CHAPTER 3

The Proposals

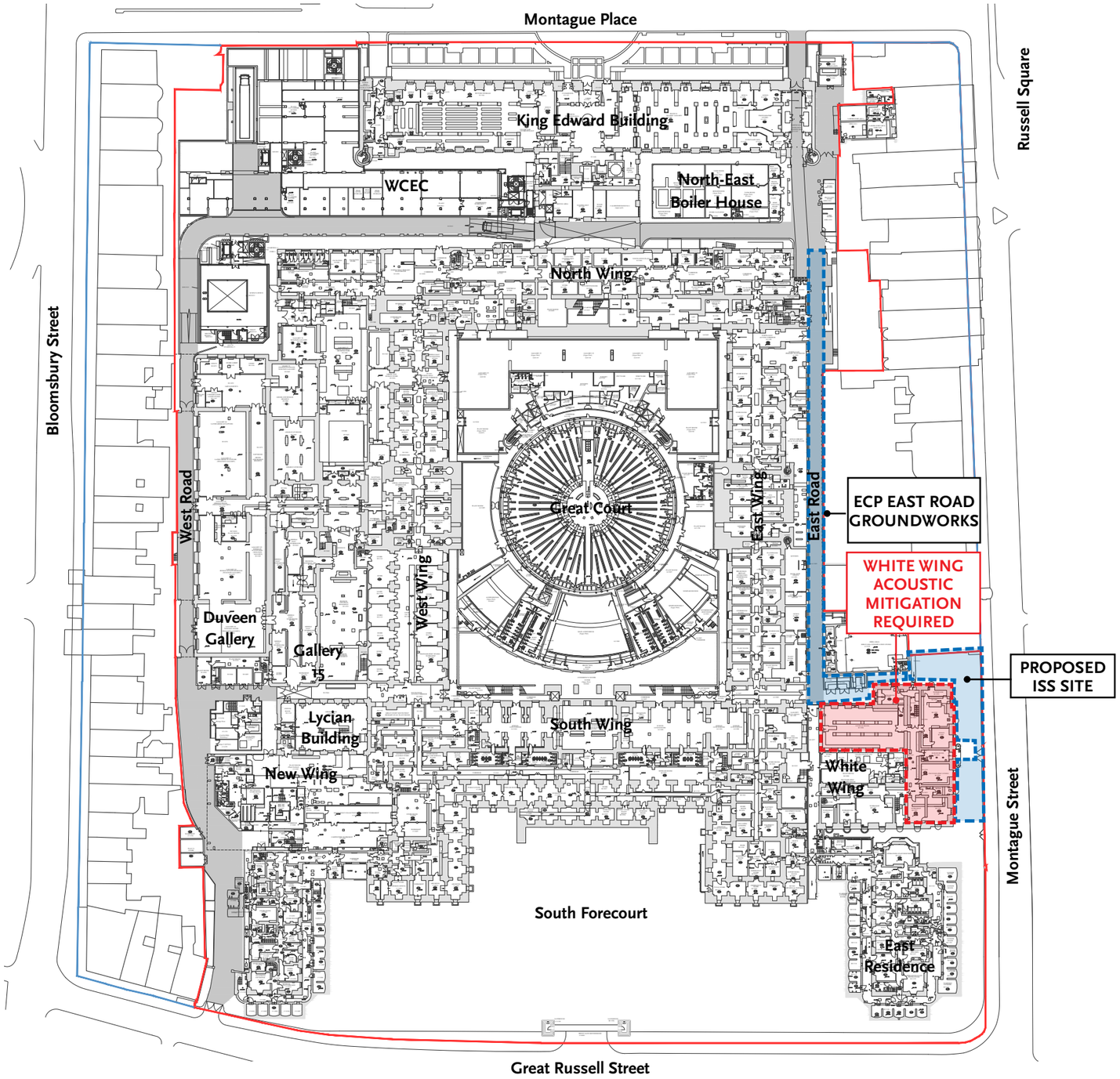
3.1 Overall Proposals Scope

In summary, the proposals for the White Wing are to install 28 units of secondary glazing at Levels 01, 02, 03, & 04 in the locations indicated on the adjacent plans. There is also an existing vent/grille in which boarding will be installed on the north elevation of room B/1/091 at Level 01. The installation of these units is required to ensure the spaces remain occupiable and therefore the functions within them can be maintained. These functions support critical operational functions in the Museum and the Museum's front of house visitor experience.

The proposals are for installation of the secondary glazing units and other sundry works on a temporary basis only during the ECP construction period. Upon ECP completion the secondary glazing will be removed and required repairs will be sensitively undertaken to restore the existing status quo.

The proposed locations for installation have been determined through a case by case analysis rather than a blanket approach, but naturally are in areas directly adjacent to expected ECP construction activity (and the additional noise this will generate), as illustrated in the adjacent diagram. Intervention has only been proposed where there is a demonstrated need and where other mitigation measures such as management procedures are not suitable. As such, the proposals represent the minimal interventions required in order to ensure critical operations and functionality of the Museum is maintained.

For further description of the needs case and determination of extent of proposed secondary glazing achieved through specialist acoustic survey and analysis, please refer to Chapter 1 of this document.



Key:

Planning Application Red Line Boundary

Other land in applicants ownership

Right:

Level 02 plan of the Museum Estate showing the location of the development site and relevant existing buildings

3.2 Historic England Guidance

In July 2024 Historic England published "Adapting Historic Building for Energy and Carbon Efficiency: Historic England Advice Note 18 (HEAN 18)".

