

# **Black & White House Museum**

## **Timber-Frame Infill Panel Repair and Replacement Specification**

April 2019

### **1.0 Background:**

- 1.1 The Black & White House Museum, formerly the Old House Museum, is a Grade I listed, timber-framed merchants house, constructed in 1621, and situated in its original location in High Town, Hereford.
- 1.2 Its external and internal fabric has experienced several phases of change over the preceding centuries with the most comprehensive changes occurring in the late 19th and early 20th centuries.
- 1.3 Much of the eastern, western and southern elevations have either been altered to some degree, or re-built entirely; with the northern elevation being the most original.
- 1.4 An external visual assessment of the infill panels at 1<sup>st</sup> and 2<sup>nd</sup> floor level was conducted in March 2019 following the delamination of several panels (access via mobile platform). Closer inspection will be required to fully determine the precise condition of each panel.
- 1.5 No internal inspection has been undertaken; but the internal surfaces of panels to be replaced will need to be addressed.
- 1.6 During the external assessment damage to a small number of timber-frame elements was observed, and provision should be made for appropriate repairs.

### **2.0 Existing Infill Panels:**

- 2.1 The Black & White House has been subject to documented two phases of repair in 1990 and 1992, and in the main it appears that the areas of damage relate to repairs undertaken during those phases of work; although a number of works from the 1980s have also been referred to.
- 2.2 The eastern and southern elevations are the worst effected, with over 20 damaged panels on each façade.
- 2.3 The western elevation has a significantly lower rate of failure, 3 panels, and there appear to be no failures on the northern elevation.
- 2.4 The orientation of the building will have influenced where damaged has occurred as the eastern elevation gets the morning sun, and the southern elevation has prolonged exposure to the sun at the hottest times of the day, both situations resulting in increased levels of thermal expansion.
- 2.5 Forty five panels in total are displaying varying degrees of damage which will need to be addressed. However, I would factor in at least a 30% margin for increase, as closer inspection once works begin may reveal further damaged panels.

### 3.0 Existing Panel Specification:

- 3.1 In 1990 the listed building consent application details the 4" infill area as having a 1" 2-coat lime plaster external face, a 2" wood wool substrate, and a 1" 3-coat lime plaster internal face.
- 3.2 The 1992 application details wattle & daub as the replacement material, with limewash as an external finish, and distemper for the internal finish.
- 3.3 Both specifications are present on the southern elevation, and both have failed, albeit they were undertaken nearly 30 years ago. As any new panels will be replacing modern ones there is no requirement to use one system over the other; the use of wood wool board would be the most practical solution.



### 4.0 Replacement Panel Specification:

- 4.1 New panels should consist of an external lime render, a wood board substrate, and an internal lime plaster.

- 4.2 Internal Plaster:

Two coat build up consisting of an 8-10mm backing coat, with a render mesh, and 8-10mm finishing coat.

A Natural Hydraulic Lime, NHL2, should be used with a well graded, washed, aggregate for the backing coat; and with a fine, washed, aggregate for the finish coat. (St. Astier or Singleton Birch NHL)

Sufficient surface hardening between coats may take 24hrs to 7 days depending on temperature and exposure.

Once completed the plaster surface will need to be kept moist for up to 7 days to ensure sufficient hydraulic set and prevent rapid drying.

- 4.3 Substrate:

Wood Wool boarding, such as Celenit, 50-60mm deep as appropriate.

Oak battens can be screwed to the timber-framing to provide an appropriate fixing surface, and boards can be rebated to fit. Stainless Steel screws should be specified.

Oakum caulking should be used to infill gaps between boards and timber-frame surfaces to absorb movement and provide a flexible and breathable seal.

No non - breathable sealants to be used – eg: silicone, acrylic, mastic, tar.

#### 4.4 External Render:

Two coat build up consisting of an 8-10mm backing coat, with a render mesh, and 8-10mm finishing coat.

A Natural Hydraulic Lime, NHL3.5, should be used with a well graded, washed, aggregate for the backing coat; and with a fine, washed, aggregate for the finish coat. (St. Astier or Singleton Birch NHL)

Sufficient surface hardening between coats may take 24hrs to 7 days depending on temperature and exposure.

