough to introduce a lead cap by replacing the single lintel with a thinner one. Those hoists that didn't have the height to introduce the caps had the brickwork and lintels removed and replaced with the 3 lintel arrangement supported by brick stacks.



For the example opposite, to cap the pulley with the lead and ply box there wasn't sufficient height with the existing lintel so the opening was altered.

Summary of Significance

The single lintel arrangement appears to be original (or at least historic) and although replaced with a single lintel that is undersized and structurally in-adequate it appears to be the original design intent for the building.

The triple lintel arrangement is a poorly designed and implement piece of work undertaken in the 20th century and the arrangement is structurally inadequate.

Item	Date	Comments	Significance
Single lintel openings	Mid-late 20th century	Highly likely to be the original arrangement but a slimmer lintel has been installed that is now sagging.	Low
Triple lintel openings	Mid-late 20th century	An altered arrangement to introduce weather protection. Poorly designed and implemented	Low

Proposal	Significance	Comments	Impact on Significance
Single lintel openings. • Replace undersized single lintel with thicker lintel. • Remove brickwork stacks 	Low	The option has been explored to re-inforced the existing single lintel but this is not possible. The original arrangement is highly likely to have been the same as existing but with a thicker beam (as proposed). The brickwork stacks appear to have been introduced to support the lintel that is	Low / Beneficial Small loss of evidential value relating to the removal of this phase of the adaption of the building. However, the removed fabric is mid/late 20th century and does not relate to a significant change in the buildings history. In many ways returning to the original arrangement offers an enhancement to significance.

		undersized. The brickwork is modern and has limited significance.	
Triple lintel openings. • Replace with single lintel • Remove brickwork stacks • Remove modern brickwork around lintels and rebuilding in brickwork to the match the original 1830 construction 	Low / intrusive	Retaining this arrangement has been explored but has proved problematic. The triple lintel arrangement is a poorly designed and implement piece of work undertaken in the 20th century and the arrangement is structurally inadequate. The brickwork stacks appear to have been introduced to support the lintels. The brickwork is modern and has limited significance.	Low / Beneficial Small loss of evidential value relating to the removal of this phase of the adaption of the building. However, the removed fabric is mid/late 20th century and does not relate to a significant change in the building's history. In many ways returning to the original arrangement offers an enhancement to significance.
Redressing lead cappings	Low / intrusive	The plywood boxes and lead caps are mid-late 20th century alterations to protect the crane heads. They obscure the original detail such as	Beneficial Redressing the lead work closer to the crane heads will reveal more of the original heritage fabric and allow for a visually simpler arrangement.

			the pulley wheels and meant unsatisfactory works to the structure to implement them.

Summary and Conclusion

The approach for both openings relates largely to removing low or none significant elements and restoring the feature to an earlier period with the works necessitated by structural failure. This conforms with Historic England's guidance on restoration in 'Conservation Principles, Policies and Guidance' (2008)

"Restoration to a significant place should normally be acceptable if:

a. the heritage values of the elements that would be restored decisively outweigh the values of those that would be lost;

b. the work proposed is justified by compelling evidence of the evolution of the place, and is executed in accordance with that evidence;

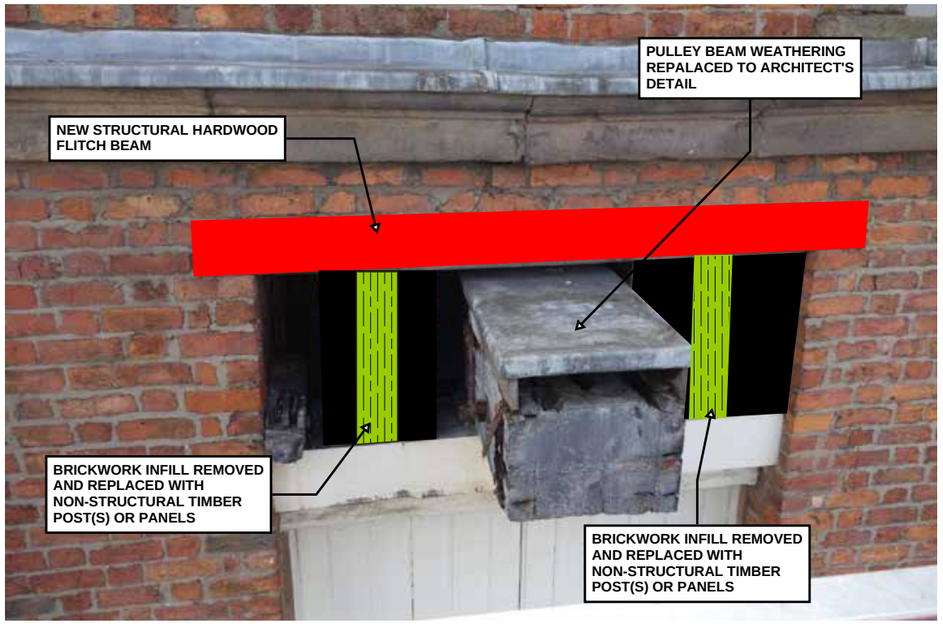
c. the form in which the place currently exists is not the result of an historically-significant event;

d. the work proposed respects previous forms of the place;

e. the maintenance implications of the proposed restoration are considered to be sustainable."

Elevations at high level





Hutton & Rostron's 2015 report noted that the previous replacement of timber lintels internally had been with unseasoned new timber leading to shrinkage and localised loss of contact and support to the masonry and these will be replaced with new lintels.
Historic removal of the pulley equipment was followed by brickwork infill which are not fully bonded the full depth of the walls to the south elevation and not at all to the north elevation which are showing some structural failure. The brickwork will be removed and replaced with a new infill detail to weatherproof the openings including securing all pulleys. Closing the existing opening to the weather and pigeons with a a rear timber panel and dark coloured perforated front metal panel set back from the front line will return a welcomed clarity and consistency to this detail.

Existing

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GENERAL NOTES

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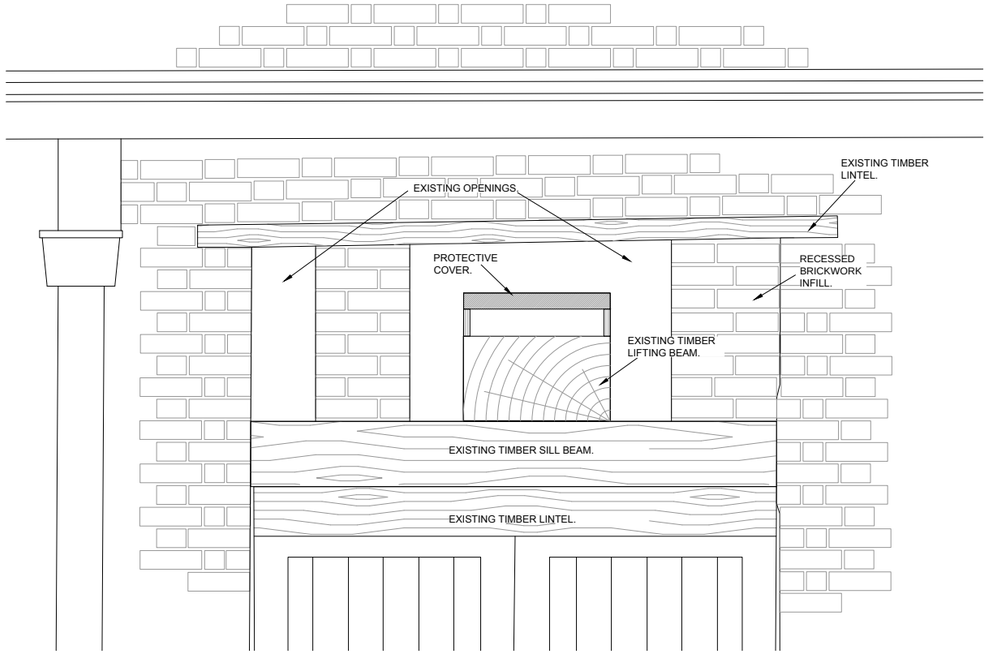
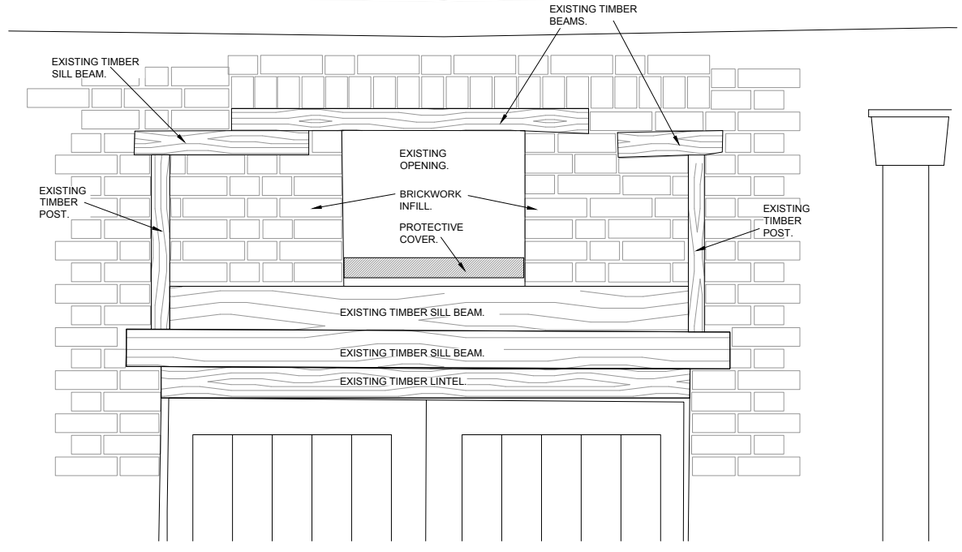
2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.



