



Heritage Statement

1830 Warehouse
essential repairs to
the roof, Museum of
Science and Industry
Manchester

March 2023 | Project Ref 4700I



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1. Introduction

1.1 This Heritage Statement has been prepared by HCUK Group on behalf of Science Museum Group in relation to the heritage values at the 1830 Warehouse, the Museum of Science and Industry, Manchester. Manchester City Council (MCC) are responsible for decision taking at this site.

1.2 The 1830 Warehouse is a Grade I listed building (UID: 1282991), it sits within the Castlefield Conservation Area and is close to a number of other listed buildings and structures including the former Liverpool Road railway station and station masters house (grade I, UID: 1291477) and the elevated track and viaduct between those two that links the bridge over the River Irwell to the Station and Warehouse (Grade II, UID: 1254726).



Figure 1: The Site showing the 1830 Warehouse in Context (Blue triangles denote listed buildings or structures)

The Context

1.3 This report considers a series of works to the roof structures of the 1830 Warehouse to secure the building's longevity and the safety of users. Specifically it covers repairs to failed timber truss members within Bays 1 and 2; the reprofiling

of the valley gutters across the roof to address increased rainwater; and, changes within Bay 4 including insulation and replacement of the torching.

- 1.4** This document provides a brief historical summary of the 1830 Warehouse and looks at the history of the roof and its structures. There is particular focus on the Bay 4 treatment which is a traditional 'torched' finish applied as a deliberate curatorial decision during the restoration in the early 1990s.
- 1.5** A site visit with MCC was undertaken in January 2023 where the need for the work was described. Further information on the history of the torching finish was requested, and a closer understanding of its specific heritage value in order to inform design decisions and careful consideration of the options for this Bay of the 1830 Warehouse prior to any submission. Additional discussions were had with MCC in March 2023 where the various options were discussed including the preferred Option 6, which was agreed as a broadly balanced approach. Some elements of finishing detail were discussed alongside aspects of the truss repairs to prioritise retention of historic fabric and removal of temporary supports giving a more long term solution.
- 1.6** This report presents a brief statement of significance focussing on the roof structures and finish. It considers the impact of the proposed works on heritage significance of the roofs and the overall special interest of the 1830 Warehouse as a Grade I listed building.
- 1.7** Design reports and drawings from Studio Downie Architects (SDA) and structural reports from Conisbee Structural Engineers should be referenced where appropriate alongside this heritage statement.
- 1.8** The 1830 Warehouse is divided into five structural bays divided internally with substantial brick walls and numbered 1-5 from west to east. Externally each incorporates two gables and a series of openings, both doors and windows. The southern façade is shorter than that to the north as it extends upwards from the elevated track level.



*Figure 2: the 1830 Warehouse southern façade (top) and northern façade (below)
(composite by Studio Downie Associates)*

Purpose of this Statement

- 1.9** This statement seeks to provide proportionate information on the history of the building and its roof, and how these elements contribute to the significance and heritage values of the 1830 Warehouse overall. This feeds into an impact assessment to accompany the planning and listed building consent applications for the works outlined.
- 1.10** This statement draws on documents and archival matter held by the Museum. An additional site inspection was made in January 2023 and has fed into the completion of this report.
- 1.11** This report does not reproduce the full history of the 1830 Warehouse but provides targeted information that has informed a design and engineering solution to problems identified in a heritage led manner.

2. Historic Background

- 2.1** The following section presents a very brief historic background of the SIM site along with more specific detail on the development of the 1830 Warehouse. It is based on records and documents provided by the Museum and on the Castlefield Conservation Area Appraisal.

Historic Background

- 2.2** From 1758-1761 the Duke of Bridgewater employed James Bindley to construct the first canal in Britain in order to transport coal from the Duke's mines at Worsley to Manchester. The success of this prompted the construction of the Rochdale Canal, opened in 1804. This made Castlefield the hub of the canal network which subsequently developed.
- 2.3** A large number of warehouses were also built alongside the canal system to supply the rapidly growing population of Manchester which was the fastest growing city in the world in the 19th century. It became clear that canals could not move goods quickly enough, and this led to the construction of railways, the world's first railway station was opened on Liverpool Road in 1830, the buildings of which currently fall within the SIMM. The 1830 Warehouse was part of this transformative construction phase and was the first warehouse to be served by railways in a similar way that the canal warehouses had been in the years before.
- 2.4** In 1844 Liverpool Road station closed to passengers but remained in operation as a goods station only. This became the centre of a network of railway lines, several of which crossed Castlefield on viaducts. Further viaducts were constructed, extending as far as Central Station, which opened in 1879. The remains of the old town of Aldport, were demolished at the end of the 19th century to make way for the construction of the Great Northern Warehouse, also known as the transport interchange building.
- 2.5** During the 20th century, industrial and commercial use of both the canal and rail networks declined until they were used only largely for leisure purposes. In 1975 the station was closed by British Rail. The railway complex at Liverpool Road was

sold to a conservation group for £1 and was reopened as the Greater Manchester Museum of Science and Industry in 1983 with the Station Building and Power Hall open to the public.

The 1830 Warehouse

- 2.6** The 1830 warehouse was built by David Bellhouse Jr. There is no documentary evidence of the architect, although it is suggested that Thomas Haigh of Liverpool may have been the architect. An alternative suggestion is that put forward in the list description, that George and Robert Stevenson were responsible for its design. Its footprint covers 320x70 feet and the building is slightly concave to the north, and convex to the railway line. It was built to provide warehousing facilities for the rail network. Each bay was designed to operate independently for vertical movement of goods through the building and between rail and road networks.
- 2.7** The building has a brick envelope with timber frame internally, reinforced at basement level with steel and iron columns. The timber framed construction was a measure of expediency to address the complexities of a curved footprint meaning that although the timber frame was carefully pre-fabricated (as evidenced by the complex sequence of carpenters' marks visible on the timbers) minute adjustments could be effected by carving and shaving timbers to fit the unique situation on site, something that would not have been possible for a cast iron structure of a fully fire-proof construction type. The unique planform of the site and technological 'fix' that was required to accommodate the curved footprint is clearly visible within the upper floors of the building where the fact that the roof trusses are individually located and aligned is visually appreciable.

