

— Design Note

Client:	British Museum
Project:	39 Russell Square + Science Block
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This note outline’s three amendments proposed to be made to Application Ref: **2023/3252/P**, which involves refurbishment works to 39 Russell Square and the Science Block Extension. The three amendments include:

- 1. Addition of insulation to the Science Block roof build Up
- 2. Addition of louvre grilles to Science Block west wall
- 3. Addition of a step and handrail to the rear yard of the Science Block

1.Addition of insulation to Science Block Roof Build up

Existing Condition

The rear extension to 39 Russell Square – referred to as the Science Block – was completed in 1962, originally designed to house permanent science staff of the British Museum. The roof of the science block is formed of a reinforced concrete barrel vault structure, with inlaid glass blocks in a grid formation. The roof had displayed several issues: in relation to waterproofing, condensation and loose spalling concrete to the underside.

The outer surface of the roof has been covered in an apparent bituminous waterproofing membrane, due to water ingress through the roof since the building's completion. This membrane has broken down over time and has developed gaps, evidenced by the fact light passes through the glass blocks in several locations.

A layer of cork had been applied to the underside of the concrete structure of the roof, which was done either as part of the original construction or as a later remedial measure. We believe this may have been an attempt to reduce the condensation forming on the inner face of the concrete because of cold bridging. Where cork has been previously removed, areas of reinforcement are exposed where concrete has fallen away from the soffit. There are areas of staining on the cork, caused either by water ingress or condensation continuing to form on the underside.