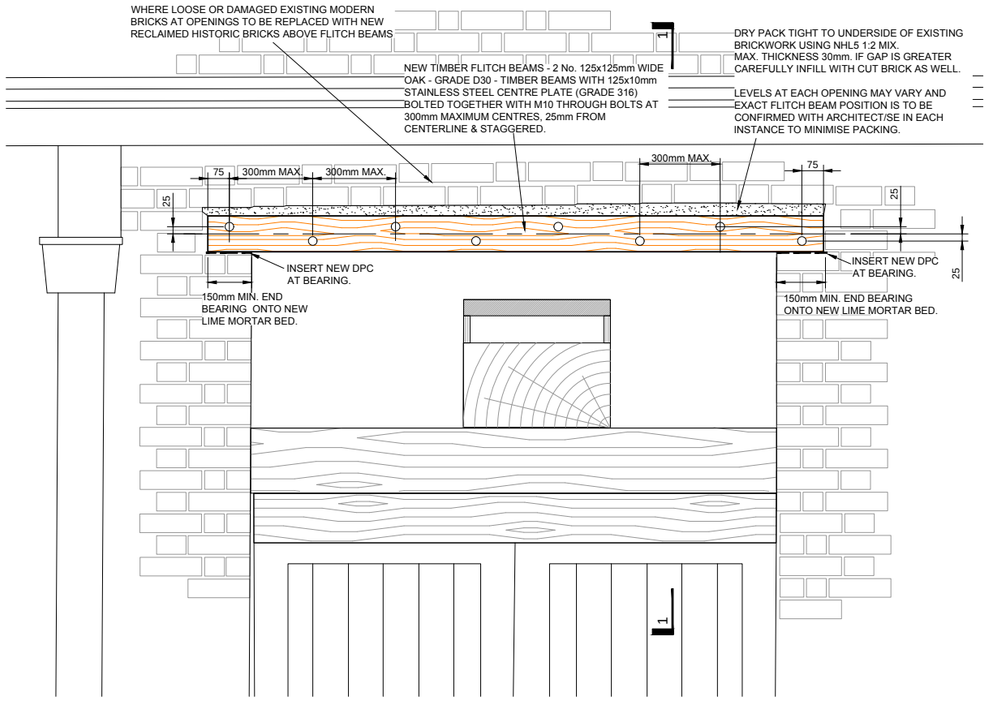
EXISTING PULLEY OPENING - TYPE A.

SCALE 1:10



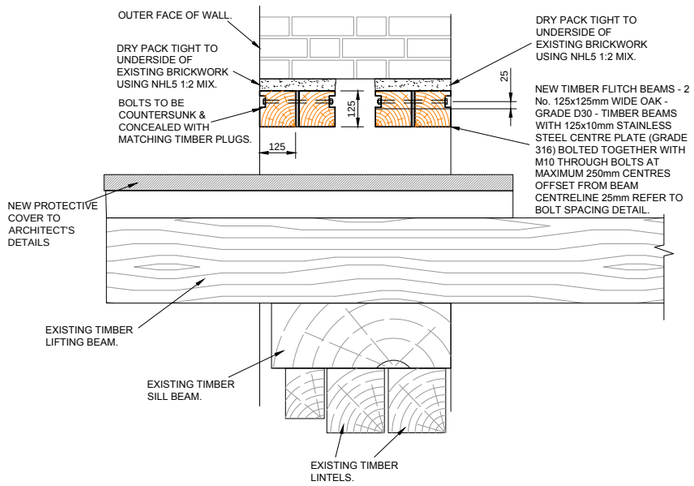
EXISTING PULLEY OPENING - TYPE B.

SCALE 1:10



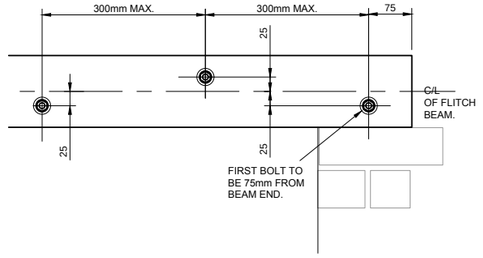
TYPICAL REPAIR DETAIL.

SCALE 1:10



SECTION 1-1

SCALE 1:10



BOLT SPACING DETAIL.

SCALE 1:5

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
T3	21.02.20	NOTES REVISED	PM	SW

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Drawing Status
TENDER

Project
Science & Industry Museum,
1830 Warehouse URW

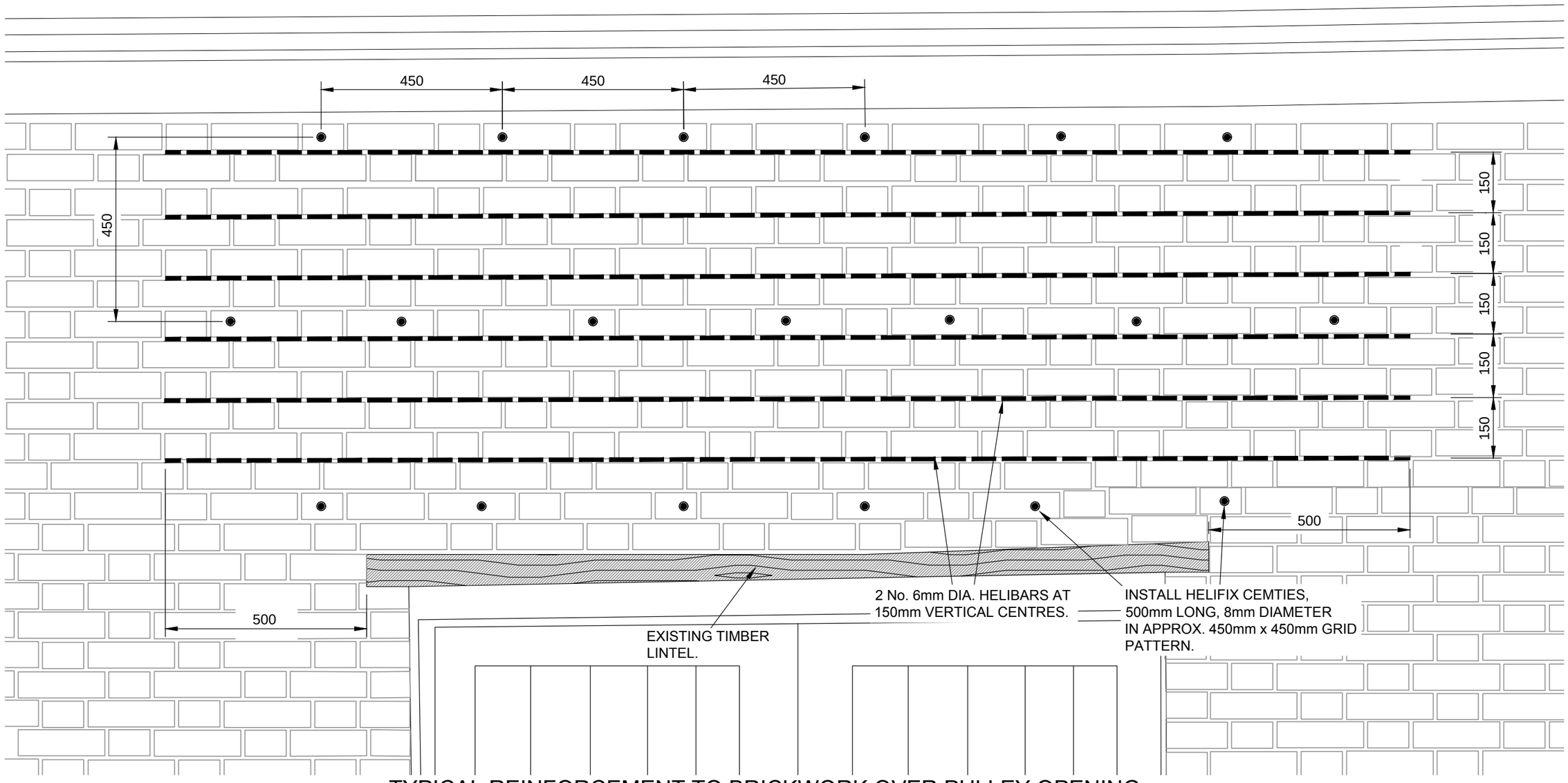
Date MAY 2019
Scale 1:10 @A1
Drawn PM
Engineer SW

Title
North Elevation
Pulley Opening Repairs.

Project No
180426

Drawing No
180426-CON-1830-XX-DR-S-4004

Revision
T3



TYPICAL REINFORCEMENT TO BRICKWORK OVER PULLEY OPENING

SCALE 1:10

NOT FOR CONSTRUCTION

STRUCTURAL REPAIR NOTES

1. HELIBAR TO BE INSTALLED AS PER HELIFIX METHOD STATEMENT LR08 UNLESS OTHERWISE STATED ON THIS DRAWING.
2. CEMTIES TO BE INSTALLED AS PER HELIFIX METHOD STATEMENT WT13 UNLESS OTHERWISE STATED ON THIS DRAWING
3. CRACKED BRICKS TO BE REPAIRED BY RESIN INJECTION USING ROTAFIX STRUCTURAL CRACK SEALER EPOXY ADHESIVE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CRACKS IN MORTAR JOINTS TO BE INJECTED WITH LIME-BASED GROUT AND REPOINTED IN ACCORDANCE WITH CONISBEE'S SPECIFICATION.
4. ALL HELIFIX WORKS ARE TO BE CARRIED OUT IN STRICT ACCORDANCE WITH HELIFIX CURRENT DATA SHEETS AND MANUFACTURER'S SPECIFICATIONS UNLESS OTHERWISE NOTED.
4. ALL HELIFIX WORK TO BE UNDERTAKEN BY AN APPROVED INSTALLER.

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER RELEVANT DRAWINGS. DO NOT SCALE FROM THIS DRAWING

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Project
Science & Industry Museum,
1830 Warehouse - URW

Title
South Elevation. Typical Pulley Opening Reinforcement.

Rev	Date	Description
T1	21.06.19	PRELIMINARY TENDER ISSUE.

Scale	Drawn	Engineer	Date
1:10	PM	SW	June 2019

Drawing Status	Project No	Revision
TENDER	180426	T1

Drawing No
180426-CON-1830-XX-DR-S-4000

SCOPE OF WORKS OVERVIEW

A large part of the proposed works are to the brickwork and the pulley openings/associated brickwork and as agreed once scaffold access is available for the main contractor/specialist sub-contractors investigatory work will proceed for both a single lintel and triple stepped lintel opening to establish a Method Statement **(MS)** for approval of the works which will further inform the specification notes and set the approach for the remaining pulley openings and brickwork.

The pulley openings affected affected by the proposed works are noted in the key of drwg. 261/PD/220A with a circle/ number and the circles are located along the top of the elevations with a line linking to the pulleys . For the existing now without a pulley the mesh panel will be installed to match those with a pulley

The height of the existing lintels of approx. 75 mm is not adequate to support the brickwork and it is unlikely this arrangement at the north side is original due to evidence of rebuilding around the openings and the relatively modern appearance of the brickwork infills.

SPECIFICATION NOTES

1.Surveys identified that there is no predominant timber type and lintels are oak or scots pine with oak the preferred specification for strength and durability.

2.The new lintel flitch beam will be two bricks high/thick to achieve adequate structural capacity to support the brickwork above without recurrence of cracking; there is evidence of this height of lintel being used for an apparently original pulley beam arrangement at Bay 2 on the South elevation which will remain unaltered as the picture below.



The lintel fixings will be at 300 centres, countersunk and pelleted with oak matching a beam on the south elevation as below.



3.The bearing levels of the existing lintels spanning over the pulley beams vary along the elevation by a brick course in some instances and there is also variation to the height of the pulley openings below ranging from 6 to 8 brick courses high.

4.To avoid sanitisation of the pulley design the proposal is to retain this variety matching both the existing beam levels (whereby the lintel clears the top of the pulley beam/ lead dressing) and their lengths provided there is the required minimum bearing into the brickwork which will be clarified once scaffold access is available.