1830 Warehouse Phasing

- 2.8** After being built in 1830, the warehouse was altered in 1831 with the insertion of a mezzanine floor in the three bays nearest Water Street. An engine house was also built between the warehouse and Water Street in 1831, a water tank was also added to the top floor of the east end (Bay 5). The introduction of steam power likely saw some of the earlier gravity hoists linked to the new steam drives, but the

angled alignment of some of the gravity hoists would not allow connection to the new drive shafts and it is likely that the two systems ran in parallel¹.

2.9 At some point after 1848, but presumably before the completion of the Grape Street Bonded Warehouse in 1869, the basement was adapted for storing wine and spirits. Security was increased by infilling the loading bay wells (except for one) and light wells and nailing metal strips across the underside of the floorboards that formed the ceiling.

2.10 The 1850 Ordnance Survey map (Figure 3) identifies the functions of the warehouse at that time listing: a butter room in Bay 1; groceries room in Bay 2; a spirit room in the western third of Bay 3; and, corn stores in Bays 3, 4 and 5. This map also helpfully clearly locates the position of the early rails, that ran into the building directly from the viaduct where coaches and trolleys were turned on turn tables – shown as circles on the tracks. Each bay included a single entrance for the tracks, with only Bay five featuring two such entrances. In bay three the rail line passed right through the warehouse and on to the cotton store No. 1 constructed to the north. Extant signage on the southern elevation of the 1830 Warehouse indicates the position of capstans (vertical axis pulleys, powered by hand or motor) within the building. The presence of wear on the lower jambs of the wagon arches (recorded in 1991 by Greater Manchester Archaeology Unit [GMAU], 1992, section 5.4) suggest that, though the position is unknown internal capstans were used to haul the waggons from the turn tables into the building for unloading.

¹ Greater Manchester Archaeological Unit 'Archaeological Survey of the 1830 Warehouse' 1991, Section 6.2

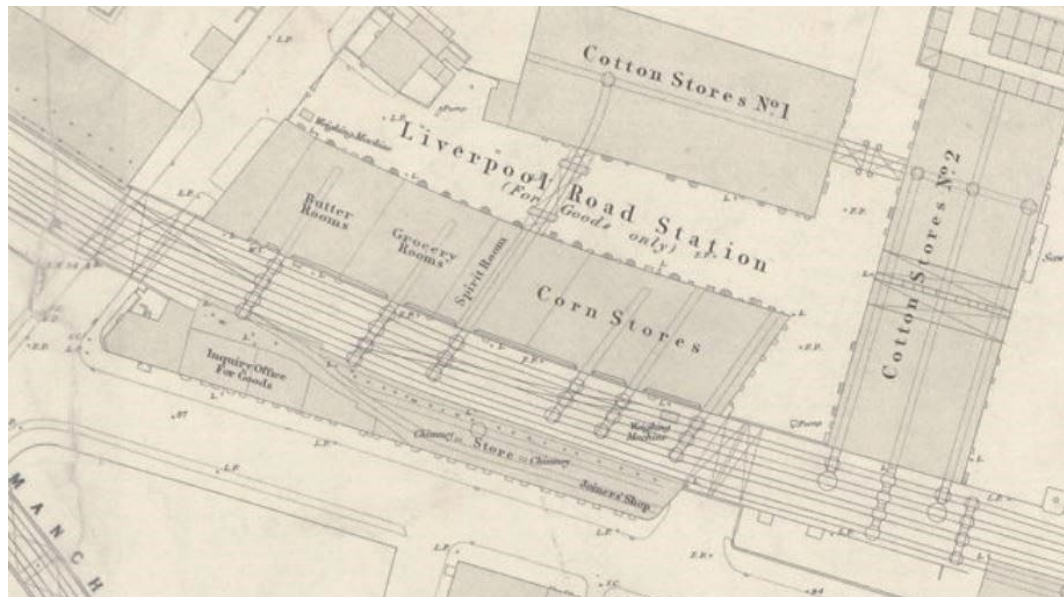


Figure 3: 1850 OS extract (Five feet to one mile sheet 32 ref JRL1300082). The engine house is the last narrow bay on the west. Note the turntables and tracks shown running into the building in positions that equate clearly to the wagon arches today.

- 2.11** In c.1870, the top floor and rail level were modified to accommodate the installation of hydraulically powered machinery. These modifications entailed the cross-bracing of affected roof beams and addition of new posts to support the installation of four hydraulic hoists in Bays 2 and 3. Three were located against the northern elevation powering hoists to yard level. One was located in Bay 2. Photographs of the southern elevation prior to restoration works show a long arm projecting from the western part of bay 2, likely associated with this jigger. An hydraulic crane was also installed at rail level in Bay leading to the widening of the wagon door to permit the rotation of the crane jib. The image below (figure 4 and Figure 6) shows clearly the extension upwards of the Bay 2 Wagon Arch and possibly a sliding doorway over the lower part of the opening but nothing covering the upper part of this new opening.
- 2.12** At some point, perhaps relatively early in its history, a series of offices were installed within the building. Two at yard level, two at rail level and one on the upper roof level. The date of insertion is unknown and they do not all survive today, though external traces survive in the presence of glazed sash windows set into adapted cargo doors, or behind the triple openings above the wagon arches.



Figure 4: The southern elevation in 1975, note elongated hoist arm above the cargo door in Bay 2 (Manchester Libraries)



Figure 5: n.d image of the southern elevation from Bay 5 looking west prior to works. (Manchester Libraries, supplied by museum)



Figure 6: n.d photograph of the eastern part of the southern elevation (Manchester libraries, supplied by museum)

2.13

As the more efficient hydraulic crane and jigger made the internal rails redundant, all cargo could be unloaded via the more powerful jigger hoist and crane, moved into the building and then transported via internal hoists or through the bays horizontally for which openings were widened and the rail beds were infilled with a raised floor supported on modified rail trestles. A canopy was added along the south elevation at this time to protect wagons on the nearest track waiting to be loaded or unloaded by crane. The northernmost internal doorways were widened for easier movement of goods. Evidence for these changes remains legible in the building's external elevations and in internal elements of the structure. Figure 5 shows the eastern end of the building prior to restoration works. The bay 5 wagon doors retain their timber floors, projecting slightly from the stone jambs. A single gravity hoist remains over the western Bay 5 Cargo door and the longer hydraulic hoist position is visible in the distance. There are traces of the former canopy in different coloured brickwork, though the canopy must have been interrupted for the hoists.