Once completed the render surface will need to be kept moist for up to 7 days to ensure sufficient hydraulic set and prevent rapid drying.

#### 4.5 Paint Finishes:

Once the lime render has sufficiently dried and cured, this is likely to take at least 28 days, a mineral paint system, such as Keim Soldalit & Optil, can be applied to the external and internal face of each rendered panel.

The length of time necessary between rendering/plastering and painting may require works to be undertaken in two separate phases.

#### 4.6 External Paint:

Three coats will be required, a Soldalit Fixativ binder coat, and then 1st and 2nd coats of Soldalit; each coat will require at least 12 hours drying time before next.

Render surfaces should be protected from rain, and allow 48 hours to dry if exposed.

#### 4.7 Internal Paint:

Once the lime render has sufficiently dried, this is likely to take up to 28 days, a mineral paint, such as Keim Optil, should be applied to each rendered panel.

Three coats will be required, a Granital binder coat, and then 1st and 2nd coats of Optil; each coat will require at least 12 hours drying time before the next is applied.

### **5.0 Workmanship & Protection:**

- 5.1 Materials should be used by competent contractors experienced in working with them, and with due regard to manufactures instructions and relevant British Standards guidelines, including:

BS EN 13914-1:2016 – Design, preparation and application of external rendering and internal plastering – Pt. 1 External Rendering.

BS EN 13914-2:2016 – Design, preparation and application of external rendering and internal plastering – Pt. 2 Internal Plastering.

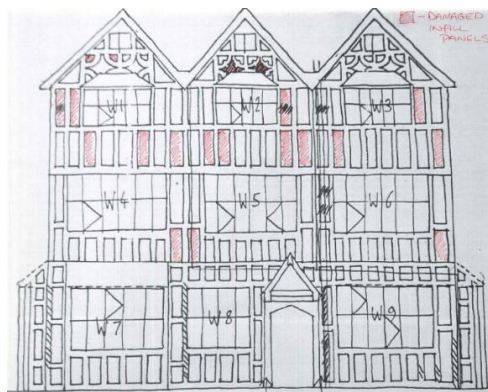
BS EN 13139:2013 – Aggregates for Mortars.

- 5.2 Lack of proper application and appropriate care during the rendering/plastering process can result in the lime work failing to carbonate sufficiently which can lead to material failure.

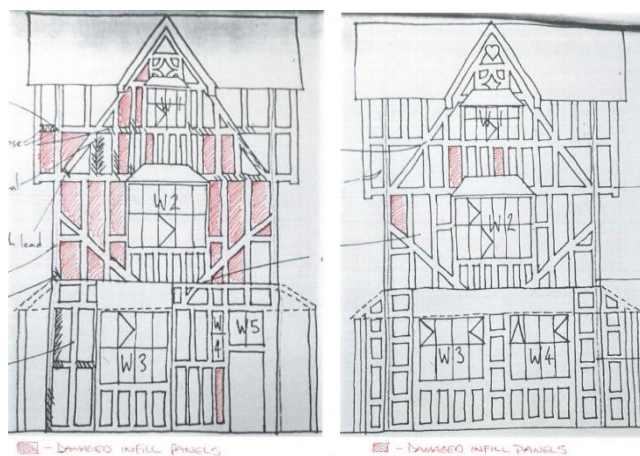
- 5.3 Lime work should not be undertaken in temperatures below 5C.
- 5.4 Lime should be stored in a dry environment.
- 5.5 A gauging box should be used to measure mix materials.
- 5.6 Lime Render/Plaster should be used within 2 hours of mixing.
- 5.6 Lime work should be protected from wind, rain and direct sun during application and drying periods.
- 5.7 Hessian or other appropriate coverings should be used to protect finished panels.
- 5.8 Render/Plaster should be kept moist for approximately 7 days; preferably by mist spraying at intervals as necessary.

## 6.0 Damaged Panel Elevations:

- 6.1 The following elevation drawings were part of the 1990 application, and have been used to highlight damaged panels.
- 6.2 Sections hatched in red ink signify a damaged or cracked panel.



South Elevation



East Elevation

West Elevation