The advice note was produced to "provide clarity - in support of consistent decision making - on approaches to improve the energy efficiency and support carbon reduction of historic buildings, whilst conserving their significance".

Within section 4 the advice note states:

- *Installation of secondary glazing to the windows will generally be acceptable.*

- *In most cases, the impact of its installation on significance will only cause minimal harm to historic fabric and architectural interest, which will generally be acceptable in view of the benefits obtained.*

- *Exceptions may include interiors of exceptional architectural quality (such as the finest state rooms of a great house), buildings with historic shutters which would be damaged or rendered inoperative by the installation, and buildings with glazing of exceptional significance which should not be obscured. In many of these cases, temporary secondary glazing used seasonally will generally be acceptable.*

- *Listed building consent is unlikely to be required for all other secondary glazing works.*

- *Secondary glazing can provide very effective draughtproofing as well as improved thermal efficiency.*

- *Secondary glazing will provide considerable improvements to thermal performance and energy conservation. In respect of multipane windows, it often outperforms double-glazing.*

These proposals align with this guidance, in that their installation will improve acoustic environmental performance, but also draughtproofing and energy performance of the fabric for the duration of their install. They are proposed to be temporary in nature for a set period, in a similar fashion to the seasonal temporary glazing considered gerenally acceptable even in exceptional circumstances of architectural quality.

Right:

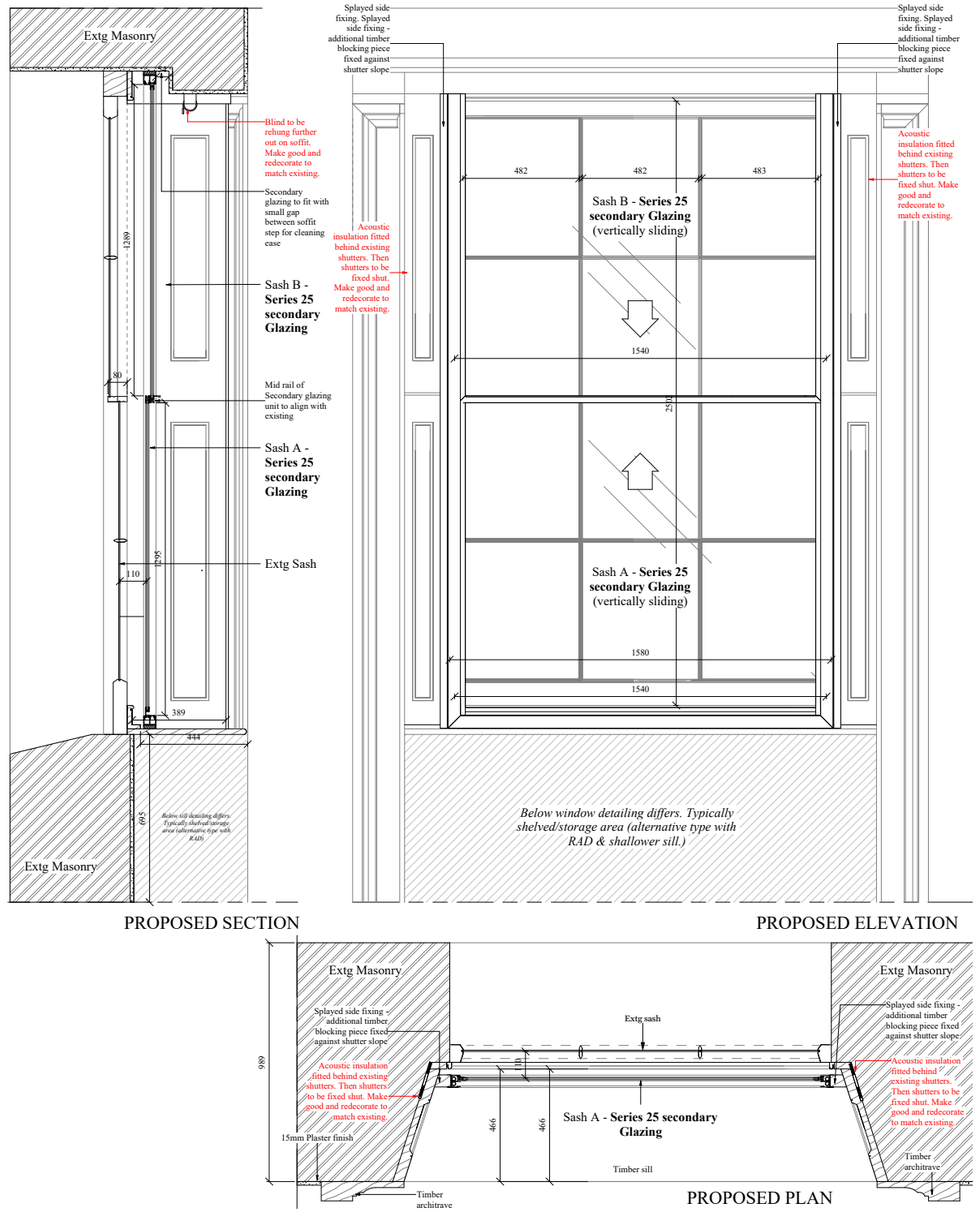
Front cover of the Historic England's "Adapting Historic Building for Energy and Carbon Efficiency: Historic England Advice Note 18 (HEAN 18)", publshed July 2024. Copyright Historic England

3.3 Detailed Drawings & Schedule

It should be noted that this chapter provides an illustrated summary of the works only. It is intended to be read in conjunction with, and not a replacement for, the full detailed drawings and schedule contained within the application documents.