Figure 7: South façade today looking from Bay 1 eastwards. (Image: SDA)

2.14 In 1985-86, the easternmost bay of the Warehouse was altered for the museum by the replacement of the internal timber frame with a steel frame supporting reinforced concrete floors – the entirety of Bay 5 was to become the Electricity Gallery, opening in 1986. A ramp was built parallel to the east elevation where the entrance lies. Bay 5 opened as the Electricity Gallery in 1986.

2.15 In 1992-96, the remaining four bays were carefully restored by the repairing of the timber frame, followed by the installation of two lift and staircase cores with skylights installed above. All roofs were insulated and windows and wagon arches glazed. Within the roofs the profile and alignment of the roofs were maintained based upon the original truss positions and forms. The valley gutters and their position were part of the original design, but all the fabric around them – linings, timber planking, many common rafters were renewed during the restoration. All slates on the roof were re-laid with a mixture of salvaged slates and slates brought in. The restoration ethic at this time was to retain as much original historic fabric as possible and to make any new interventions clearly identifiable through the use of modern materials and date stamping on newly inserted timbers, for example.

- 2.16** Bay 4 was chosen as an area that would be repaired and preserved 'as was' with minimal intervention or adaptation and a more traditional approach to materials and aesthetic, it had the least post 1830 alterations and prompts for the finish in this area were taken from the record of the building completed by the Greater Manchester Archaeological Unit. The roof was not insulated, openings were left unglazed, and the raised track level floor was removed to reinstate the original track entry whereby carriages could be rolled into the building for unloading direct
- 2.17** The roof over Bay 4 was left uninsulated with traditional torching applied beneath the slates. Torching is a traditional weather proofing measure whereby plaster is applied beneath and between slates limiting water ingress through wind blown rain or snow. Sometimes it is applied only to the junction between slates, sometimes it is applied uniformly beneath the roof. If incorrectly applied it can force the slates up increasing the problem of water ingress and it is likely that it was a finish that always required regular ongoing maintenance. The use of torching diminished when membranes and sheet materials became widely available.
- 2.18** A degraded torched finish was observed and recorded within the GMAU photographic record though not explicitly described within the recorded descriptions in the final report. The photographic contact sheets held in the Museum Archive also reveal that other finishes were observed within the roof, again not explicitly described. The alternate finish recorded in the photographs included continuous use of sarking boards from valley to ridge in at least part of Bay 2. Sarking boards would have a similar weather proofing effect but require less ongoing maintenance.

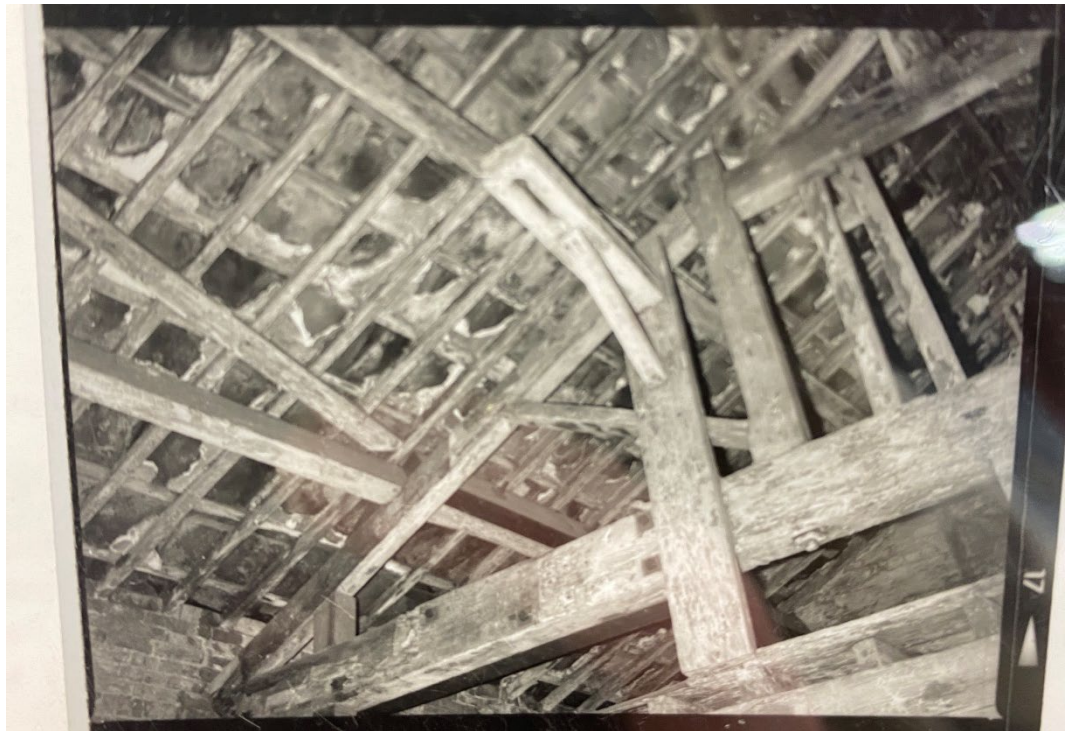


Figure 8: GMAU photographic archive contact sheet: Film 164, Bay 1 Hoist 3069 showing remnants of torching between rafters and battens to roof slope



Figure 9: GMAU photographic archive contact sheet ref: 48 4.484. Bay 2 close to one of the lunette windows showing sarking boards over the common rafters, an alternate finish beneath the slates.

- 2.19** Elsewhere in the 1990s restoration timber replacements, if necessary, were achieved using salvaged period timber from the removals from the reconstructed Bay 5; the only change was the glazing of openings in bays other than Bay 4 in the doors to prevent rain ingress.
- 2.20** Repairs to the roof more widely were identified through date stamped timbers. Other than in Bay 4 the roof was fully insulated between and above the rafters leaving a very different character in comparison to Bay 4. Windows were glazed, and in Bay 3 the mezzanine was removed to create a more welcoming and spacious 'entrance' into the building.
- 2.21** During the restoration in the 1990s the 1830 Warehouse was upgraded to Grade I, the highest rank of listing



Figure 10: Bay 4 roof today, note netting in place to catch the falling torching



Figure 11-12: Bay 4 on the left with sarking boards reflecting the position of the valley gutter and the visible battens with torching and (right) Bay 3 with continuous boarded finish above the common rafters.

