

British Museum – 9 Montague Street Bow Window**Structural Engineering Note on the Reconstruction Proposals**

1.0 Alan Baxter first visited 9 Montague Street in November 2022, at the request of CBRE, following the local collapse of the spandrel panel at ground floor level to the rear bow window. Brickwork debris was still present at ground floor level and in the lightwell below.

2.0 We visited again in January 2023, when the brickwork debris had been cleared and it was possible to look at the structure at ground floor level. We were able to see that the spandrel panel was built up off three timbers, but only one of these was built into the brickwork reveals either side. The front two, including the curved piece of timber were not therefore supported on the wall and we couldn't see any signs that they were effectively connected to the timber behind. Both had rotated and dropped resulting in the partial collapse (see attached sketch SK01 and photos). We concluded that the spandrel panel must originally have taken some support from the window frame below, but this had been replaced, possibly during the last refurbishment and a gap was left between the underside of the front two timbers and the top of the window frame, which was filled with foam. This left the timbers unsupported and for a while the arrangement stayed in place relying on some secondary arching action in the brickwork spandrel, but the timbers will have gradually rotated under the load before finally the spandrel panel failed.

We concluded therefore that the original detail was not adequate structurally and that it would not be appropriate to simply reconstruct the bow window on a like for like basis. This could not be justified as the issues with the original detail were a major contributory factor in the collapse.

3.0 We looked at options in timber to reconstruct the floor locally to support the ground floor and the curved brickwork to the spandrel panel (brickwork cannot arch when it is built on a curve) but these could not be justified either.

We concluded that the arch itself and the brick spandrel panel over needed to be supported on a stainless steel angle, built into the reveals either side, with intermediate support provided by the floor structure. The existing arrangement of the floor timbers was such that in order to take support from the existing timbers and provide support to the angles to the arch a cranked member was needed and we concluded that this needed to be steel. On this basis we developed the proposal as shown on SK05.

4.0 In developing the details we advised CBRE that the proposed repair was not “like for like” and might therefore need Listed Building Consent. We reviewed the repair proposals with senior colleagues here at ABA to see whether they thought that a repair could be achieved using a similar timber arrangement to the original, but we concluded that this had been such a major factor in the partial collapse of the brickwork that it could not be justified. It seems unlikely that the original builder fully understood the difficulties and rotational forces that arise when building a curved brickwork flat arch. We have therefore developed and refined the steelwork repair detail which is attached.