The drawings show existing and proposed plans, sections, and elevations at 1:10 scale for each window type condition, along with accompanying scoping and type drawings. The accompanying window schedule contains key specification information such as sizing, window product specification, finish, works to existing elements required, referenced back to the window type and drawing number reference within the detailed drawing pack.

Reference should be made to this information for a full and detailed understanding of the proposals.



Right:

Proposed detail plan, section, and elevation for window type C3

3.4 White Wing Scope

The proposals for the White Wing are to install 28 units of secondary glazing at Levels 01, 02, 03, & 04 in the locations indicated on the adjacent plans. There is also an existing vent/grille in which boarding will be installed on the north elevation of room B/1/091 at Level 01.

The existing windows are of varying types ranging from smaller units at the basement level to grand proportioned large format sashes finished in stained timber (suspected stained pine) at Level 02, of which the general detail remains the same to windows at Level 04, though the overall size of the windows are smaller and the internal shutter surrounds and trim are painted in off-white.

For types B1, E1, & E2 the proposed unit has slightly thicker sightlines due to the required structural integrity of the window needed for such large units. It presents elevational sightlines of 90-104mm at the jambs, sills, and heads, with an internal transom profile of 40mm. The units will be constructed of two panes matching the proportion of the existing sash panes behind. The frames will be finished in anodised bronze at Level 02 where the internal window and trim is in stained timber, and in PPC off white in other locations where the surrounding shutters and trim is painted off-white in the existing condition.

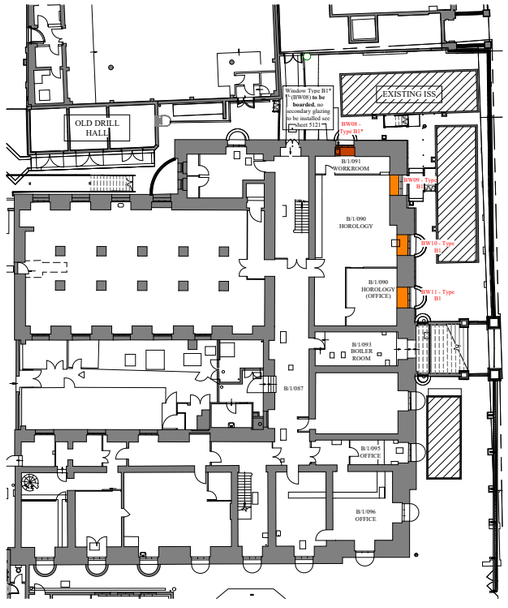
The new unit requires an offset from the internal face of existing sash unit in order to achieve the required acoustic performance, meaning the existing timber shutters will have to be pinned and window fixed through the shutter. Once removed, sensitive repairs will be undertaken in situ as described later within this chapter.

Key:

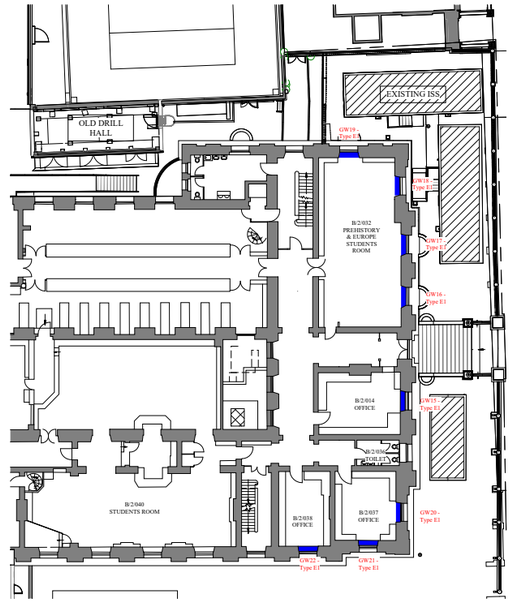
- S.Glazing Type B1
- S. Glazing Type B1*
- S.Glazing Type F
- S.Glazing TypeC3
- S.Glazing Type E2
- S. Glazing Type E1

Right:

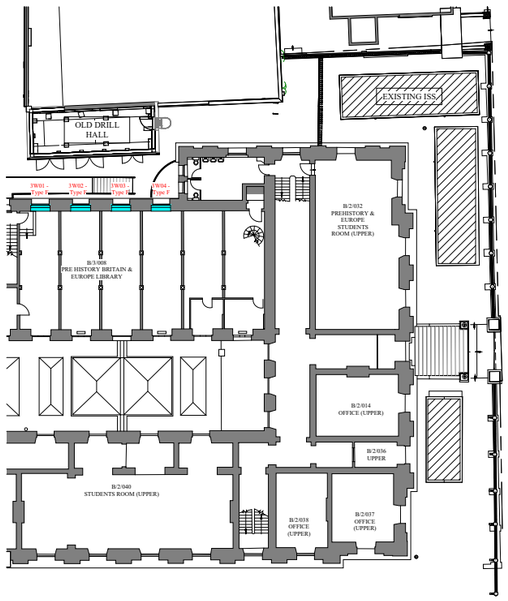
Existing photographic survey of windows proposed to have temporary secondary glazing acoustic mitigations installed within these proposals in Level 04 of the White Wing