3. Significance

Assessment of Significance

- 3.1** That the 1830 Warehouse has the highest level of heritage significance is inherently acknowledged in the listed status of the building at the highest grade. Only 2.5% of listed buildings are grade I, indicating exceptional interest. Special interest is intrinsic to significance. Appendix 2 contains a summary statement of significance for the 1830 Warehouse as a whole. This section considers in more detail the significance of elements of the roof as pertinent to this application.
- 3.2** Significance is defined within Annex 2 of the NPPF as: *"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting."*
- 3.3** For the purposes of clarity the following assignments of levels of significance have been made, these have not been formally agreed with external consultantes but are presented on the basis of professional judgement in order to clarify understanding and shape the discussion around these areas and features within the 1830 Warehouse and their treatment both now and in the future.
- **High Significance:** original fabric and or clearly illustrating and evidencing the original, that is early 19th century structure and appearance of the 1830 warehouse as well as its functional purpose as an element of historic interest. Aspects with this significance may survive particularly completely and in tact bearing in mind that the building has undergone successive phases of repair over the years that is inevitable with any building of some age.
 - **Moderate significance:** Fabric or features that are more altered or from a later phase of the museum reflecting and illustrating change to technology or access which is important to understanding the evolution of the building.
 - **Low/neutral significance:** this fabric may be heavily altered which has eroded and disrupted the ability to understand period or function. It may relate to the adaptations to the building for use within the Museum. These

changes were undertaken in more recent decades and the materials used are not innately of heritage value.

- **Detrimental:** Fabric or materials that overtly disrupt understanding of the buildings historic form, fabric or function.

Valley Gutters

3.4 The original trusses making up the roof structure and fully exposed internally are of the **Highest significance**. They are an integral part of the building and on its top floor levels provide direct illustrative and evidential historic and architectural value enabling an understanding of this building and its construction technologies. The roofs show clearly how traditional and well established structural methods for building warehouses were used to accommodate and address the unusual planform and function.

3.5 Between each bay the valley gutter is concealed within the top of the brick wall dividing the bays. Traces internally suggest that these wall heads were reconstructed in the 1990s period to contain the valley gutter.



Figure 13-14: (left) one of the principle roof trusses (Bay 2). (right) valley gutter in Bay 2 showing modern purlins beneath the gutter and above the historic beam, drip tray visible bottom left.



Figure 15: View towards one of the party walls between the bays showing scarfed in timber replacements to the common rafters and a change in the brickwork between the trusses suggestive of rebuilding to enclose the valley gutters.

- 3.6** In line with the physical roof trusses the position and alignment of the valley gutters is also of **high significance**. Their position is defined by the roof structures and historically illustrated and indicated on the external facades in the position of the hopper heads and openings in the parapet wall. The gutters historically had a high central point and then drain to both the north and south facades where openings into the parapet walls drain into hopper heads and down pipes.
- 3.7** The materials making up the roof other than the principle trusses, such as the twin purlins supporting the valley gutters, the lead lining and current slates are of **moderate significance**. They are traditional materials respectful of the building's Victorian construction but modern creations rather than authentic historic examples.
- 3.8** Internally other materials used in the gutter constructions is a poorer, in particular the use of MDF sheet board rather than traditional sarking boards, this is visible at points from within the upper levels, such modern materials are **neutral** to significance. Remedial works to counteract the failing gutters and unforeseen

overflow comprise a combination of drip trays, plastic piping and buckets. These elements are **detrimental to significance** and are visually negative in relation to the experience possible of the roof structures internally.

Bay 4 Torching

- 3.9** Bay 4 is a modern creation of the 1990s restoration to an historic pattern and arrangement. The main structure of trusses, purlins, collars etc are, as above of the **Highest architectural and historic significance**.
- 3.10** The aesthetic and way the finish is applied of Bay 4 is considered to be of **moderate significance**, contributing to evidential historic values. The curatorial choices in the 1990s reinstated a traditional finish using traditional materials including legibility of the solid timber bases to the gutters combined with torched undersides of slates. This can be seen and understood within the upper floors and allows a direct understanding of how historic buildings of this type and period were finished and waterproofed. Evidence in the historic building record from GMAU shows that torching was not the only historic weatherproofing technique used.
- 3.11** The innate material qualities of the Bay 4 finish are considered of **low to moderate significance**. The torching uses broadly traditional lime plaster but it has been incorrectly mixed and blended with an inappropriate aggregate so that it is a poor quality and not reflective of the value of the building. This inadequacy has led directly to the failure in the material being experienced now. It is not the original fabric and with the poor mix is considered not to contribute to special interest despite the traditional approach.

Trusses

- 3.12** The truss members identified as in need of repair (see drawing 220627-CON-XX-02-DR-S-1103 SECOND FLOOR PLAN STRUCTURAL REPAIRS) are original elements of the building's primary structure. They have **high architectural and historic significance**.
- 3.13** Later reinforcing elements such as spliced in timber repairs maintain that high significance and are legibly later repairs understandable as such and contributing to the ongoing historic interest of the building which now includes the considerable

phase of restoration in the later 20th century. They sustain the high values being in appropriate materials and utilising traditional techniques whilst illustrating historic evolution and periods of change and reuse. They preserve all evidential value of the truss type, its structural technology and material qualities.

3.14 Later structural supports such as the hollow steel posts are considered to **detract from architectural and historic interest** to some degree. Though they are easily identifiable as later added support they intrude into the space beneath the trusses in a way that interrupts the historic sense of structure and bay rhythm as well as its openness. The structural survey identifies that this form of reinforcement places the rest of the building, particularly the floor structures beneath the supports under undue stress and risk of cumulative damage.



Figure 16: Later steel columns inserted beneath major truss within Bay 2 and intruding into the otherwise open space. Also note carefully spliced in timber repairs to the truss which are more sympathetic to heritage character while still being legibly as a repair.

4. Proposals

- 4.1** This chapter of the report should be read alongside the proposal drawings and the Design Approach Document by Studio Downie Architects as well as structural information and drawings from Conisbee. The proposals presented, particularly for Bay 4, evolved through careful options appraisal as part of the design development and these options are also summarised with a consideration of the differing impacts to allow comparison.