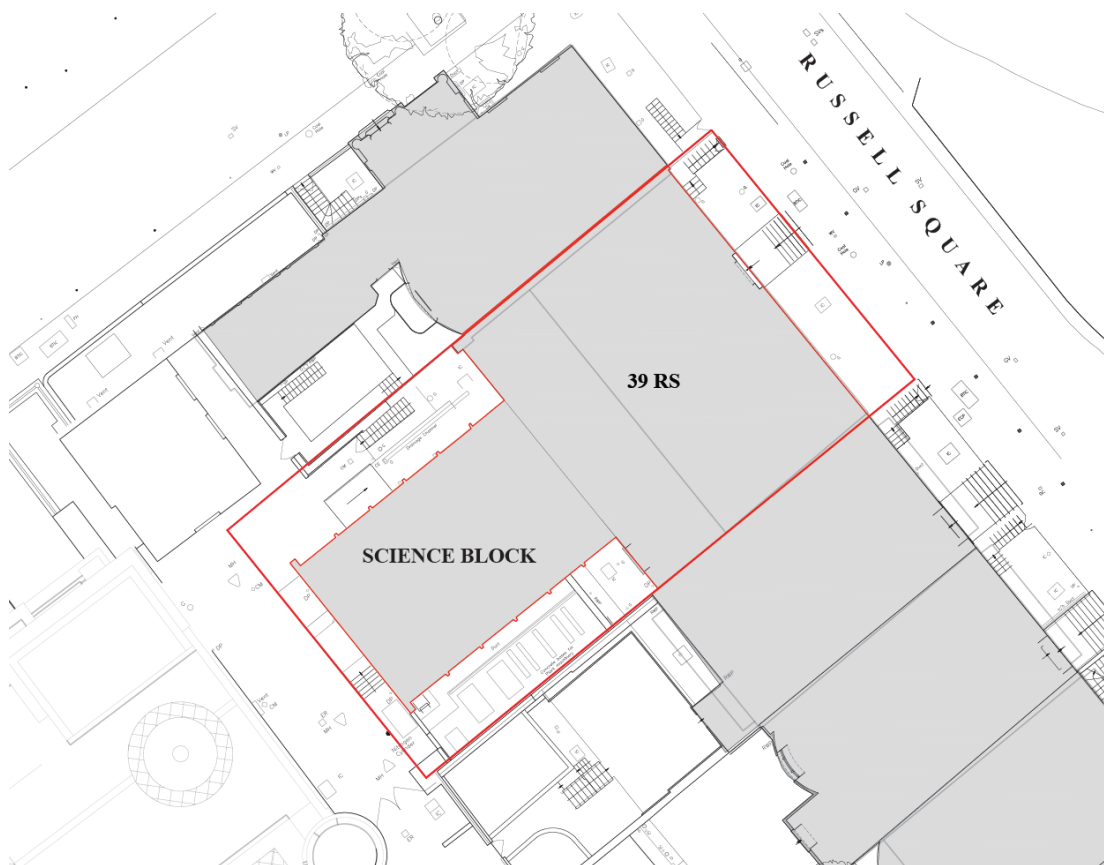


Figure 1: Block plan of 39 Russell Square and Science Block



Figure 2: Photograph of the Science Block roof shortly after construction

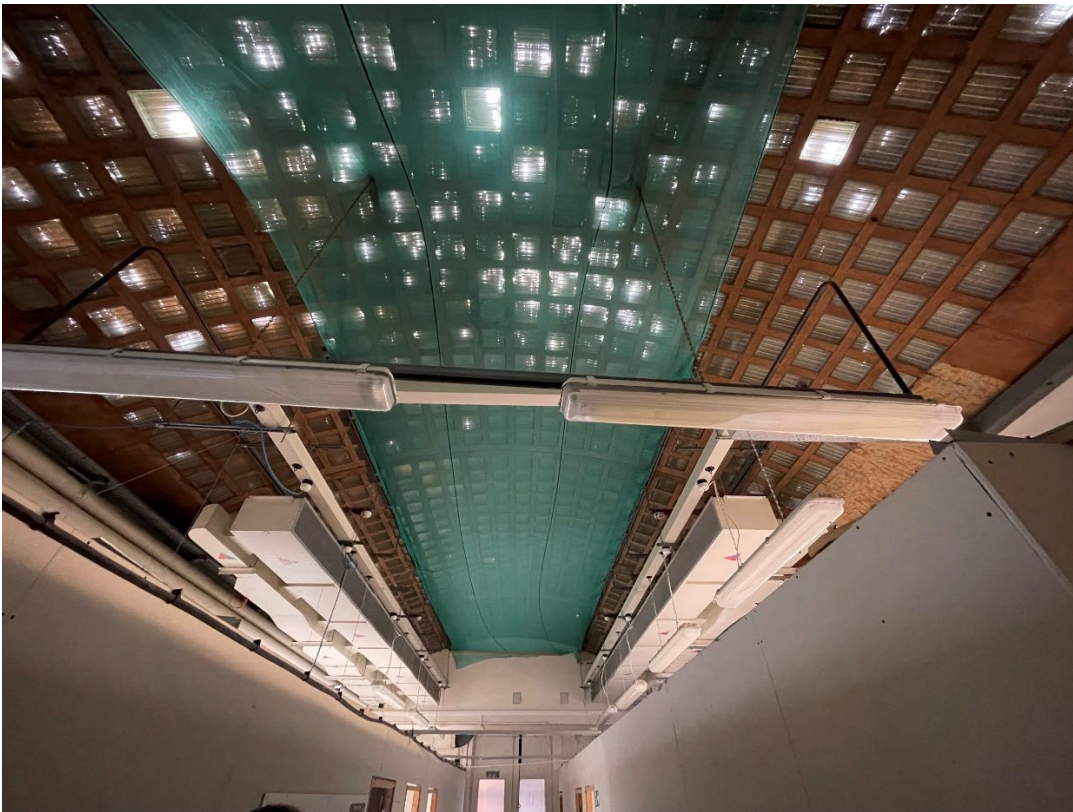


Figure 3: Photograph showing the underside of the Science Block Roof as existing



Figure 4: Photograph showing the Science Block Roof from above as existing

Consented Scheme

The scheme which gained planning and listed building consent proposed a new flat roof covering applied directly on top of the roof, with no insulation, per the consented section below