5.As noted above the precise area and extent/scope/process of work will be agreed on site/informed by the Method Statement (MS) but generally will be based upon.

o Brickwork to be propped

o Existing lintel and free standing infill brick piers only to be carefully removed using hand tools to avoid disturbing the surrounding existing brickwork which will retained insitu unless loose

o New lintel to be installed

o Any disturbed brickwork at bearings to be rebedded in lime mortar

o Localised repointing in lime mortar

The MS will also include a review and clarification of:

o the possible wider mortar joint to pack the top side of the beam with the underside of the brick with mortar and possibly also with cut brick where the gap would be excessive.

o how localised brickwork settlement is dealt with when installing a new straight beam and if careful taking down and rebuilding using the retained building fabric is required.

o proposed use of Heli bar and Heli fix above the lintels; ref. drawing S-4000- T1 agreed approach clarified with joint widths suitable to accommodate the reinforcement with extent of works to be reduced where possible.

New panel to the pulley opening

Various options were considered but with an unacceptable visual impact and the agreed proposal is shown on 261/PD/310A
The proposed detail is for a front mesh and rear wood panel to be fixed to central timber posts and to the brickwork to the side.The mesh is set back from the front of the opening to a depth which prevents pigeon roosting. The posts, which will be kept to the absolute minimum width to reduce presence, gives the required bracing and stiffness that the perimeter framing to the brickwork alone cannot provide.

Pulley beam restraint internally

SCOPE OF WORKS OVERVIEW

There are three locations in bay 3 where beams have rotated downwards and this restraint is recommended
The beams all appear to have been originally bolted down to the mezzanine structure and there are pre-existing holes for this purpose towards the rear of the beams.

SPECIFICATION NOTES

The proposal is for a new a new single bolt painted black to be inserted using the original holes. The works will not be visible from the second floor level and there will no significant intervention to the beams themselves or mezzanine

Pulley beam repair and lead capping

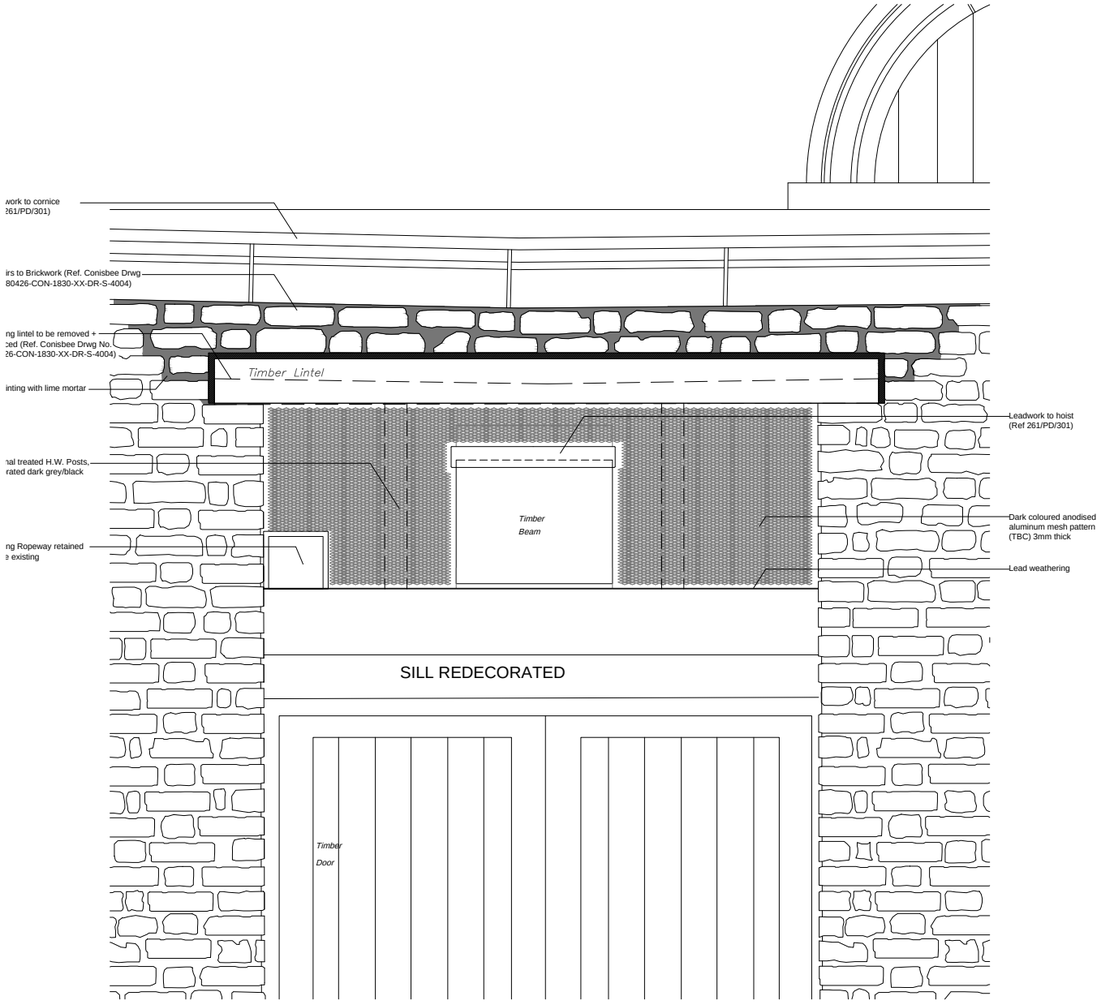
SCOPE OF WORKS OVERVIEW

The general condition of the pulleys is acceptable with some areas of small lose fragments but the full extent of decay can only be established with full scaffold access.

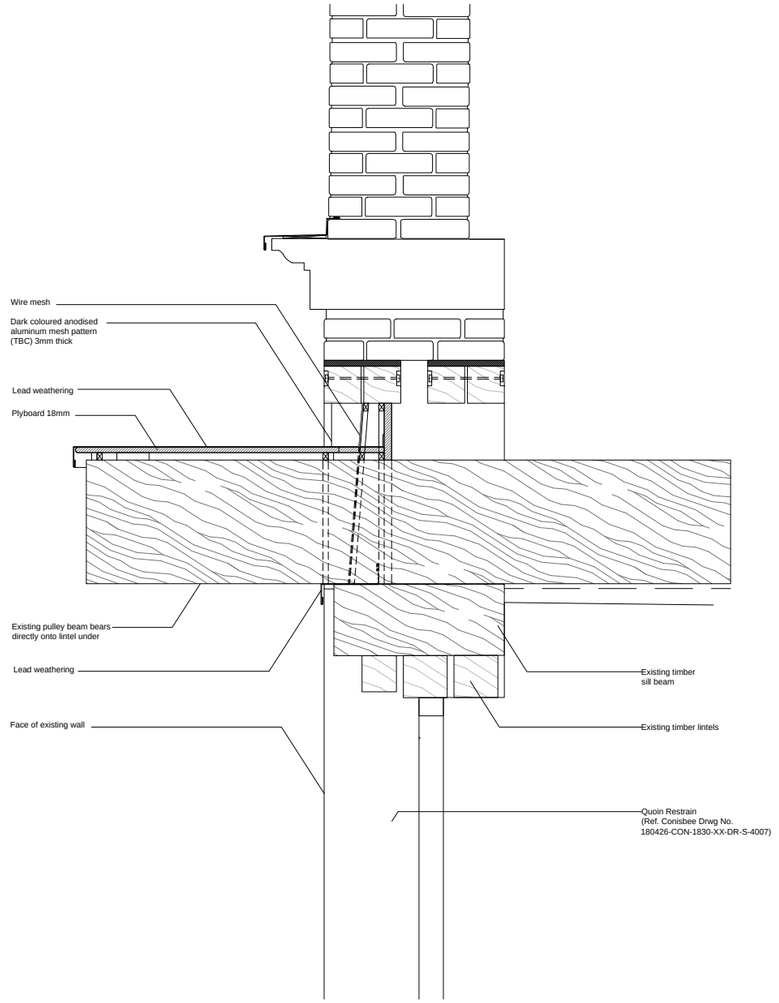
The current scope of Repair Works allows for retaining all the existing pulley beams (no new ones) and re-dressing the top with a new more minimal lead cap protection cover to arrest the decay and deterioration of the wood, making them safe rather than ‘ repairing’ them to like new.

SPECIFICATION NOTES

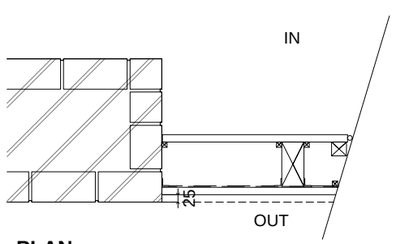
It is currently anticipated that structural repair, probably comprising a traditional timber splice is limited only to the pulley beam in Bay 2 on the South facade. Other defects are currently assumed to be non-structural and likely dealt with also by traditional splicing and piecing in new matching timber to replace decayed. Close inspection with scaffold access is however required to confirm
The existing metalwork will be inspected removing small, loose friable pieces and re-fixing if viable and where heavily corroded and loose will be removed, stored on site and replaced .



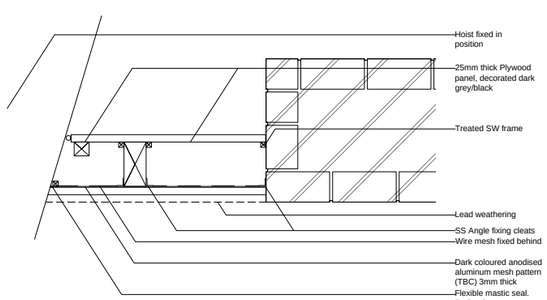
EXTERNAL ELEVATION
HOISTS No.10



SECTION
HOISTS



PLAN
HOISTS



KEY NORTH ELEVATION



PROPOSED DETAIL: TYPICAL HOISTWAY 1:10 @ A1 / 1:20 @ A3

Drawing 261/PD/310A

4.3.3 LEAD WORK: CHUTES TO RWP, CORNICE, PULLEY CAP

SCOPE OF WORKS OVERVIEW

The building was heavily restored in the early 1980's including a re-roof and it is likely the lead will have been replaced but records do not exist. A condition survey noted that the lead detailing locations were a particular source of water ingress and defects leading to wider deterioration of the stone and brickwork:

The existing lead to the chutes and associated flashings is beyond its useful life, many sections of lead are missing and it is difficult to attach/ overlap new lead and ensure it is suitably weathered; this is also the case for the lead to the stone cornice where it is beyond its useful life, is not properly fixed nor provides the correct weathering; the works do not include the gutter linings and associated underlying structure.

The proposal is to remove all the existing lead and install new lead to match the existing detail and appearance providing appropriate weathering to protect the existing stone cornice from further degradation.