Valley Gutters

- 4.2** The gutters are failing at present due to a combination of structural settling which has lowered the central high point reducing the fall, narrow openings along the length which makes blockages more likely and renders regular maintenance and visual checks difficult, and higher and more intensive rainfall periods.
- 4.3** The proposals are set out in detail within the design approach document. In brief the solution is to create a deeper sided tapered gutter detail, traditionally lined in lead, with a new profile and slope.
- 4.4** The design will result in a minor change to the visual appearance of the gutters which will become wider and slightly elevated in the centre over their existing position. These features are primarily the creation of the 1990s restoration and their historic aspects – the openings through the parapet walls; the alignment between the pitched roofs; the internal support purlins and relationship to the main trusses - will all be preserved. New structure required to raise the central part of the gutters will all be located and fixed above the internal roof structures without greater impact than the current structures.
- 4.5** The proposals will affect materials installed in the late 20th century identified as moderate significance where they are traditional materials, or low where they are modern – such as mdf or ply sheet observed internally. The proposals will maintain this situation, most particularly preserving the use of traditional materials and techniques for the external finish with salvaged and reused slates from the existing roof wherever possible and traditional lead gutter linings.

- 4.6** The proposals will enable the removal of the remedial measures installed to capture uncontrolled water ingress which are detrimental to significance (buckets, drip trays, pipes). This removal, and the addressing of the underlying problem that causes the water ingress, offers a benefit in two ways. Firstly, the unattractive features themselves will be removed, restoring the aesthetic qualities of the original roof structure and opportunities to see and understand the traditional structures without 'clutter'. Secondly, the proposals will minimise and remove risk to the retained roof structures which are of high significance.
- 4.7** These proposals cause **no harm** to heritage significance preserving traditional materials and the moderate values they retain and offering benefits to the areas of highest significance through the removal of detracting features and preventing further risk of damage.

Bay 4 Roof

- 4.8** The existing condition and need for repairs to Bay 4 are set out on Page 19 of the Design Approach Document. The desire is to maintain active use of the upper floor of Bay 4, to improve the environmental performance of the building overall, and to remove the current ongoing risk to users which is arising through failure of the existing torching leading to falling material on a regular basis.
- 4.9** In heritage terms the torching is considered to have moderate significance in relation to the building. It provides illustrative historic and architectural values in presenting an aesthetic facsimile of a traditional approach which had been applied within the warehouse during its periods of use but it is not authentic historic 'original' material. The use of continuous full torching (as opposed to partial torching over only the joints between slates) means that from within the building it is not possible to directly understand – without explanation – that the lime mortar finish seen between the rafters and battens is applied directly to the underside of slates. There is no visibility of the roofing materials apparent internally. The aesthetic illustrative value extends also to the visible treatment along the valley gutters, where sarking boards beneath the lead of the gutter illustrate this change in finish and suggest function.



Figure 17: torching in Bay 4 with sarking boards indicating the different finish to accommodate and support the lead of the valley gutter. None of the actual roof surfaces or finishes are visible internally.

Options appraisal

4.10 The following paragraphs present the options that were considered, and which are set out in full detail within the Design Approach Document, alongside a consideration of how the options would impact upon heritage significance. Where effects of different options are similar they are grouped together.

4.11 The long term viable use of the 1830 Warehouse, which is no longer the original purpose of storage of goods, is considered a heritage benefit and the best way to secure its future as an asset to be enjoyed by this and future generations. Options which enable viable uses are identified here as relevant to the preservation of heritage values of the listed building overall.

4.12 Options 1-4 all focused on various options of retaining the torching and were as follows

1 – No change with the installation of full netting system fixed to the underside of the roof timbers to catch falling material.

4.13 This option is not considered viable. It retains a flawed material and instead of addressing problems simply prevents those problems from affecting users. It would add detrimental aesthetic elements in the form of concealing netting obscuring both the original rafters and trusses as well as the aesthetically recreated torched roof, negating the illustrative value of having it retained.

4.14 This option is considered harmful by perpetuating an unsatisfactory material situation and obscuring illustrative values.

Option 2 – Patch repair or, Option 3 – Like for like replacement

4.15 This option preserves the heritage status quo. It maintains values at their current situation. There is preservation of the aesthetic and technological illustrative values. There is a potential to improve materials over the existing in a like for like option 3 but in option 2, the difference between the existing poor quality blend of lime mortar and any repair replacement may be flawed and contribute to ongoing failure of the finish. This system will require ongoing maintenance and any factors that are beyond the inherent issues with the current torching mix (such as weathering, temperature changes and fluctuations, see Design Document pages 19-20 for more details) will continue, presenting further potential risk to the torching falling even with ongoing maintenance.

4.16 These options offer no improvement to the thermal performance of the building and will continue to see this area exhibit a marked temperature differentiation that may affect the viability of it as a space to be successfully used into the future.

4.17 Options 2 and 3 ostensibly present a no harm solution, but they come with risks that should be considered. The risk is of reduced success of the building and its ongoing useability, which would be detrimental to the preservation of heritage values.

Option 4 – encapsulate torching

4.18 This option considers repairing and then retaining the existing torching material above a newly insulated internal finish below the batens but between the rafters.

- 4.19** This option would preserve the evidential values pertaining to the traditional techniques used in the historic Warehouse, but encapsulating it behind a new insulated layer would conceal all the elements of illustrative historic and architectural value – it would prevent users of the space from seeing and understanding this finish as different from those in other bays of the Warehouse, effectively rendering the torched finish as an archaeological remain, buried and with the potential to evidence past approaches but not seen or experienced within the space.
- 4.20** The torching is of value and interest because of its illustrative powers and the contrast to other bays where the different approach taken, with traditional materials enables an understanding of the building and its structures. If it is covered up, this benefit and aspect of significance is no longer appreciable.
- 4.21** This option would also have limited thermal benefit and in encapsulating the torching there is an inability to maintain inspection and repairs if needed. If condensation forms beneath the cold slates it will be very difficult to identify early.
- 4.22** With the concealment of the torched finish, and the potential for difficulties in maintenance this option is considered to cause harm. It would be a lower level of less than substantial because it would retain the 'historic' approach, but it would remove opportunities to understand and see that approach negating the benefit of the current aesthetic finish.
- 4.23** Options 5-7 involve the insulation of the roof in some form to improve the functionality and useability of the uppermost floor of the Warehouse and the thermal performance of the building overall.