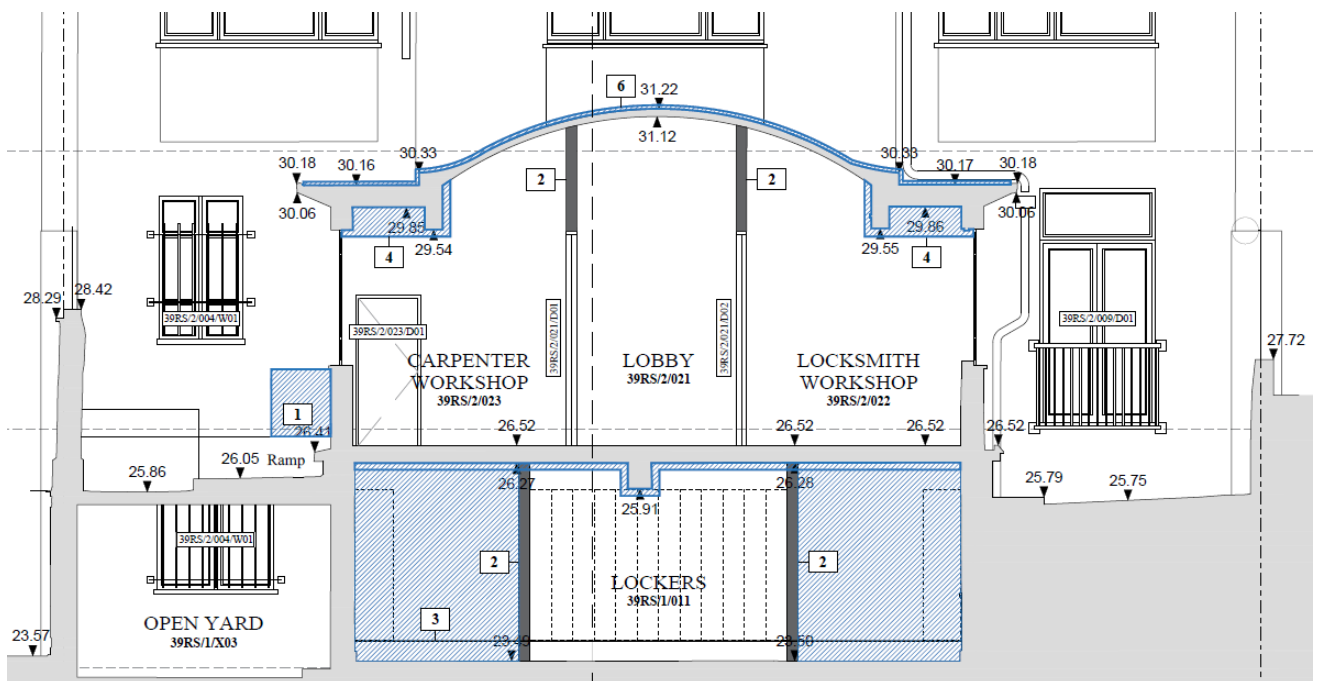


Figure 5: Section of consented scheme

Proposed amendments

As described in the section on the existing condition, the existing buildup of the roof was of glass blocks, set within a reinforced concrete structure, with a thin layer of cork applied to the soffit. The exact U-value of a construction of this nature is unknown but was estimated by roof waterproofing manufacturer Proteus to be around $0.51\text{W/m}^2\text{K}$, a long way over maximum threshold for roofs in refurbishments of $0.35\text{W/m}^2\text{K}$ as well as the maximum U-value for any improved element of a roof in existing building of $0.18\text{W/m}^2\text{K}$. The $0.35\text{W/m}^2\text{K}$ value is particularly important, as building fabric with thermal performance above this value is likely to attract interstitial and/or surface condensation.

To prevent condensation forming on the roof, it is proposed that a thin layer of insulation is added to the proposed roof build up, to be introduced over the existing roof build up, beneath the new liquid applied waterproof covering. The new insulation is proposed to be 80mm, which will raise the roof level by a total of 90mm (including 10mm for the new roof covering). This additional height does not result in the need to raise any parapets or copings, and does not create a significant change in the roof height or edge profile.

The proposed section is included in the application, an extract of which is included below.