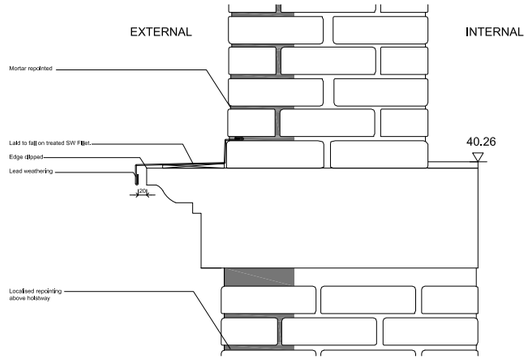
SPECIFICATION NOTES

The existing lead will be carefully removed avoiding any damage to the existing fabric including the stone cornice which will be gently brushed down and prepared for the new lead. The new lead installed generally to the chutes and cornice will be rolled Code 5 lead with flat welted/ stainless steel clipped joints along its length (less prone to storm damage) with a minimum 100 mm overlaps to joints and minimum 75 mm upstands. For the cornice the joints will be aligned to features on the elevation and laid on a fall with a welted drip to the front of the stone cornice and a rear upstand inserted into the first brick joint.

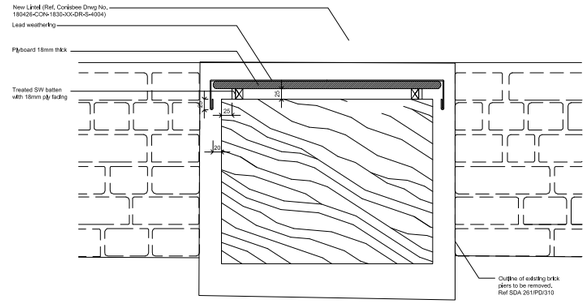
The leadwork details are in accordance with the Lead Sheet Association (LSA) and a response to both traditional and the existing lead detailing with an approach based on:

o With the difficult access/high exposure a nominal increase in allowances to improve long term protection.
o The LSA suggest a two brick high rear upstand but we have matched the existing single brick upstand as requested.
o As requested the the LSA guidelines for additional support face fixings located to the centre third of each length of lead upstand has been omitted
o As requested to match the existing the depth of the lead drip will match the depth of the vertical face of the cornice.
o In accordance with LSA standards intermittent concealed clips will provide additional support at the lead joints matching the existing joint as the picture to the right.

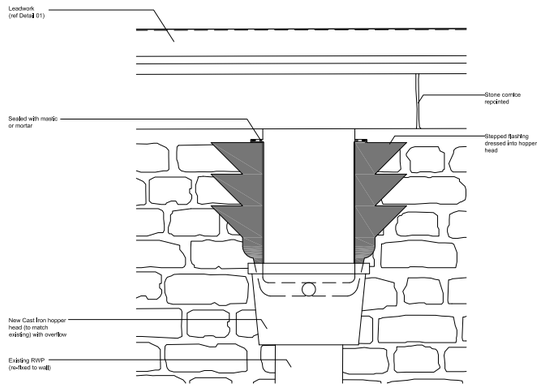
The top of the pulley beams will be re-dressed with a new more minimal lead cap protection cover to arrest the decay and deterioration of the wood. The re-dressing detail to be conditioned and once access is available it will be reviewed and updated for discussion and approval



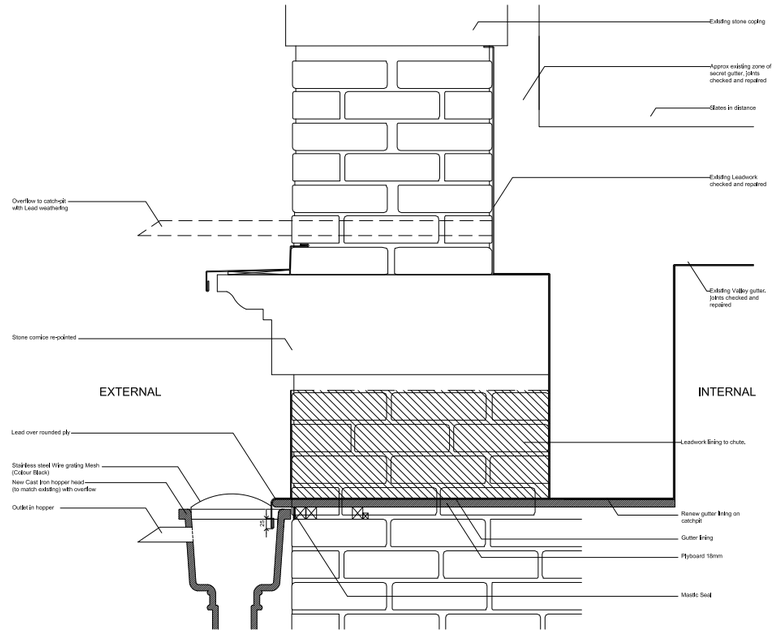
Detail 01 CORNICE



Detail 02 HOISTS. EXTERIOR ELEVATION



Detail 03
CHUTE / MESH EXTERIOR ELEVATION



Detail 04
OVERFLOW / MESH

PROPOSED DETAIL: LEADWORKS: DETAIL SHEET #1 1:5 @ A1 / 1:10 @ A3

Proposed works to chute, stone cornice and pulley cap

Drawing 261/PD/301A





Existing

SCOPE OF WORKS OVERVIEW

All stonework was subject to a conditional survey which established the majority of the historic fabric is retained and with works only proposed to four locations. The three levels of consideration were:

o to first maximise the retention of existing stonework having identified that the fixings, weathering/weathertight details and face condition are acceptable.

o localised indent repair where there is more serious deterioration to the face/bedding of the stone but importantly the existing fabric is retained.

o where the damage to and condition of a section of stone is unrecoverable with significant and extensive cracks and shattering and replacement is required with a matching stone

Refer to Conisbee's NBS and the drawings below for the location of the works. Any cosmetic or minor repairs or the use of consolidating fluids are not proposed.

Structural Engineer's Drawing S-3207 T1 West elevation – indent repair to delaminating stone coping.
Structural Engineer's Drawing S-3204 T1 North elevation Bay 5 - repair to delaminating coping to one section.
Structural Engineer's Drawing S-3203 T1 East Elevation – replace deteriorated stone cornice to two sections.

SPECIFICATION NOTES

Bay 5 North Elevation: Stone cornice ref. Conisbee drwg. S-3204 T1. This length of delaminating stone cornice will have an indent repair to the lower section as Conisbee drwg. S- 4003 T1 and as the Conisbee NBS.



West Elevation: Stone cornice ref. Conisbee drwg. S-3207 T1. The proposal for this length of delaminating stone coping is an indent repair as Conisbee drwg. S- 4003 T1 and as the Conibee NBS. Once full access is available consideration will also be given to the option of redressing the face of the stone however removing loose material may result in local loss of the coping overhang and promote wetting of the brickwork where the proposed indent repair will maintain the overhang.



East Elevation: Stone cornices ref. Conisbee drwg. S-3203 T1. This length of deteriorated, poorly matched and lower quality modern stone cornice is one of two which appear to be cracked throughout the projecting part of the block and these cracks are likely to continue through the bedding plane. The stone will be carefully cut out and any corroded fixings and associated rust debris removed with least disturbance to surrounding stonework masonry. Suitably sized and aligned holes will be formed in the masonry and rear of the stone (a better matched and more durable replacement) for stainless steel dowels and the stone carefully bedded in a hydraulic lime: sand matching the existing finish and joint widths



4.3.4 BRICKWORK

SCOPE OF WORKS OVERVIEW

1.A conditional survey identified areas of brickwork where urgent repairs were required and the proposed works which will be carried out in accordance with the Conisbee NBS are:

o The strengthening of existing brickwork through the insertion of reinforcement; refer to the structural engineer's drawing 180426-CON-1830-XX-DR-S-4000 T1 which explains the installation of the Heli bars.

o Associated works over the adjusted pulley openings where localised settlement has occurred.

o Areas of brickwork where existing pointing is in poor condition, loose or fallen out and if left will lead to further deterioration of the existing bricks

o The careful removal of any plants, root systems and associated soil/ debris from joints, voids and face work;

2.The Repair Works budget cannot cover removing all of the cement based mortar, only addressing specific areas often at high level where most exposed. Once scaffold access is available for the main contractor and their specialist sub-contractors the precise area and extent/scope/ process of work will be agreed on site/informed by the Method Statement (**MS**).

The building was repointed in cement in the 1980s (or earlier) and has not shown widespread spalling of brickwork and removing all the cement mortar whether by hand or mechanical and if well adhered would cause more damage to the existing brickwork.

The proposed minimal intervention approach is to remove cement where loose, friable or easily removed by hand avoiding damage where cement is well adhered. The main areas for the works is those most exposed to weather at high level, largely to the roof gable ends as pictures included. No photographic evidence or archive reporting is available to determine the rate and it is assumed to have accelerated following cementitious pointing c1980.

However as noted at the site visit 20/2/20 there are very few if any bricks requiring replacement with the aim to retain the existing bricks. Those to be considered are a limited number mainly at low level on the South elevation as pictured below and if replacement is required salvaged bricks held in storage on site by the client will be used with the extent of repairs clarified by the MS.









SPECIFICATION NOTES

o The works for brickwork and pointing will be as the Conisbee NBS.

o There will be a chemical analysis of the historic mortar to achieve a lime mortar match and a visual check for the colour match with proposed trial areas as the Conisbee NBS and the **MS**

o Where existing lime mortar is identified within key zones, this will be left in place with any loose joints carefully removed and repointed with matching lime mortar.

o Loose cementitious mortar will be carefully removed with hand tools and repointed with lime mortar but only if it will not damage existing brickwork otherwise it will be left as existing.

o Any existing loose bricks (that can be removed by hand without damage - 'reconstruct' or missing bricks) will be rebed in lime mortar to match the existing.

o Salvaged brick: The first option will be that the existing brick stock will be batch checked for matching like for like with each zone of work to the bays. Existing bricks to be removed and replaced with salvaged will be dimensionally checked for consistency and aligned carefully with adjacent brickwork. Option 2 will be to possibly repair and Option 3 to source a suitable matching brick.

o A series of small wood blocks set into the brickwork only above the lintels to the south elevation, possible former supports will be replaced with bricks - see drwg 261/PD/220A-item B in the key. H&R's timber condition survey (included with this application) identified the remaining timber grounds are decayed and the slots create a path for water ingress and potential for further deeper damage to the original fabric requiring more significant repair in the future. The proposal is to avoid re-inserting modern seasoned timber which will eventually decay and repeat the risk of damage in the future, remove any remaining timber fibres and to sensitively fill the holes with matching brick.

o Smaller redundant fixing holes will be cleaned thoroughly and deep filled with grout set back for the top lime mortar pointing mixed with brick dust to match existing.

o Existing vegetation growth will be removed during the works but will not require any of the built elements to be taken down. Where it can't be completely removed without disturbing masonry the stem will be cut close to the wall, removing bark from the stump and applying herbicide paste leaving the stump to wither.