Option 5 – remove torching and insulate between rafters

- 4.24** This option retains the existing roof line but sees the replacement of the torching with an alternate weather proofing system, a permeable membrane and in between the rafters applied insulation finished with an internal lime coat. The insulation falling between the rafters only still leaves potential for cold bridges where slates rest directly over the rafters which extend into the building, the thermal benefits would not be as fully beneficial as in other options.

- 4.25** This option preserves the historic roof line without any external change in height. The roof is invisible from all surrounding areas at ground level and is set well down behind the parapet walls. Though retaining its historic alignment would sustain the architectural interest of the building this is today a relatively small part of the building's special interest bearing in mind that all other roofs have been raised already and that the roof itself (slates) are not original but replacements from the 1990s restoration.
- 4.26** Though the option retains the largely invisible external appearance of the building, it would see loss of the aesthetic finish presented by the torching. This is considered harmful though the loss of ability to understand the different approach that had been taken in this Bay and the original approach within the Warehouse. The moderate illustrative historic values of this finish within the building would be eroded causing harm.

Option 6 – raise roof and insulate, internal lime plaster finish (preferred option)

- 4.27** This option will see the roof insulated from above the rafters, with appropriate measures taken for vapour permeability. Internally, battens can be retained visually spanning the rafters as well as the sarking boards at valley gutter level. Between the battens and rafters a lime plaster coat, which could also be an insulated lime product, would be applied to the underside of the membrane and carrier board (see page 24 of the Design Approach Document for drawn details) giving a very similar finish to that seen today.
- 4.28** This approach will see the loss of the traditional torched approach, the internal lime finish will no longer be directly applied to the base of the roofing slates in the traditional manner. This causes a degree of less than substantial harm. However, the existing finish allows no direct view to the slates, the method of full torching means that internally what is seen is the slightly uneven plaster finish, the horizontal battens passing over the common rafters and, at the valley gutters, horizontal sarking boards. This visual experience would remain very similar. The specific mix of finishing lime coat, and the way it was applied could mimic very closely the uneven cellular character of the internal roof slopes of Bay 4 today. This would retain some illustrative historic values despite the loss of the evidential values which reside in the technological 'match' seen in today's roof.

- 4.29** This option will retain contrast to the other bays in the building and opportunities would remain to provide interpretation on the past roofing technique to increase knowledge.
- 4.30** **This option is considered to give rise to a very small, the lowest, level of less than substantial harm.** It comes with the benefits of enhancing the thermal performance of the building and its ongoing viability. The reduction in contrasting environmental conditions within the building will also serve to minimise the risk of condensation building up making it more likely that this internal lime plaster finish would be easier to maintain over time, though it still may require repairs in the due course of time.

7 -raise roof and insulate, internal plaster board or other board finish

- 4.31** This option sees the external roof raised and insulation applied over the rafters but instead of a natural lime finish, with retained battens, a boarded finish is applied internally bringing the aesthetic of Bay 4 into line with Bays 1-3 of the 1830 Warehouse.
- 4.32** This would see the internal appearance changed and, though thermal benefits would arise, there would be an erosion of illustrative and evidential values. The deliberately illustrative approach taken for this bay in the 1990s work would be lost. Various board finishes were explored which might give a more textured or irregular finish to that seen in Bays 1-3 but this would introduce yet another material into the museum, for which there is no precedent and is deemed inappropriate.
- 4.33** Option 7 would give rise to less than substantial harm at a notably higher level than Option 6 though the thermal benefits would be the same and the potential for even lower maintenance costs would limit financial risk for the Museum as curators of the Warehouse.

Preferred option

- 4.34** Option 6 is the preferred option presented as part of this application. It continues the aesthetic of a torched roof sustaining architectural and evidential values to the degree that they can be understood from within the building today. It continues the

internal use of traditional materials within Bay 4, maintaining a material historic consistency though the authenticity of the treatment is lessened – the lime plaster is no longer fixed directly to the roof slates. By sustaining the internal aesthetic any harm through the loss of the actual authenticity of the finish being fixed directly to the underside of slates is minimised to the **lowest end of less than substantial harm**. Externally, the roof level will rise slightly but will be entirely beneath the parapet and will preserve and continue the characteristics of the roofscape of the building today without any material change.

Truss repairs

- 4.35** A variety of failures, splits and damaged truss chord timbers were observed in Bays 1 and 2 of the 180 Warehouse. They are detailed from page 26 onwards in the Design Approach Document and in structural reporting from Conisbee. Several of these failures have been addressed in the past with semi-permanent props installed but these are not satisfactory in the long term and transfer load in a way that places the rest of the building, specifically floor structures, under risk.
- 4.36** Proposed repairs are a combination of spliced in timber repairs with reinforcing bolts and in one instance resin and a system of overplating the damaged areas leaving as much historic fabric in situ as possible.
- 4.37** Spliced timber repairs from several phases of repair are already seen within the building providing ongoing reflection of phases of work and illustrating the history of the building's later adaptation and restoration in its new uses. In all instances the proposed repairs seek to retain as much of the original historic fabric as possible and to be fully legible as repair interventions enabling the ongoing development of the building to be understood. The practice of date stamping repair works established in the 1990s restoration work should be maintained to enable the more recent history of the building to be legible.
- 4.38** The repairs will secure the removal of later remedial works – the props – which will enhance these areas restoring the historic character of the space.
- 4.39** **No harm** is considered to arise from these repair works.

5. Conclusion

- 5.1** Ongoing repairs are essential for all historic buildings. Traditional fabric of all kinds is subject to decay and change through the natural processes of time, weathering and use. These can be exacerbated by poor design decisions at any stage in a building's history. The proposals set out here and within the application are to secure a programme of essential repairs to the 1830 Warehouse covering specific works within the roof structure and upper floors which include some changes that address a need to enhance the thermal performance of the building overall and secure its most optimum viable use into the future. Securing the optimum viable use of an asset is considered a heritage benefit and it is recognised that a viable use does not necessarily have to be the original purpose of a building (NPPG Paragraph: 015 Reference ID: 18a-015-20190723).
- 5.2** Works to reprofile the valley gutters, and to effect repairs to primary truss timbers, are considered to give rise to **no harm** to the building's significance at all. These works will see the removal of earlier emergency remedial works such as drip trays or hollow steel props and address the underlying problems that necessitated them. These removals of detracting features actively enhance heritage character and opportunities to experience the original structures. **These works are beneficial to heritage significance.** The valley gutter works will sustain the aspects of highest significance such as the alignment of the gutters, their pattern of fall and openings within the external facades as well as the original trusses beneath affecting more recent fabric which although of some interest is modern. Re-using similarly appropriate traditional materials for the valley gutters will sustain the material and evidential value that these elements contribute to. Minimising risk to the building, and thus securing its heritage values into the future, is considered a benefit that can be factored into the planning balance.
- 5.3** In Bay 4 change is proposed that will see **a low level of less than substantial harm** caused to evidential values as the internal lime finish of Bay 4 will no longer be an authentic torched finish directly applied to the underside of slates.
- 5.4** A careful options appraisal has sought to minimise any harm through providing a solution that provides a very similar internal aesthetic and material quality. The existing ability to understand why the roof in Bay 4 is different is not one which is