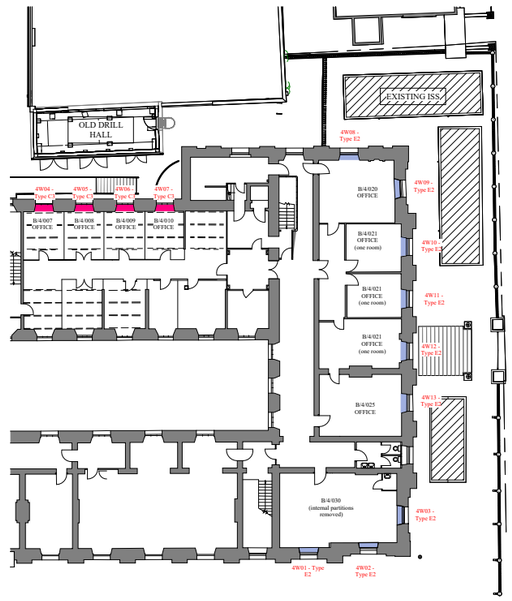
Level 01



Level 02



Level 03



Level 04

For types C3 & F the proposed unit has slimline elevational profiles of 73mm at the jamb, 85mm at the sill, and an internal transom profile of 28mm. The frames would be finished in PPC off white to match the existing internal paintwork of the window frames and surrounds.

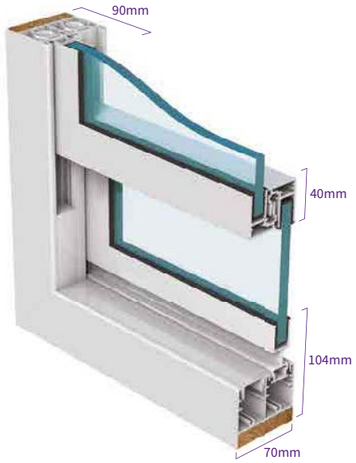
Further summary of the various types of window are provided on the following page. Reference should be made to the detailed drawings and schedule contained within the application documents for further information.

SERIES 25 VS

- Type C1, C2, C3, D1, D2, F

SERIES 90 VS

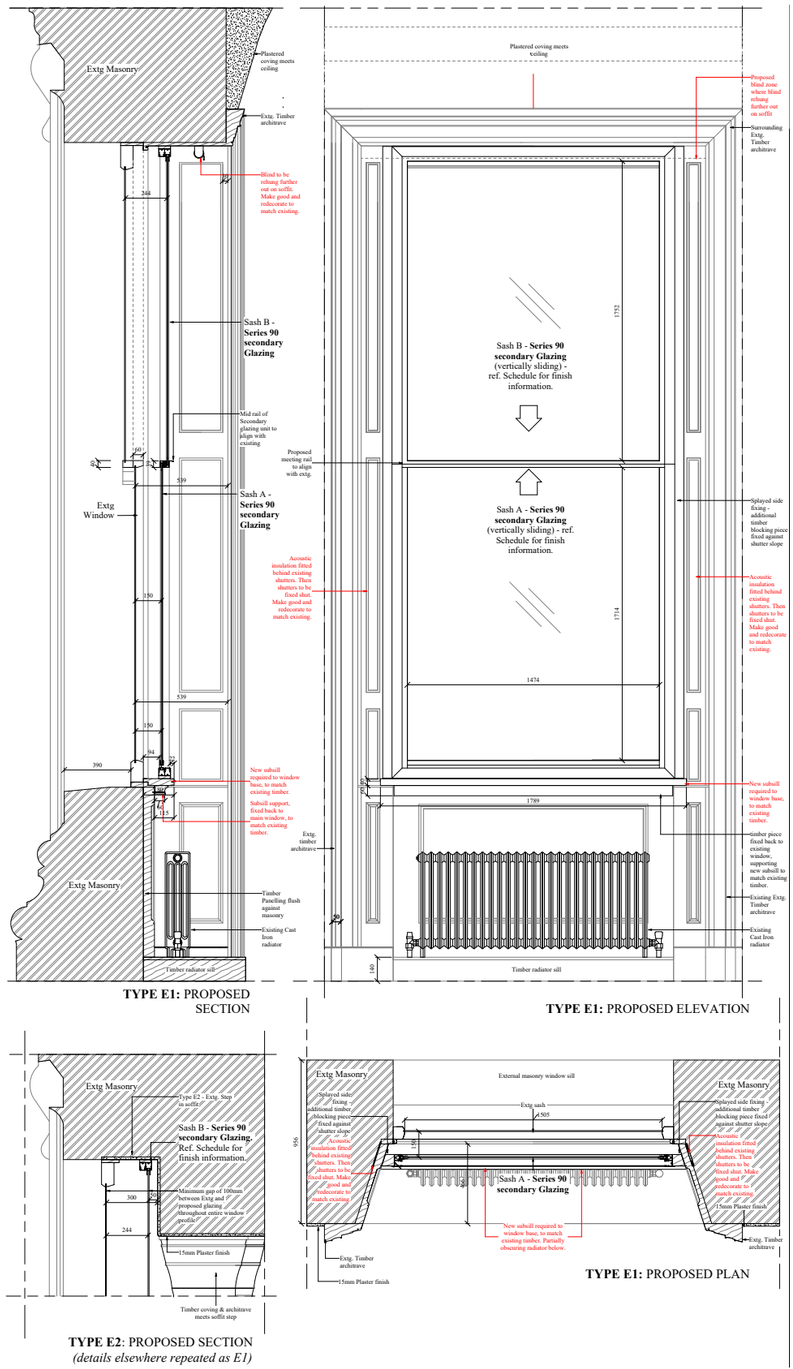
- Type B1, B2, E1, E2



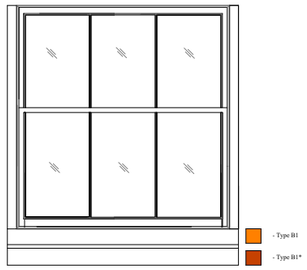
Left to right:

CGI showing the proposed secondary glazing section types

Proposed drawing for window types E1 & E2



WHITE WING LO1



2 Type B1 & B1*
1 : 20

Existing Window Arrangement Notes:
B1 - Vertical sliding sash window
B2 - Vertical sliding sash window with curved head.

Proposed Secondary Window Finish
B1 - PPC - White
B1* - NO SECONDARY GLAZING (boarding as per sheet 5122)

Number of instances (B1)
3

Number of instances (B1*)
1

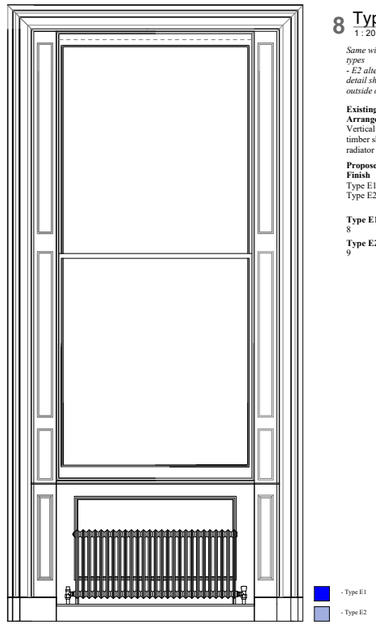
Key:

- S.Glazing Type B1
- S. Glazing Type B1*
- S.Glazing Type F
- S.Glazing TypeC3
- S.Glazing Type E2
- S. Glazing Type E1

Right:

Existing photographic survey of windows proposed to have temporary secondary glazing acoustic mitigations installed within these proposals in Level 04 of the White Wing

WHITE WING LO2



8 Type E1 & E2
1 : 20

Same window profile across both types
- E2 alternative installation detail shown on sheet 5114 (fixed outside of bulkhead soffit step.)

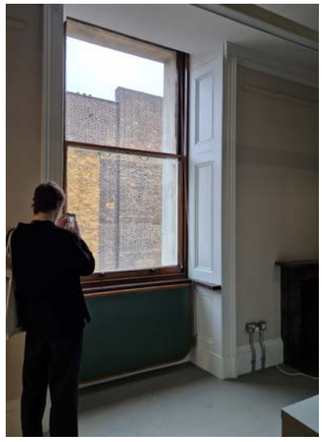
Existing Window Arrangement Notes:
Vertical sliding sash windows, timber shutters on internal face, radiator below.

Proposed Secondary Window Finish
Type E1 - Anodised Bronze finish
Type E2 - PPC White

Type E1 Number of instances
8

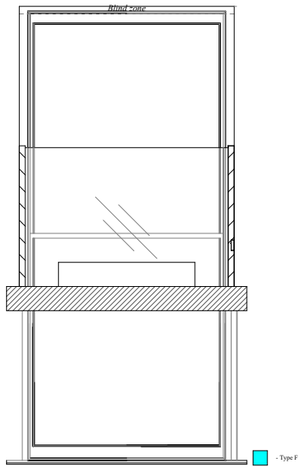
Type E2 Number of instances
9

Type E1



Type E2

WHITE WING LO3



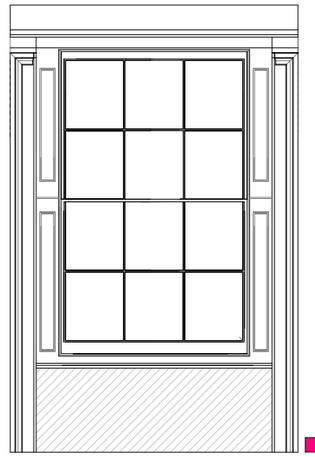
9 Type F
1 : 20

Existing Window Arrangement Notes:
Single glazed sash window spanning 2 floors. (See detail) .

Proposed Secondary Window Finish
PPC - White

Number of instances
4

WHITE WING LO4

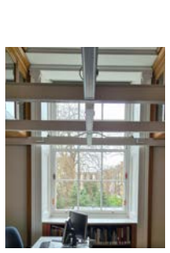


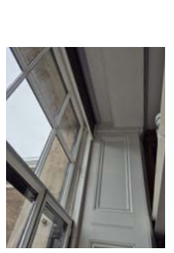
5 Type C3
1 : 20

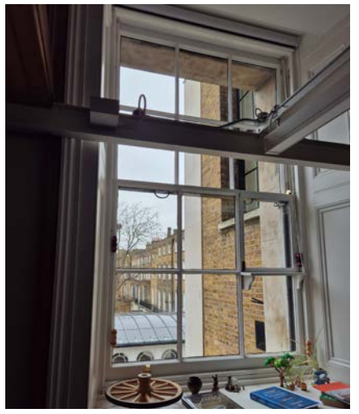
Existing Window Arrangement Notes:
Vertical sliding shorter sash windows, timber mullions and suspended steel infront.
Painted white timber shutters sloping onto internal face

