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## **Structural Design Parameters:**

### **Safe Access Systems**

#### **1830 Warehouse**

#### **Science & Industry Museum, Manchester**

Ref: 180426/S Wilkinson

Approved By: K Clark

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Status: Planning Issue

Version 1

The following structural design considerations and principles must be applied in the detailed design for the proposed safe access systems at Bays 2 and 5, as depicted in SDA drawings 260/PD/203, 260/PD/205, 260/PD/206, 260/PD/215 & 260/PD/216 and Conisbee drawings 180426-CON-1830-RF-DR-S-4100 and 180426-CON-1830-RF-DR-S-4110.

### **1.0 NEW STRUCTURAL OPENINGS (ROOF)**

- No works to be undertaken to primary structure (valley beams, purlins etc.). Proposed works are to be to common rafters only. New hatch sizes and locations are positioned to minimise loss of historic timber fabric. At each location no more than two common rafters are to be cut to either enlarge an existing hatch or install a new hatch.
- Existing rafter sizes mean that strengthening is required around the openings. Common rafters and new trimmer beams around the openings are indicatively to be doubled using timber of the same size, species and quality. It is expected that doubled members will be bolted or screwed together to provide required composite action. Structural requirements are to be finalised following confirmation of the loads applied by the new hatches and external platforms together with forces applied by the hook-in anchor points.
- Existing fixings between common rafters and purlins are to be confirmed but are likely skew-nails. Additional stainless steel angle brackets will be required where rafters are doubled.

- Connections between doubled rafters and trimmer beams will require reinforcement with stainless steel angle brackets.

## **2.0 NEW INTERNAL ACCESS STAIRS**

- At Bay 2 an existing opening is present in the mezzanine floor structure. Structural strengthening is not likely to be required at this location for installation of a lightweight folding ladder (subject to final confirmation of ladder arrangements)
- At Bay 5 an existing iron/steelwork spiral staircase is proposed to be extended to provide access to the roof hatch. The connection detail between the existing and new central columns is to be confirmed following intrusive investigation but will comprise either an internal spigot or external sleeve/coupler (subject to termination detail at the existing column). Existing stair metal material to be confirmed for structural calculation of connection requirements.

## **3.0 FALL RESTRAINT SYSTEMS**

- The internal anchor points are intended to allow safe transition from access stairs to the external platform only. Projected maximum loads that may be locally applied to the timber structure are to be confirmed by the system supplier and fixing arrangements to be reviewed. Anchor points are provisionally shown as fixed to new timber trimmer beams.
- Externally, the hook-in points are integral to the access platforms and do not directly affect the roof structure.

## **4.0 EXTERNAL PLATFORMS**

- Final sizes and positions of external metal access platforms to be adjusted for positioning of post bases directly over strengthened rafters under. Additional timber or steel framing should not be introduced if it will be visible at the soffit (other than generally as depicted in the planning drawings).

- Platform post bases to be bolted or screwed to common rafters and/or purlins (if alignment permits).
- The Contractor and/or platform supplier to confirm proposed platform deadload and forces potentially applied by activation of the integrated fall-restraint hook-in point. Timber structure capacity/strengthening measures to be reviewed following confirmation.
- Access loading/ temporary storage on the platforms should be restricted to  $0.75\text{kN/m}^2$  to avoid overstressing the common rafters.

## 5.0 GENERAL CONSIDERATIONS

- Existing timber at fixing locations must be inspected to ensure that is free from decay, infestation or damage that may reduce its load-bearing capacity.
- All proposed new timber to match existing species, quality and (unless otherwise noted) dimensions.
- All new fixings and brackets to be stainless steel. Fixings are generally to be recessed below timber surfaces and plugged with matching timber. Any exposed brackets or bolt heads to have black paint finish.
- The soffits are exposed within the building in most areas and the access systems should be set out to minimise changes to the roof structure that will be visible from below.