Proposed use of the 'Heli bar' and 'Heli fix' systems

o The issue is lack of adequate bonding between the layers of brickwork and works are only proposed where there is evidence of current structural defects with the preferred approach not to take down sections of the wall and rebuild.

o Heli fix is a more discrete solution allowing greater retention of historic fabric than traditional methods(cutting out affected bricks and inserting replacement brick) that may involve greater fabric disruption e.g. through stitching cracks with new brickwork.

o Cemties need to be installed through brick centres to structurally connect the outer skin of brickwork to the inner leaves and the drill holes will be filled with lime/brick dust mortar to achieve a discrete repair.

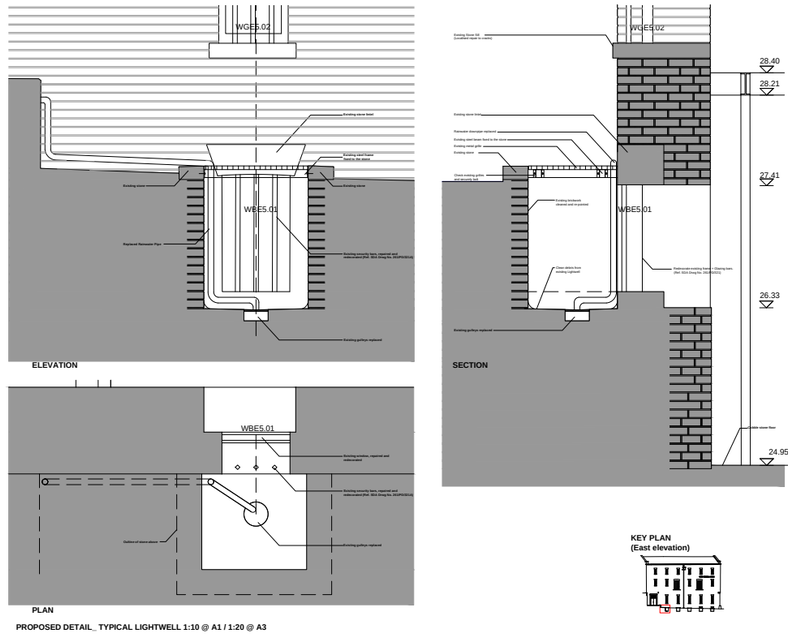
o Existing joint widths are 10-15 mm and capable of accepting reinforcement without affect to the brickwork. Raking out using power tools is not permitted to avoid such damage.

o These works will not be visible: the Heli bars will be inside the joint and concealed by the repointing and where bricks are drilled the head of the Heli fix will be set inside the brick face and the surface hole filled with lime/brick dust to provide an invisible repair.

Works to the lightwells

The lightwells to the basement windows are protected by an open metal grate to prevent falling and rainwater is collected and drained by a gully. The side walls are brick and the base is a concrete screed and in most cases debris has collected within. Biological growth indicates the build up of very damp conditions with the base and sill of the windows highly vulnerable to decay.

All the surfaces of the lightwell will be cleaned and the brickwork walls re-pointed



PROPOSED DETAIL_ TYPICAL LIGHTWELL 1:10 @ A1 / 1:20 @ A3

Drawing 261/PD/322A

4.3.5 Wood repairs

SCOPE OF WORKS OVERVIEW

A conditional survey of the wood elements to the building was completed by Hutton & Rostron/H&R which has been submitted with this application. The proposed works in this application are a response to the items identified by the survey requiring immediate repair. The survey identified levels of conditions to the wood across the building with a mix of hardwoods but the majority a softwood/20th century replacement. The approach is to:

o maximise retention of the historic fabric where possible

o retention where the majority of the section of wood is in good condition with localised repairs

o remove and replace those elements of wood where major rotting and crumbling of the material has occurred.

The works will also involve:

o re-decoration of the cargo doors externally.

o Re-instating a fender to the north elevation

SPECIFICATION NOTES

o where all cills/horizontal surfaces (most exposed to degradation) will be retained and prepared, degreased and rubbed down to give a light key and repainted to match existing.

o All protecting fender elements where loose will be fixed back with stainless steel bolts and existing boron rods will be replaced.

o wood panelling of the existing cargo doors will only be prepared for painting, degreased and rubbed down to give a light key to add an additional layer of protection.

We have listed below with photographic examples the proposed approach for the works clarifying the variation/transition from one repair type to another. The general approach is to maximise the retention of all existing wood and the works will be carried out in accordance with the Conisbee NBS Specification.

1. Retain all of the existing wood piece with primarily surface preparation: This applys to the majority of the window and door cills and any related horizontal elements which have been exposed to some limited wear such as paint loss and minor surface decay. These will be retained and prepared with loose, friable material removed, degreased and rubbed down to give a light key and repainted to match the existing. An example to a window sill is shown below.



2. Retain tthe existing wood piece with localised repairs: with a mixture of original hardwoods but primarily pine as a 20th century replacement across the building the proposal is to replace all decayed wood with a long lasting hardwood such as oak. The affected area will be carefully cut out, the replacement piece scarfed in and then prepared and painted as in note 1. An example to a cargo door sill is shown below.



3. Remove the entire wood piece where decayed throughout: a piece of hardwood/oak matching the profile of the existing section will be installed and prepared and painted as in note 1. Two examples are shown below to cargo doors which are in a limited number of locations and primarily to the south elevations and indicated on drawing 261/WD/220A





4. Other wood repairs

o Protecting fenders: some are loose and will be fixed back with stainless steel bolts with a wooden dowel cap inserted and stained black to match and conceal the hole.
A missing fender on the north on the north elevation will be re-instated with a dark stained oak to reflect the existing fenders.

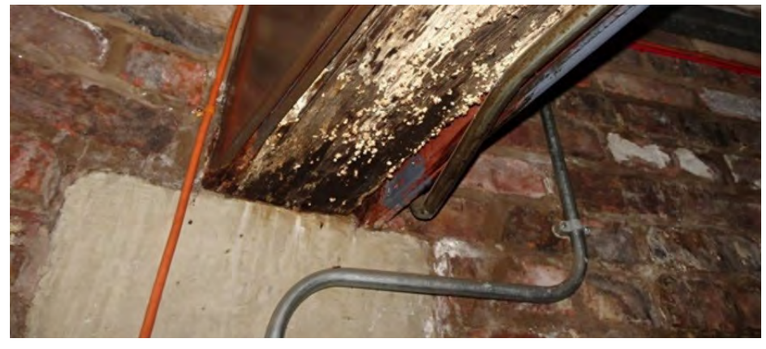


o Replace 7no. decayed timber short joists with new treated timber to match with improved waterproofing Ref. dwg S-3200 - T2:

The extent of the joists (new replacement timber c1990) will be established and the decayed element removed as per structural engineer's note. To retain the existing appearance, the short joists will be reinstated with seasoned structural hardwood (oak) as per the structural engineer's specification. The top surface of the new joist will be fully weathered over in lead.



Internally as below where timber repairs/decay removal allows a DPM will be installed between the timber and bearing



Repair works indicated on Conisbee drawings:

Ref. dwg S-4030 - T1: Timber beam, joist, rafter bearing repairs with option 2 the proposed detail using methods where possible to forming a traditionally repaired carpentered joint.

Ref. dwg S-4031 - T2: Timber surface repairs

4.3.6 Cargo bay doors

SCOPE OF WORKS OVERVIEW

The drawing (261/PD/311A) requires the contractor to check that each device is secure and operating correctly so the doors are locked in position to ensure a stable base to enable the perimeter seal to be satisfactorily installed to prevent bird and insect access and to prevent movement due to wind.









SPECIFICATION NOTES

o reinstate water bars where loose, seal any air gaps with mesh. Strip back paint and redecorate all loading doors, fascias and cills.

o All existing hinges, locks, latches and bolts in place on the the doors will be retained

o Within the retained fittings these missing or corroded elements will be replaced with like for like.

o Where existing locks are not properly securing the door against movement, the lock will be tightened, potentially with timber fillets or wedges to the bottom sill and secured in place.

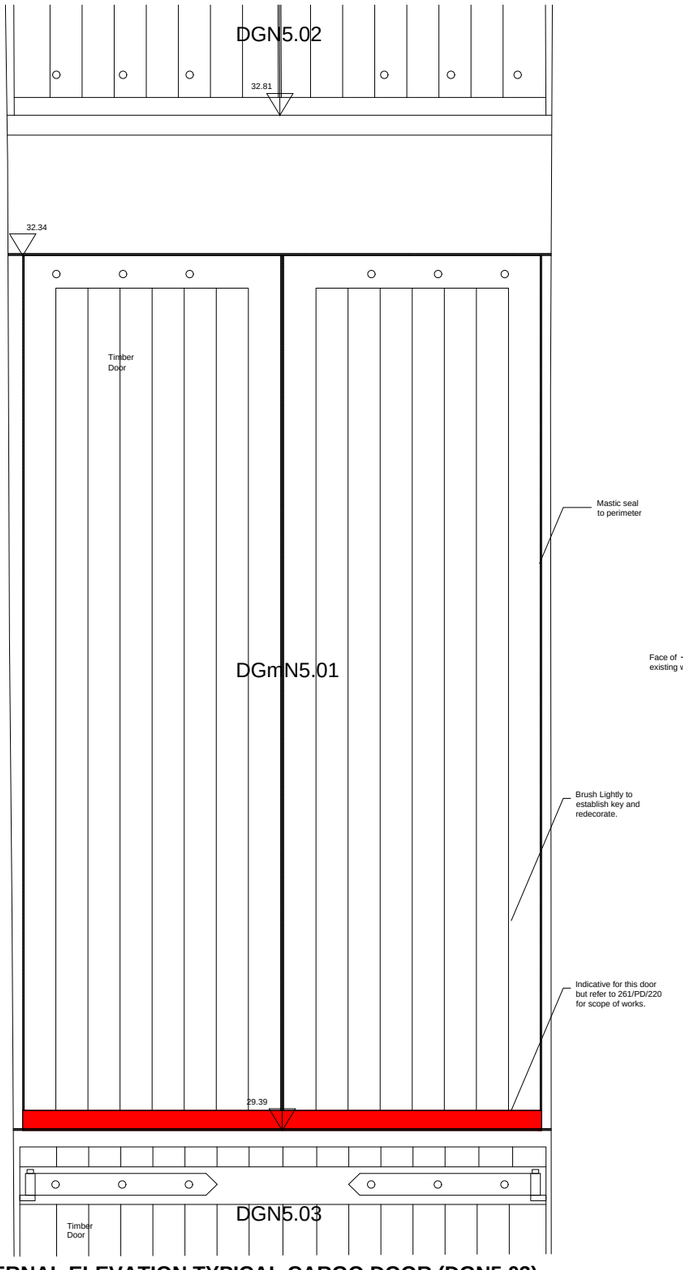
o Where existing locks are missing and the door is not secure, a historic lock will be sourced to match those existing and this is likely to be a pair of dead bolts to the top and bottom of the leaf and a horizontal security bar.