Proposed Secondary Window Finish
PPC - White

Number of instances
4



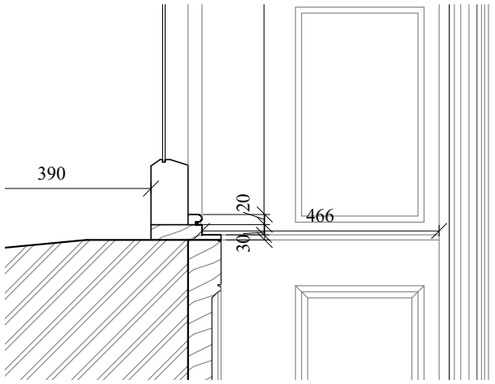


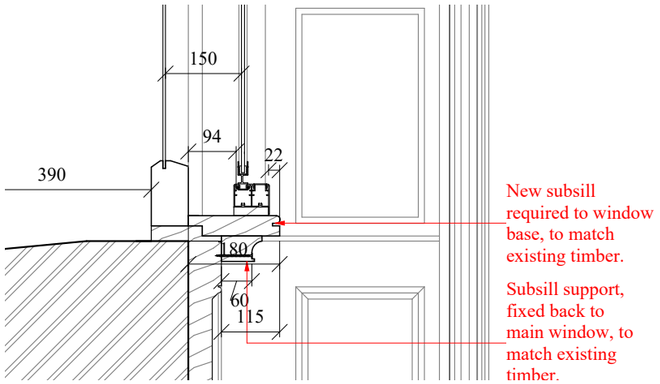


3.5 White Wing Windows Sub Sill Works

For window types E1 & E2 within the White Wing, a new timber sub-sill piece allows for 100mm minimum cavity between existing pane and secondary glazing, this is reversible and fixings can be removed and repaired as per the methods outlined later in this chapter.

The subsill would be of stained timber material, with the stain applied to get as close a colour match finish to the existing adjacent timber for type E1 and painted white to match existing internal paintwork for type E2.





Proposed Type E1 sill detail

Clockwise from top left:

Photograph of existing sill.

Illustrative CGI of the proposed secondary glazing unit in anodised bronze finish in the White Wing, Level 02

Illustrative CGI showing profile of new sub sill piece with secondary glazing splay fixed against existing timber shutters.

Proposed Type E1 sill detail showing new sub sill piece fixed back to existing timber.