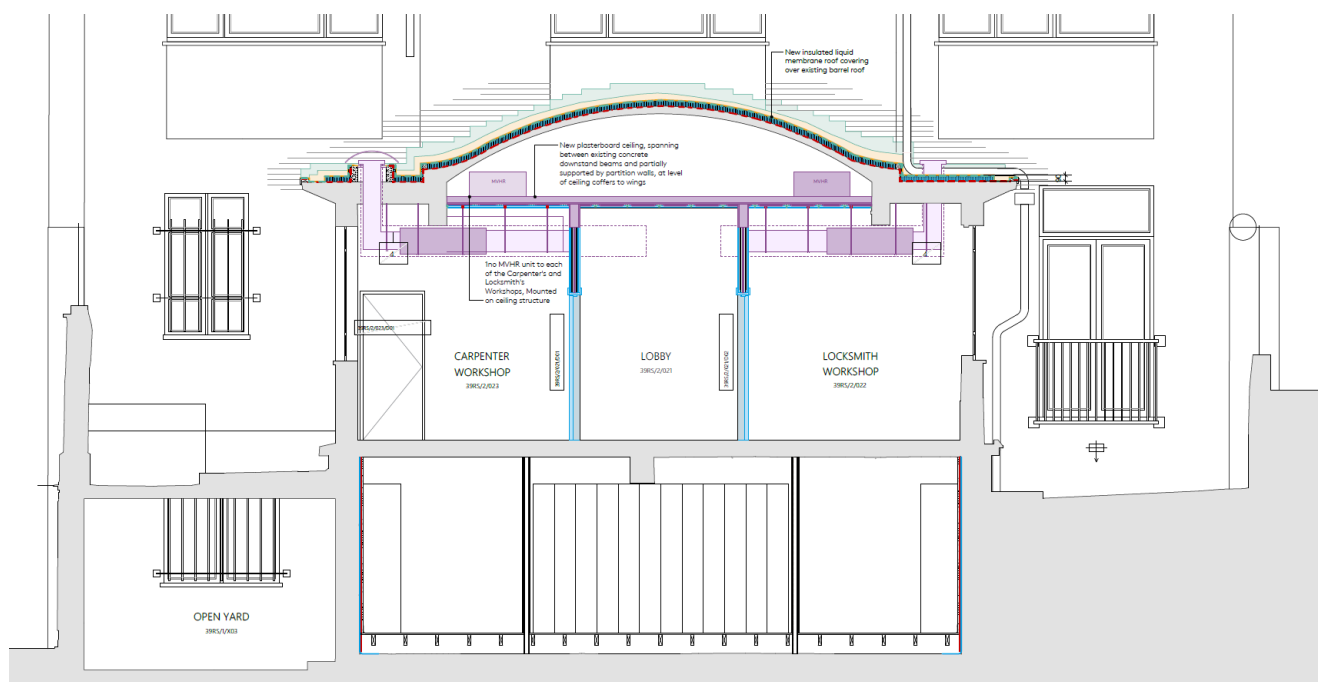


Figure 6: Section of amended scheme

2.Addition of louvre grilles to Science Block west elevation

4no. new louvre grilles are proposed to be inserted in the west elevation of the Science Block. These are proposed to be added to allow for the increased airflow required to ventilate the workshop space, established following the development of the ventilation scheme through Stages 4 and 5.

The new grilles are to be formed of powder coated aluminium and have been aligned in a row on the west elevation to have as little visual impact as possible.



Figure 7: Existing elevation of west elevation of Science Block

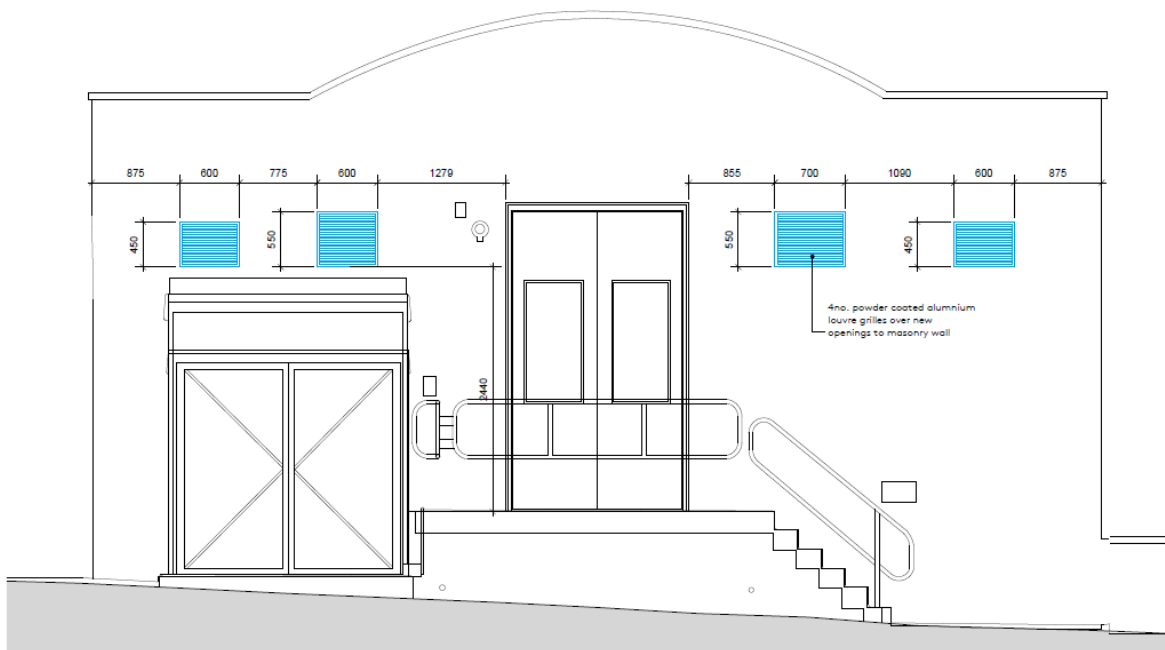


Figure 8: Proposed elevation of west elevation of Science Block

3. Addition of a step and handrail to the rear yard of the Science Block

In the rear yard of the Science block, there is an existing step of circa 375mm up to the yard to the south of the Science Block, from the passageway to the west.