This is as per the illustrated typical door elevation which has the benefit of fixing to the frame and in the future if doors are opened can be retained in place as a barrier from falling.The doors are categorised on the internal elevation references as ‘as-found’ visual types.

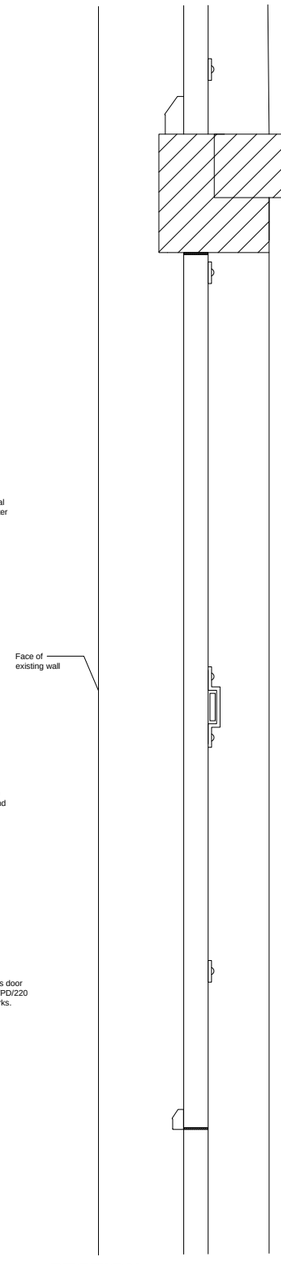
o the external panelling will be prepared for painting, degreased and rubbed down to give a light key to add an additional layer of protection. Paint sampling will be undertaken and colour samples prepared for review



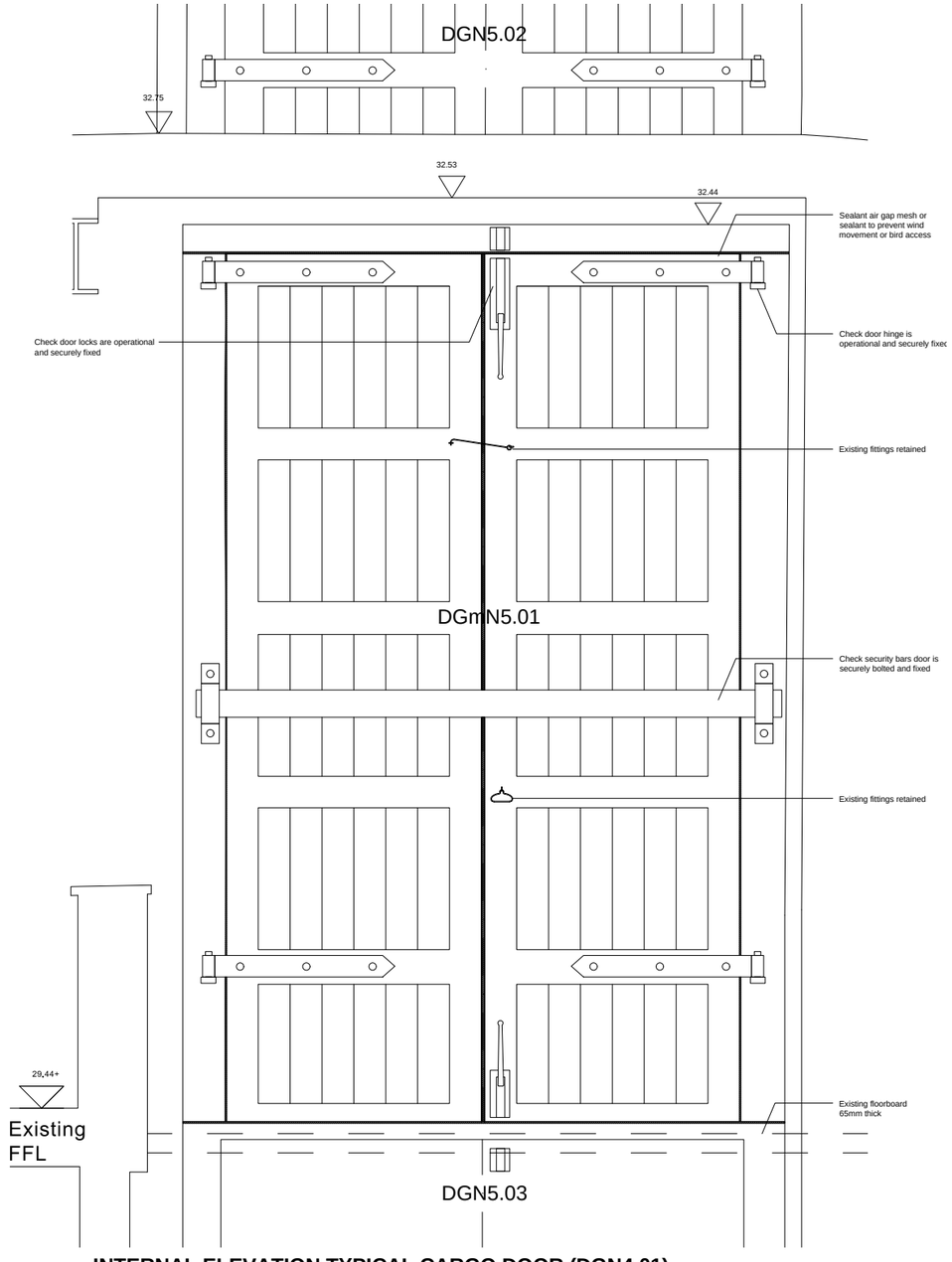
Existing



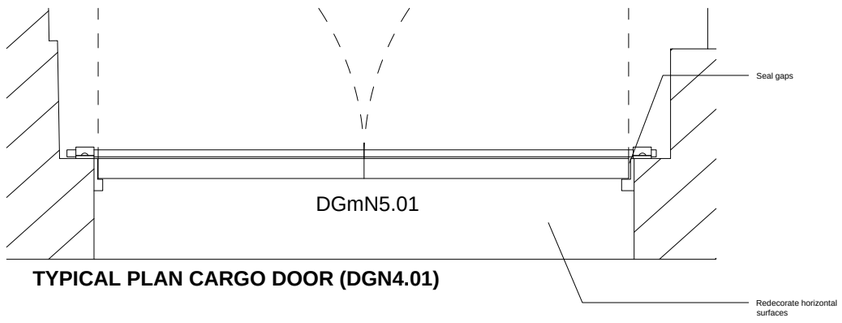
EXTERNAL ELEVATION TYPICAL CARGO DOOR (DGN5.03)



SECTION



INTERNAL ELEVATION TYPICAL CARGO DOOR (DGN4.01)



TYPICAL PLAN CARGO DOOR (DGN4.01)

KEY NORTH ELEVATION



PROPOSED DETAIL: TYPICAL CARGO DOORS 1:10 @ A1 / 1:20 @ A3

Proposed

Drawing 261/PD/311A

4.3.7 Timber frame windows

SCOPE OF WORKS OVERVIEW

o The existing seals will be carefully raked out back to a solid base

o linseed oil putty and a primer will be applied prior to redecoration.

o Existing modern metal frame windows and roof lights: a dark coloured mastic will be applied.

o The glazing to Bay 5 south which is not historic is cracked and will be replaced like for like to match the adjacent lunette in the same bay.



SPECIFICATION NOTES

o Any modern sealant product between the frame and brickwork to the existing timber windows will be removed and replaced with a mortar fillet

o NBS specification for linseed oil putty between frame and glass:
Front putty: Finished to a smooth, neat triangular profile stopping 2 mm short of sight line. Surface lightly brushed to seal putty to glass and left smooth with no brush marks.
Sealing putty: Seal as soon as sufficiently hard but not within 7 days of glazing. Within 28 days apply either:

o The full final finish, suitably protected until completion and cleaned down and made good as necessary, or two coats of primer applied locally to the compound, to be followed nearer completion with the full specified finish.

o Opening lights: Keep in closed position until putty has set sufficiently to prevent displacement of glazing when opened.

4.3.8 Window security bars

SCOPE OF WORKS OVERVIEW

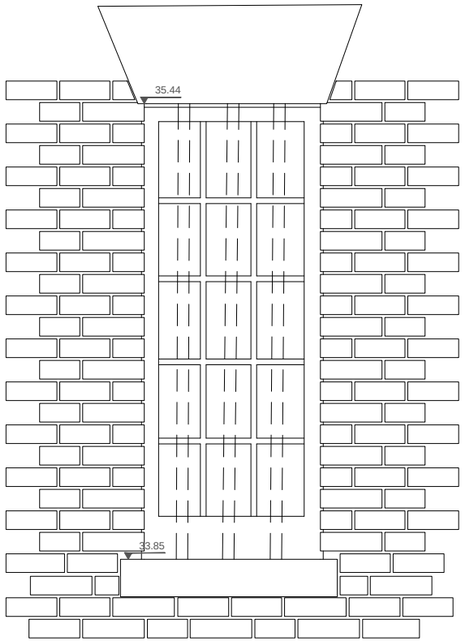
A condition survey recommendation by the structural engineer noted expansive corrosion of embedded structural ironwork including window bars and hinge fixings has caused serious cracking in a number of locations which will need to be addressed to avoid risks of falling debris and other related damage.
There are specific locations along the south elevation above the arched windows which require remedial work while with access the main contractor will also inspect all other security bars into stone sills.



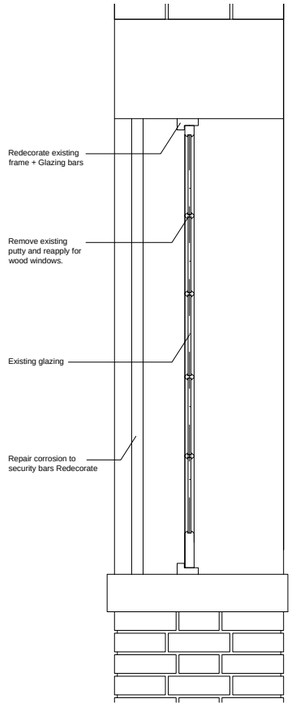
SPECIFICATION NOTES

The security bars are socketed into the sill and will be retained in place as removal may damage the sill. The bars will be rubbed down and anti-corrosive treatment will be applied before repainted to match the existing colour.