immediately apparent within the area: apart from where the finish is failing, it is not possible to see the roofing slates from within the space. This understanding comes with explanation or interpretation. If the works are allowed the aesthetic sense of an historic finish will remain present in Bay 4 and interpretation could be provided to explain historic finishes and their role in the building to augment understanding and mitigate the erosion of the authenticity of finish which is being replaced in order to insulate the roof. The ongoing use of traditional materials, lime plaster, sarking boards, and on the roof natural slate and traditional lead, will sustain the moderate significance of the listed building as retained in this material palette, none of the materials to be replaced are original to the building but are 1990s installation to a traditional pattern.

5.5 There will be benefits arising from the works which will include reduced risk to users and thermal improvements to aid maximising the ongoing viable use of the building. These safety and environmental benefits are considered public benefits and should be taken into account when undertaking the balancing exercise required by paragraph 202 of the NPPF.

5.6 Overall the level of harm presented by the preferred option for Bay 4 is considered to be at the lower end of less than substantial. The full range of public benefits, above heritage benefits surrounding maximising the ongoing viable use of the building, and around the enhanced thermal performance of the building which will support ongoing viable uses, that might balance this less than substantial harm is presented within the Planning Statement presented by Deloitte.

Appendix 1

Scale of Harm (HCUK, 2019)

The table below has been developed by HCUK Group (2019) based on current national policy and guidance. It is intended as simple and effect way to better define harm and the implications of that finding on heritage significance. It reflects the need to be clear about the categories of harm, and the extent of harm within those categories, to designated heritage assets (NPPF, paragraphs 201 and 202, and guidance on NPPG).²

Scale of Harm	
Total Loss	Total removal of the significance of the designated heritage asset.
Substantial Harm	Serious harm that would drain away or vitiate the significance of the designated heritage asset
Less than Substantial Harm	High level harm that could be serious, but not so serious as to vitiate or drain away the significance of the designated heritage asset.
	Medium level harm, not necessarily serious to the significance of the designated heritage asset, but enough to be described as significant, noticeable, or material.
	Low level harm that does not seriously affect the significance of the designated heritage asset.

HCUK, 2019

² See NPPG 2019: "Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated." Paragraph 018 Reference ID: 18a-018-20190723.

Appendix 2

Statement of Significance

This section provides an overarching statement of significance for the building as a whole. The following section considers the southern façade of the building and openings therein on a more individual bay by bay basis

Architectural value

The aesthetic and design quality of the 1830 Warehouse is simple and robust and its architectural form, in conjunction with the adjacent tracks is immediately indicative of its specific function and use directly illustrating and giving evidence to it. The five double bays with simple but good quality detailing (pilasters, copings, regular bay rhythm) have a massive but regular and balanced quality spread over the gentle curve of the long facades. The building occupies a prominent position surrounded by transportation routes and its length provides a high positive contribution to the wider area, as well as its own intrinsic architectural value, that has shared context with other nearby buildings that followed on from its construction.

The requirements of the building's function are reflected and illustrated in the disposition of various openings as well as in the evidence of later adaptation, for example evidence in the western façade for the installation of the beam engine and flywheel that reflect and changing requirements which arose in some instances very early in the building's history. The form and layout of the building reflects the technology behind the warehouse and replicates, to a degree, earlier canal warehouses, giving it a functional and illustrative value that has direct links to the earlier transport technology and showing adaption without significant innovation in the earliest years of the railway.

The materials of the building are ostensibly good quality but are not considered to be innovative or unique to the that period. They are instead typical of the early 19th century but, because of this, they give clear evidence to the period of the building and structural techniques of the age. Individual materials differ depending on their function – particularly in terms of wood choice from long straight Baltic timber in the roofs and posts to harder more durable African Oak for sills. The CMP highlights that a more traditional structural approach in terms of timber frame with brick wall materials was taken because of time constraints and because of the particular constraints of the building's form without regular right angles that would have rendered an iron framework construction too difficult within the time constraints imposed by

the company. The innovative approach of the Manchester Building firms to adapt and construct the building to fit the difficult constraint of the curved viaduct adds to architectural interest. The primary roof trusses show clear evidence of this careful construction and engineering in the comprehensive set of carpenters' marks that give evidence of the careful pre-fabrication process to fit the irregular building where trusses did not necessarily form regular right angles to the walls. Other smaller timbers, individual floor joists or common rafters were cut on site to fit the specific requirements off any particular location after the major structure was in place.

The surviving original features such as the pivoting crane, hydraulic jiggers and trap doors also contribute to its technological historical interest to greater or lesser degrees. Historic hatches and openings between floors enable an understanding of the routes by which people and equipment moved between levels. The evidence for their insertion, where they are later adaptations, illustrates the expedient steps taken by the users of the building and there is an honesty of expression within the building where the structure and functioning aspects of remnant equipment and machinery are clearly visible.

The current access onto the roof within bay 5 appears to be contemporary with the works during the 1980s. The smaller hatch within bay 4 is considered to be an historic access point. Both features are secondary elements of the roof structure and unrelated to the major structures of the trusses, that is their structure is not part of the truss structure but cut into and framed within the plain common rafters. Neither access point, or indeed any of the openings in the roof, is highlighted within the CMP of being key to the significance of the building but they are acknowledged as reflecting historic access points and the necessity through time of having access to the roof for ongoing maintenance.

Historic Value

The 1830 Warehouse has high historic illustrative and evidential value as the world's first railway warehouse. It represents the first instance in history where a railway company had need to build such a structure and embodies a distinct stage in the evolution of the history of transit. Its architectural form illustrates its historic function.