To make access to the south yard safer, it is proposed to form an intermediate step, to break the transition into 2no. steps of 168mm for each rise. A galvanised steel handrail is also proposed to be added by these steps.



Figure 9: Photo of existing step

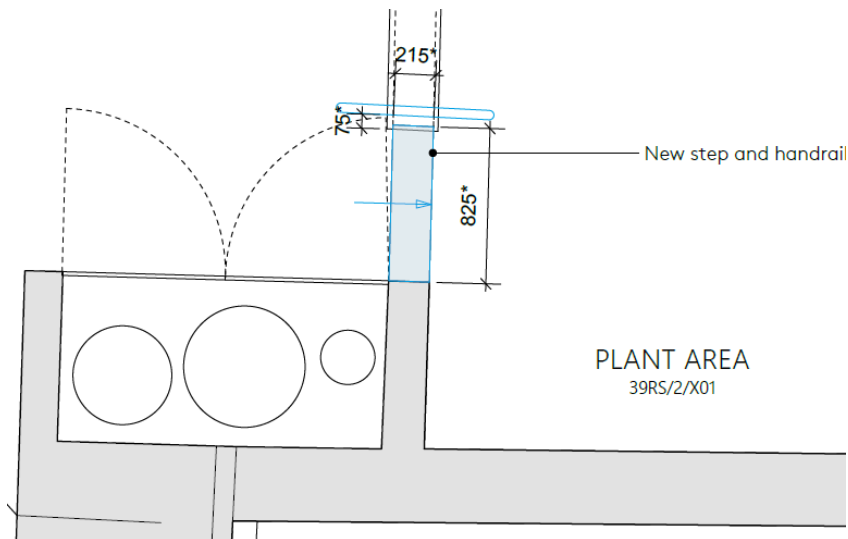


Figure 10: Proposed plan for new steps and handrail within yard of Science Block

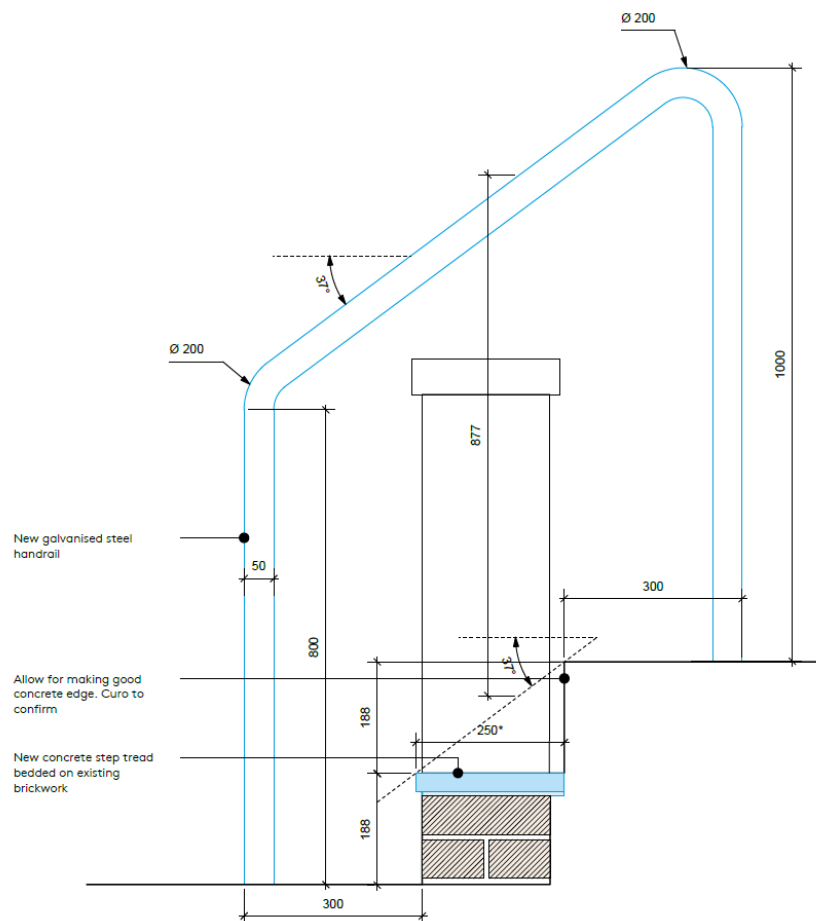


Figure 11: Proposed Section of steps and handrail