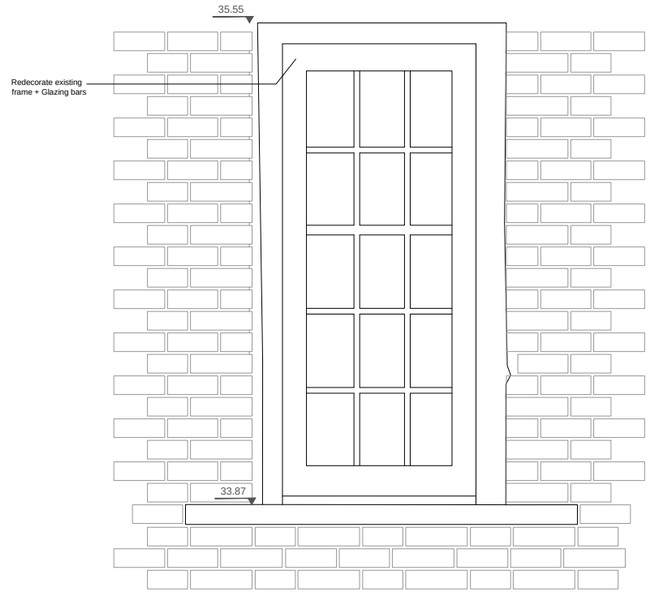
The interface with the sill will be examined to ascertain the extent of repair. Tapping out will remove any loose material. The crack can then be fully exposed and cleaned out and prepared for resin grout injection set back from finished surface. Final mortar application blended with dust to match adjacent surface.



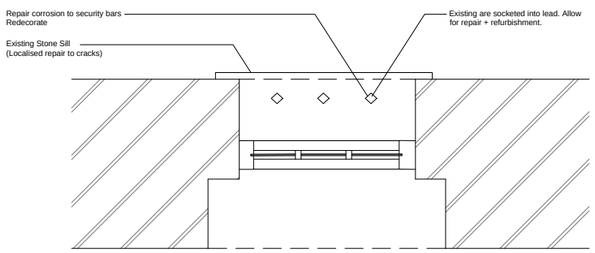
TYPICAL WINDOW (W1N5.05)
EXTERNAL ELEVATION



TYPICAL WINDOW (W1N5.05)
SECTION



TYPICAL WINDOW (W1N5.05)
INTERNAL ELEVATION



TYPICAL WINDOW (W1N5.05)
PLAN

KEY
NORTH ELEVATION



PROPOSED DETAIL: TYPICAL WINDOW 1:10 @ A1 / 1:20 @ A3

Proposed

Drawing 261/PD/321A

4.3.9 North elevation restraint to first/second floor

Structural Analysis:

The curvature of the building on plan is typically rectified in the timber frame by the breaks provided by regular brick cross walls. By bearing onto each of these walls between bays, the timber frame was able to re-orientate and run straight, longitudinally along the building. In effect, whilst the external envelope is curved, the internal bays are 5 straight lengths. At the end of each bay then, it can be deduced that the longitudinal members will be quite separate from the masonry envelope, and this has shown to be the case on site. This isolation between the bracing frame and the brickwork has led to excessively slender brickwork panels and piers having to span full height of the building with little in the way of intermediate restraint.

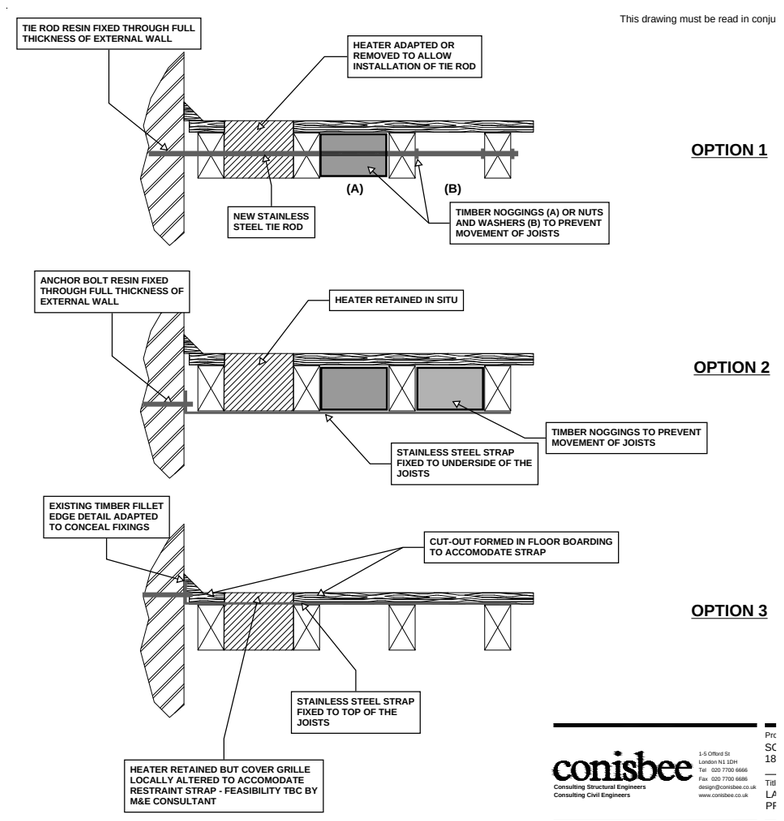
The vertical bulging of brickwork at the North Elevation(first and second floors Bays 1-4) either side of the tall cargo door penetrations is likely due to a lack of horizontal wall restraint and an excessive slenderness of the walls. The floor joists at each floor were noted to run parallel to the north elevation but having little interaction with the wall. The only restraint then at each floor comes from the embedded primary beams running north/south and cracking above and below these embedment points is suggestive of high stresses at restraint points.
Rot of a length of timber ‘quoin’ showed the North elevation wall in section and it was apparent that the two skins of brickwork that make up the thickness of the masonry are poorly bonded.

If representative of the full brick envelope, this lack of tying could be a contributory factor in reduced wall rigidity and vertical bowing.
It is possible that the bulge seen from the outside of the building is of the outer skin only and this can only be confirmed through relative internal/external verticality surveys or intrusive inspection.
Nutted bolt shanks vertically spaced at the inside face of the wall either side of the tall door openings suggest the original timber quoins were secured to the full thickness of the wall, providing a stiff column which would have stiffened this area between floors. Historic removal and replacement of these timbers with blue engineering bricks may have reduced the vertical stiffness of the piers either side of the openings and promoting bowing.

It appears previous renovation works/installation of a modern floor edge recessed heating system has affected earlier installed metal straps providing restraint between between the timber floor structure and the brickwork.



Second floor north wall with floor edge heating grille



Options considered

SCOPE OF WORKS OVERVIEW

The restraint works are proposed to the locations on the North elevation as noted on drawings 261/PD/212, 213, and 250A.

Three options were considered and discussed with the principles of Option 3 the preferred in relation to the insertion of the below floor metal strap but with further studies considering the additional noggin bracing required between the open joists to prevent them twisting.

The Conisbee drawing S-4006_T3 shows the proposed visually less intrusive timber noggin detail (to be date marked as a record) with a depth less than the existing Baltic Pine joists and a width of 100 mm which will both conceal the 75 mm wide strap(red oxide as elsewhere in the building) and avoid notching.

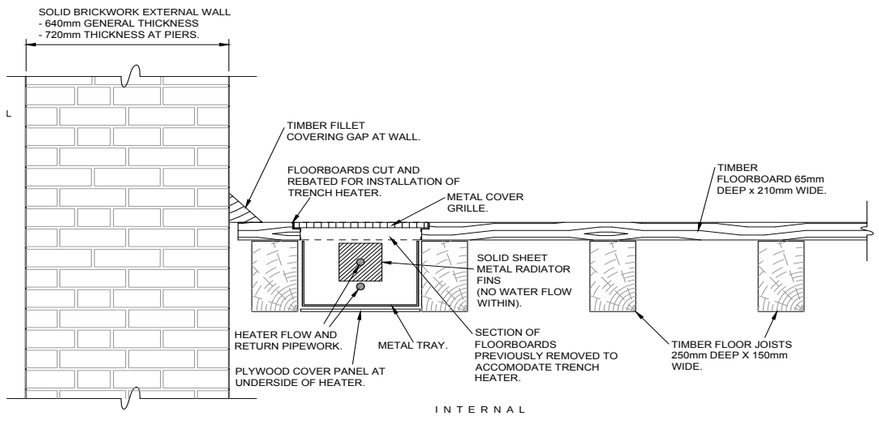
SPECIFICATION NOTES

To allow access for these works will require the removal of areas of the existing floor boards above. This will follow a specific and careful process.

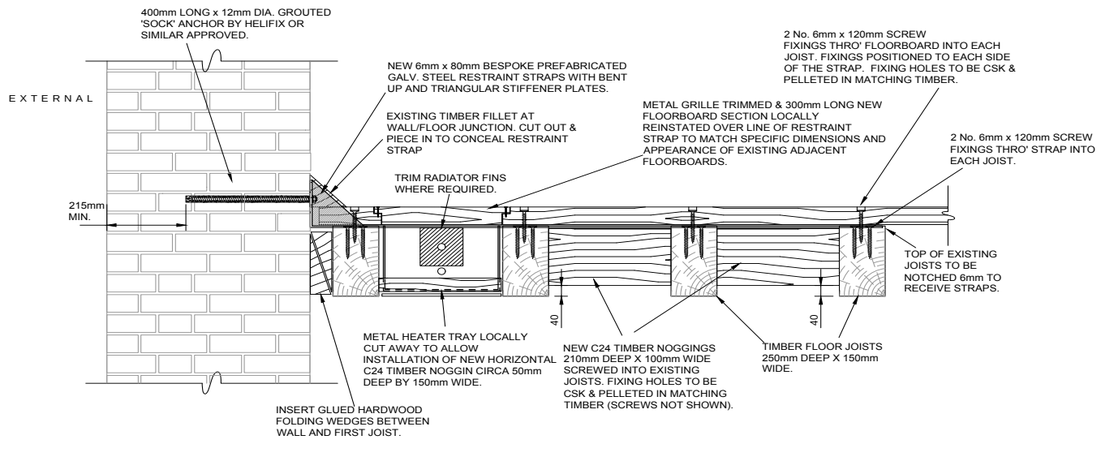
• Sequential removal of the boards to localised areas by hand.
• Carefully remove nails to protect existing fixing holes then lift boards by hand.
• Apply string/paper tags to number the boards for correct placement back in position.
• Refix in correct order re-using existing nails and fixing holes

The installation of the steel restraint straps will involve

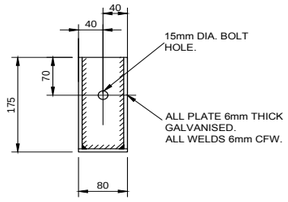
• Bricks carefully removed by hand(set aside) to inner wall face to form pocket to insert end of strap/tie anchor
• Low vibration drilling into brickwork to install 300 mm long x 12 mm dia. grouted sock anchors by Heli fix or similar
• On completion existing bricks reinstated, rebedded, pointed in moderately hydraulic lime mortar.