Existing Type E1 sill

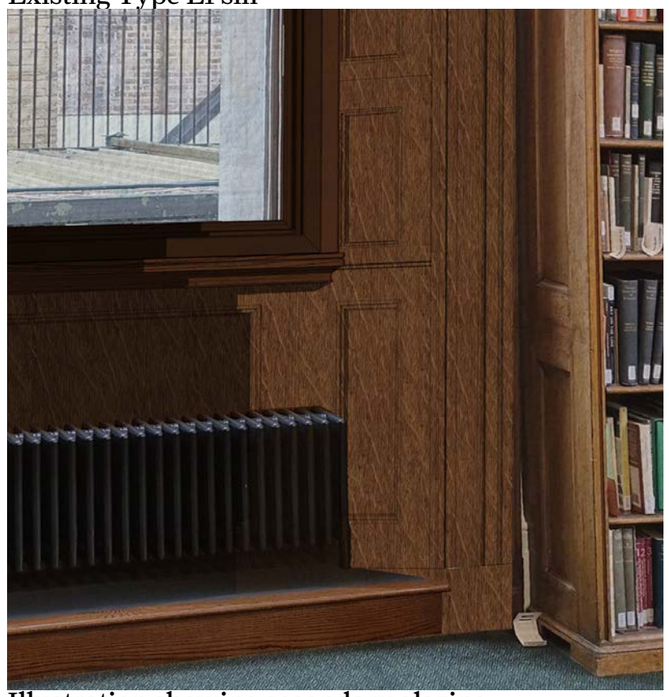


Illustration showing secondary glazing sitting on proposed sub sill

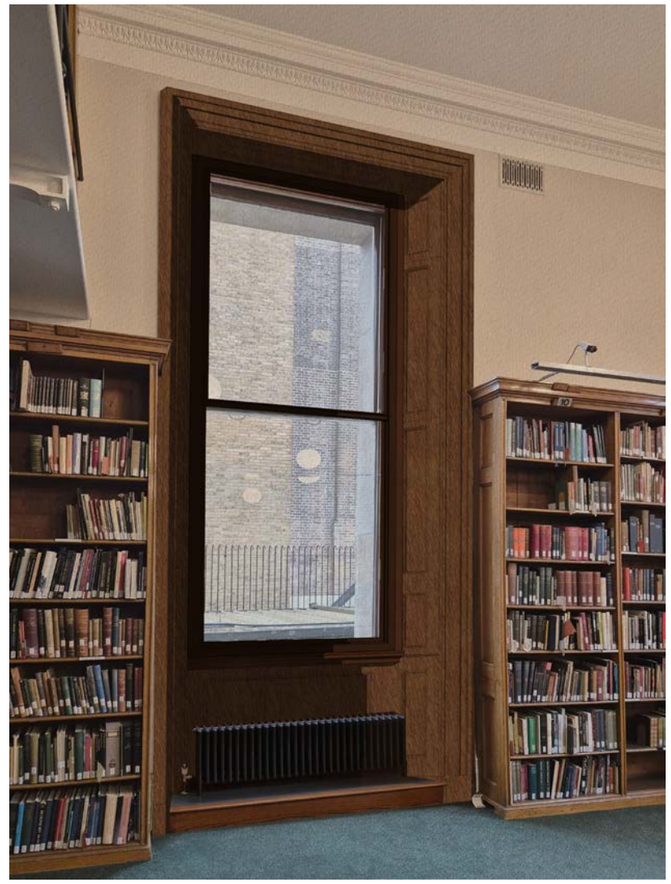


Illustration showing secondary glazing

3.6 Selected Window Types

The proposed secondary glazing windows are all proposed to be sourced from the same manufacturer, with a reputable reputation and track record of delivery and installation in sensitive heritage environments and listed buildings. A summary of the types proposed and some precedent photography provided by the supplier is provided adjacent.

- The Series 25 is a mid range aluminium vertical sliding unit which provides higher capacity spring balances that allow treatments of larger windows
- The Series 90 unit is an aluminium framed heavy duty vertical sliding unit supported on specialist balances allowing treatment of very large sash windows.

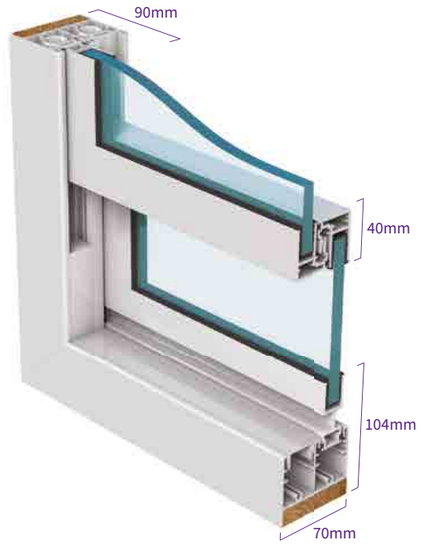
Reference should be made to the detailed drawings and schedule contained within the application documents for further information.

SERIES 25 VS

- Type C1, C2, C3, D1, D2, F

SERIES 90 VS

- Type B1, B2, E1, E2



Top:

CGI showing the proposed secondary glazing section types

Bottom:

Precedent images of the proposed secondary glazing types, each photo corresponds to the CGI above. Courtesy of Selectaglaze.

3.7 Proposed finishes

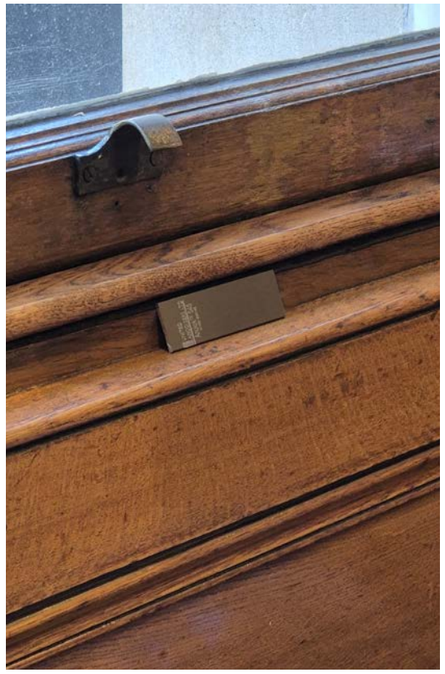
With regards to finishes, full reference should be made to the window schedule, however broadly where existing internal timber shutters and trim are treated in stained timber in the existing condition, a proposed anodised bronze finish is proposed. Where internal shutters and trims are treated in existing paintwork, an off-white PPC finish is proposed.

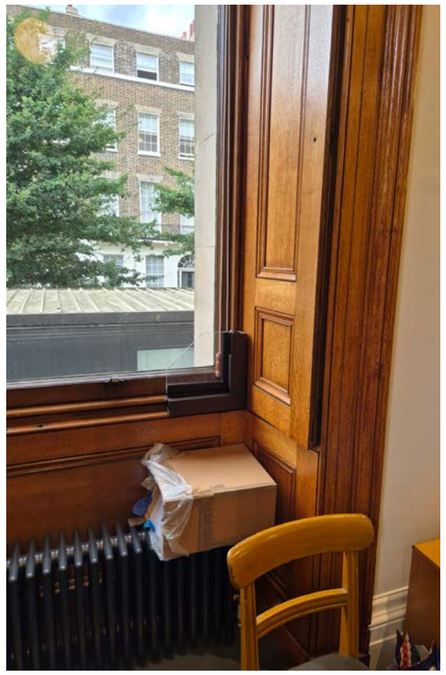
Anolok 545 anodised bronze

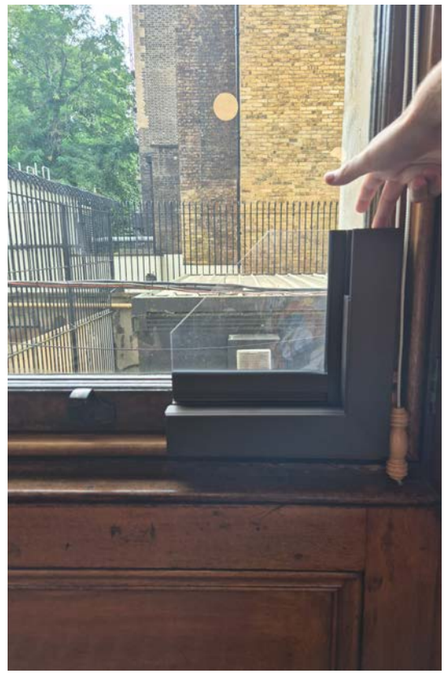
- Enhanced finish for White Wing L02 type E1 windows , where an anodised bronze finish better matches the palette of the existing window and casement.