Not only is it the first railway warehouse but also forms part of a hugely important group – the most complete early railway station in the country, with viaduct, passenger station and river bridge, only the bridge that originally spanned the road has been replaced. Group historic value is further augmented through the location and relationship to the later Liverpool Road Station warehouses, and the warehouses of the Castlefield waterways. There is high contextual

interest between the various buildings of this general period illustrating the transition from one mode of transport to another.

There is an associative element of value embodied in the links to the builders, a known Manchester firm, and other historic personages associated with the development of the railways and other buildings at this site including George and Robert Stevenson and to a lesser degree those firms and companies that used the warehouse itself. These associative links are not expressly legible in the building itself but are reflected and understood within the historic background and disseminated through the MoSI's use of the buildings themselves where the site and its buildings, and the people associated with them, are an important 'exhibit' in themselves.

Archaeological value

The warehouse is constructed of standard materials that are not considered rare or unique. Multiple phases of use and adaptation have left evidence within the building and this adds archaeological value, particularly where the specific nature of such changes might not be reflected in documentary records. Later phases of change and development since the Museum's creation were generally undertaken with a clear understanding of the importance of legibility of phasing to understanding the history of this place.

Below ground level the potential for the site to yield further information about the more ancient origins of the area, right back to Roman periods, is acknowledged.

Artistic and Communal value:

There is communal value in the current use of the building as part of the museum complex. It allows the industrial history of Manchester, as well as the wider history of early rail transport to be better understood and illustrated to visitors and museum staff. The success of the museum as an attraction to visitors, and as a valued aspect of the local community's cultural links to the past is a strand of value now embodied in the 1830 warehouse and other buildings of the museum.

At its opening and peek of functional use the railway station as a whole inspired engineers, writers, artists, cartoonists as the new age of railways offered excitement and amazement at the ingenuity and new opportunities of easy fast travel of both people and goods. The coming of the railways introduce change across Britain. It is the historic event and development of railways as a whole that formed this inspiration but as the 1830 Warehouse forms part of the earliest complete station group in the county there is a strong element of continuity and

association with this period of artistic and engineering output that adds value to all the listed buildings in the group.

Contribution of setting

The setting of the 1830 warehouse, that area which contributes to its significance or which allows that significance to be understood and experienced extends around the building to varying degrees. The setting is not affected in any way by this proposal and so this section is brief, serving only to acknowledge the importance of the setting to the building's significance in particular with regard to understanding its historic context as a building association with significant historic transportation routes and development and its group value with other structures both contemporary and later that make up a highly important collection of industrial buildings. There are no 'designed' views identified where the 1830 warehouse is intended as a focal point, though it is a prominent structure within the wider area. All views towards, past and around this building are incidental. This also applies to views out of other buildings towards the 1830 warehouse. Different aspects of the building's form and features are visible within these views, including parts of the roof structure to a greater or lesser degree. Views which could be considered as more meaningful – that is, making a greater contribution to the understanding of the building – are considered to be those from or including buildings of a contemporary period. These views, though all contain elements of later changes, have a degree of continuity with the past that aids understanding and interpretation of these buildings as a link to the past.

Appendix 3 Planning policy framework

The decision maker is required by sections 16(2) and 66(1) of the Planning (Listed Building and Conservation Areas) Act 1990 to have special regard to the desirability of preserving a listed building and its setting when exercising planning functions. The decision maker must give considerable importance and weight to the desirability of preserving the significance of the listed building, and there is a strong presumption against the grant of permission for development that would harm its heritage significance.³

There is a broadly similar duty arising from section 72(1) of the Act in respect of planning decisions relating to development within conservation areas.

For the purposes of this statement, preservation equates to an absence of harm.⁴ Harm is defined in paragraph 84 of Historic England's Conservation Principles as change which erodes the significance of a heritage asset.⁵

The significance of a heritage asset is defined in the National Planning Policy Framework (NPPF) as being made up of four main constituents: architectural interest, historical interest, archaeological interest and artistic interest. The assessments of heritage significance and impact are normally made with primary reference to the four main elements of significance identified in the NPPF.

The setting of a heritage asset can contribute to its significance. Setting is defined in the NPPF as follows:

The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

The NPPF requires the impact on the significance of a designated heritage asset⁶ to be considered in terms of either "substantial harm" or "less than substantial harm" as described within paragraphs 201 and 202 of that document. National Planning Practice Guidance (NPPG)

³ Barnwell Manor Wind Energy Limited v East Northamptonshire District Council and others [2014] EWCA Civ 137. This principle has recently been confirmed, albeit in a lower court, in R (Wyeth-Price) v Guildford Borough Council.

⁴ South Lakeland v SSE [1992] 2 AC 141.

⁵ Conservation Principles, 2008, paragraph 84.

⁶ The seven categories of designated heritage assets are World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Registered Park and Gardens, Registered Battlefield and Conservation Areas, designated under the relevant legislation.

makes it clear that substantial harm is a high test, and case law describes substantial harm in terms of an effect that would vitiate or drain away much of the significance of a heritage asset.⁷ The Scale of Harm is tabulated at Appendix 1.

Paragraphs 201 and 202 of the NPPF refer to two different balancing exercises in which harm to significance, if any, is to be balanced with public benefit.⁸ Paragraph 18a-020-20190723 of National Planning Practice Guidance (NPPG) online makes it clear that some heritage-specific benefits can be public benefits. Paragraph 18a-018-20190723 of the same NPPG makes it clear that it is important to be explicit about the category of harm (that is, whether paragraph 201 or 202 of the NPPF applies, if at all), and the extent of harm, when dealing with decisions affecting designated heritage assets, as follows:

Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated.

Paragraphs 199 and 200 of the NPPF state that great weight should be given to the conservation of a designated heritage asset when considering applications that affect its significance, irrespective of how substantial or otherwise that harm might be.

⁷ Bedford Borough Council v SSCLG and Nuon UK Limited [2013] EWHC 4344 (Admin).

⁸ The balancing exercise was the subject of discussion in City and Country Bramshill v CCSLG and others [2021] EWCA, Civ 320.

Standard Sources

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Conservation Principles, Policies and Guidance, Historic England (2008)

Kathryn Sather and Associates (2007) Conservation Management Plan comprising historic background and Gazetteer

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