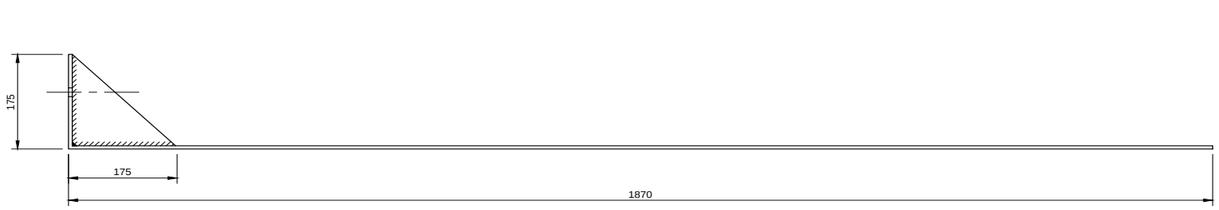
SECTION - *EXISTING.*
SCALE 1:10



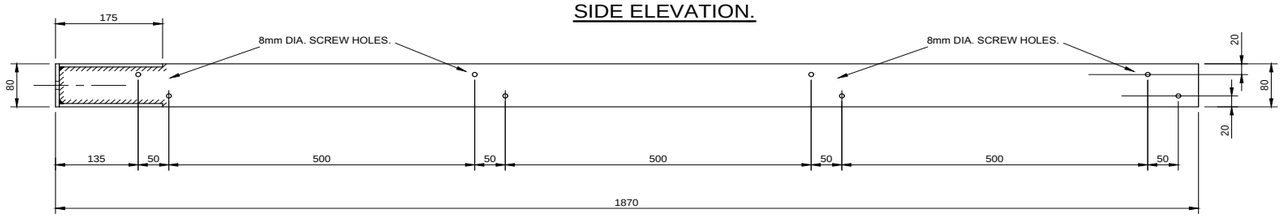
SECTION - **PROPOSED LATERAL RESTAINT STRAP.**
SCALE 1:10



END ELEVATION.



SIDE ELEVATION.



PLAN.

PROPOSED LATERAL RESTAINT STRAP DETAILS.
SCALE 1:5

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS
2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.

STRUCTURAL REPAIR NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF TEMPORARY WORKS. THEIR PROPOSALS MUST BE SUBMITTED TO THE STRUCTURAL ENGINEER SUFFICIENTLY IN ADVANCE OF THE WORKS STARTING TO PERMIT COMMENT. UNDER NO CIRCUMSTANCES SHOULD ANY STRUCTURAL ALTERATIONS BE CARRIED OUT PRIOR TO THE STRUCTURAL ENGINEER COMMENTING ON THE CONTRACTORS TEMPORARY WORKS PROPOSALS.
2. THE CONTRACTOR MUST CONFIRM STRAP LENGTH AND STIFFENER PLATE DIMENSIONS ON SITE BEFORE FABRICATION TO ENSURE THAT THE PLATES DO NOT PROJECT BEYOND THE EXISTING TIMBER EDGE FILLET.
3. EXISTING FLOOR BOARDING TO BE CAREFULLY LIFTED TO ALLOW INSTALLATION OF THE RESTRAINT STRAPS. FULL LENGTH BOARDS TO BE LIFTED ONLY - *DO NOT CUT BOARDS.* RETAIN ALL NAILS REMOVED. REINSTATE BOARDS ON COMPLETION IN ORIGINAL POSITION.
4. ALL NEW TIMBER TO BE WELL SEASONED AND MATCH SPECIES, STRENGTH CHARACTERISTICS AND GENERAL APPEARANCE OF EXISTING.
5. ALL NEW TIMBER TO BE C24 GRADE OR GRADED 'SS' UNDER THE CURRENT EDITION OF BS 4978.

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
T3	21.02.20	DETAIL REVISED	PM	KC

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Drawing Status
TENDER

Project
SCIENCE & INDUSTRY MUSEUM
1830 WAREHOUSE - URW

Title
N. ELEVATION - FLOORS 1 & 2
LATERAL RESTRAINT TIES

Drawing No
180426-CON-1830-XX-DR-S-4006

Date MAY 2019
Scale 1:5@A1
Drawn SW
Engineer SW
Project No **180426**
Revision **T3**

Agreed detail

4.3.10 General specifications/ methodologies which will be followed for the works

1 The following advice is intended to be a brief over-view highlighting key considerations and requirements. It is not intended to be complete guidance and may be superseded/augmented by advice given on the particular building in question. Regard could usefully be had to relevant Historic England guidance in their 'Practical Conservation' series and NBS specifications/methodologies although the latter need to be modified to ensure a conservation-led approach.

2 Implementing work: All works should be undertaken carefully by trained and experienced contractors. Works affecting the original/historic built fabric should only be undertaken carefully using hand-held, non-mechanical tools unless with prior written agreement of Planning Service.

3 Mortar: Any use of mortar should be to an agreed detailed specification/methodology including the use of mortar that matches the original on the building in terms of composition (by chemical analysis), colour, texture and appearance of finished application. The submitted information should also, for example, include:

(a) The depth of mortar to be removed for any re-pointing and should confirm that mortar would not be used inappropriately such as to provide a fill where masonry is missing.
(b) Regard to environmental conditions.
(c) The need to carefully use only hand-held, non-mechanical tools for the works to avoid damage to the adjacent masonry/built fabric.

4 External building cleaning: It is critical that building cleaning takes place prior to determining the appropriate match of existing and new materials (such as mortar, bricks and stone) needing to be introduced as a part of the works. Cleaning should aim to achieve a gentle 'lift' in the appearance of the building rather than an 'as new'. It is likely this is the intention of the proposed light wash. Cleaning should be to an agreed detailed specification/methodology which should include the use of small trial areas in discreet locations and should not include the use of abrasives or chemicals. Great care is required to ensure an appropriate clean that does not further exacerbate the deterioration of existing stonework and brickwork.

5 Leadwork:
(a) As with other works, intervention should be kept to the minimum that can be justified in heritage terms and a detailed methodology/ specification should include the criteria used to determine the appropriate approach in a range of circumstances.
(b) Any inappropriate past repairs (including the use of non-lead products) need to be reversed.
(c) New leadwork should undertaken on a like-for-like basis to take them back to their original detail/condition/appearance. They should be to Lead Sheet Association standards unless this conflicts with achieving a like-for-like outcome and where an approach should be agreed with the Planning Service.
(d) Existing leadwork should be re-used as far as possible. For example, where lead has become detached but is otherwise in acceptable condition it should be re-affixed.
(e) Where largescale replacement of existing lead is proposed it should be re-smelted and re-used in the proposed works to avoid the loss of the material from the building

6 Stonework repairs: Stonework repairs should be to a detailed specification/ methodology agreed with the Planning Service. This would need to include the criteria to be employed when determining the type of repair to be used. For example:

(a) There may be small blemishes and weathering (not causing water pooling or other maintenance issues) that contribute to a patina of age of the building and that should be left.
(b) Descaling may be appropriate but this may lead to the need for re-dressing stone or other repair and this needs to be understood.
(c) An individual stone may have modest cracks or other small scale damage (such as drill holes left by removed fixings) that can be successfully repaired with an appropriate lime-based mortar/filler type system to give an 'invisible' repair. Such an approach of 'plastic' repair can also be used to restore minor damage to particular architectural features such as limited damage to capital heads.
(d) For larger areas of damage to individual stones the piecing-in of an element of matching new stone would become more appropriate than a plastic repair.
(e) Where the damage to an individual stone is significant a completely new element of matching stone may be required.
(f) The choice of repair technique would also need to consider the nature of the particular element - for example, a highly elaborate carved doorway feature may need a different approach than a more standard window cill feature.
(g) Any missing elements of stone would need to be appropriately replaced in matching stone.

Any such detailed methodology/specification should confirm that consolidating fluids or similar surface treatments would not be used. Any proposed use of such a treatment would only usually be accepted if its use would fully comply with the detailed advice from Historic England on this matter. It would be difficult to see the use of consolidating fluids being appropriate or justifiable in this instance and any proposed use should be avoided.

7 Modern sealants: These are considered unacceptable where traditional building methods such as mortar and lead flashing provide an acceptable, alternative approach. The use of modern sealants would only be considered in other particular instances where a traditional method would be demonstrably inappropriate and these exceptional instances would need to be clearly explained, justified and avoid harm to heritage significance.

8 External redecoration: This should be restricted to those features that are currently painted. This should be undertaken on an evidence basis with a paintwork analysis of the existing paint undertaken by someone with appropriate expertise to establish the painting history of the building. Where such evidence is found to be unclear or to no longer exist (for example due to previous removal of paint during past refurbishment) the proposed redecoration should be on a researched basis of buildings of a similar age and type.

It is noted that the paint colour 'brilliant white' and 'gloss' finishes were not available until after the Second World War so would be inappropriate for use on this building. The redecoration should be undertaken to a detailed specification/methodology which should include the supporting evidence and/or research as appropriate.

9 Vegetation removal: This should be undertaken to an agreed specification/ methodology. The use of any chemicals would need to be undertaken with care to ensure they would not adversely affect the existing built fabric such as, for example, by causing staining. It should be confirmed that the vegetation has not become so invasive as to require any built elements to be taken down to enable removal although it is accepted that some repointing may be necessary. If this is not the case, any taking down would need to be limited and kept to the absolute minimum with the individual elements of removed built fabric being returned to their original position/orientation using traditional building methods.

10 Scaffolding: Details should be provided of the proposed scaffolding to facilitate the proposed works. The design and type of scaffolding used should demonstrably avoid damaging intervention on the listed building such as caused by the use of wall ties. Consideration should firstly, therefore, be to use structural scaffolding or a range of other options for non-structural scaffolding to avoid wall-ties. The possibility to use a combination of these options and elements of structural scaffolding should be considered ideally to avoid wall ties or, at least to keep them to an absolute minimum. The use of wall ties should be an absolute last resort and would only be accepted where other options are demonstrably impractical and subject to an appropriate detailed specification/ methodology that should, for example, confirm:

(a) Wall ties would be into mortar joints within areas of brickwork but only where the joints are sufficiently wide to avoid damage to the arrises of the adjacent bricks. Where the mortar joints are of insufficient width to avoid such damage then consideration should be given to the careful removal of a facing brick to enable a wall tie to be installed in the masonry behind. As the scaffolding is removed the tie would be removed, the drill hole appropriately repaired and the facing brick returned to its original position with appropriate use of mortar to achieve an 'invisible' repair. Where this approach is shown not to be feasible, ties should be located in the centre of individual facing bricks. The brick dust created by the drilling should be saved. As the scaffolding is removed the ties should be removed and the damage made good to give an 'invisible' repair using the collected brick dust to assist to achieve the matching colour and texture. The specification/methodology should include details of brickwork repair.
(b) Wall ties would only affect individual bricks and would not, for example, be located on any stonework or decorative brickwork/ brickwork features.
(c) Appropriate measures would be taken to avoid the building being abutted/ damaged by scaffolding poles.