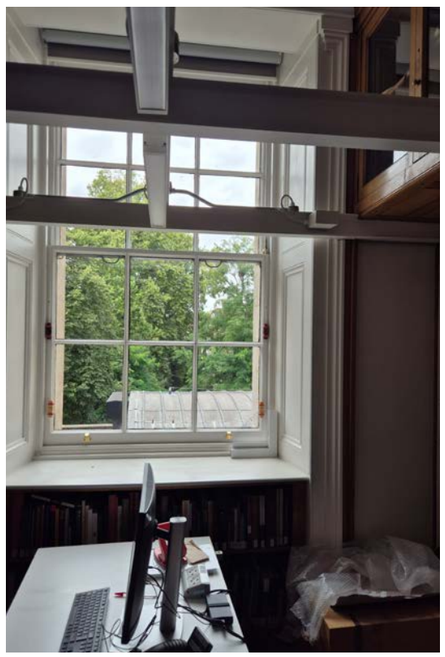
PPC RAL 9010

- PPC off-white finish for other windows throughout, where internal shutters and trims are typically painted in a matching off-white colour.









Top section, from left to right:

Photographs showing the swatch and corner samples of the proposed anodised bronze finish adjacent existing windows (thought to be of stained pine) and associated worn brass ironmongery

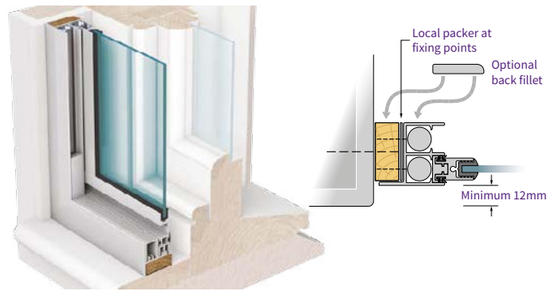
Bottom section, left to right:

Photographs of swatch and corner sample of the proposed paint finish and corner sample of secondary glazing against existing painted shutters and trim to existing windows

3.8 Proposed Fixing Details

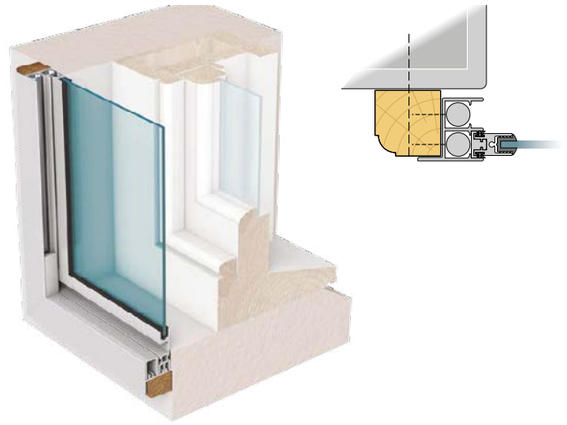
Illustrations and descriptive text is provided adjacent and on the following page to describe the nature of the proposed fixings required to safely secure the secondary glazing units in place.

Further detail as to the fixing methods is also provided on the following page.



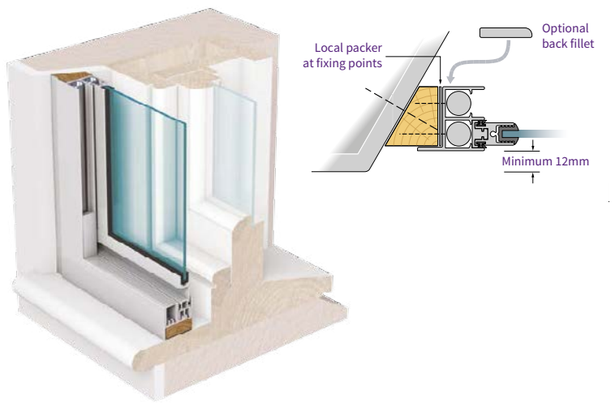
Standard square reveal fix

- 33mm x 15mm twice primed softwood ground bedded in acrylic sealant and fixed to structure
- Odd leg frame with applied sealant is conceal fixed to ground
- Local hidden packers take up opening tolerance
- Optional caulking joint between frame and wall allows finished decoration



Face fix

- Softwood frame with minimum 38mm x 32mm Section bedded in acrylic sealant and fixed to Structure
- Optional moulding
- Odd leg frame with applied sealant is conceal fixed to timber



Splayed reveal fix

- Softwood timber machined to match the splay
- Odd leg frame with applied sealant is conceal Fixed to timber
- Local hidden packers take up opening tolerance

Top to bottom:

Selectaglaze Standard square fixing detail + CGI

Selectaglaze Face fixing detail + CGI

Selectaglaze Splayed reveal fixing detail + CGI

Typical fixing detail for vertical sliding units into timber grounds shown below.

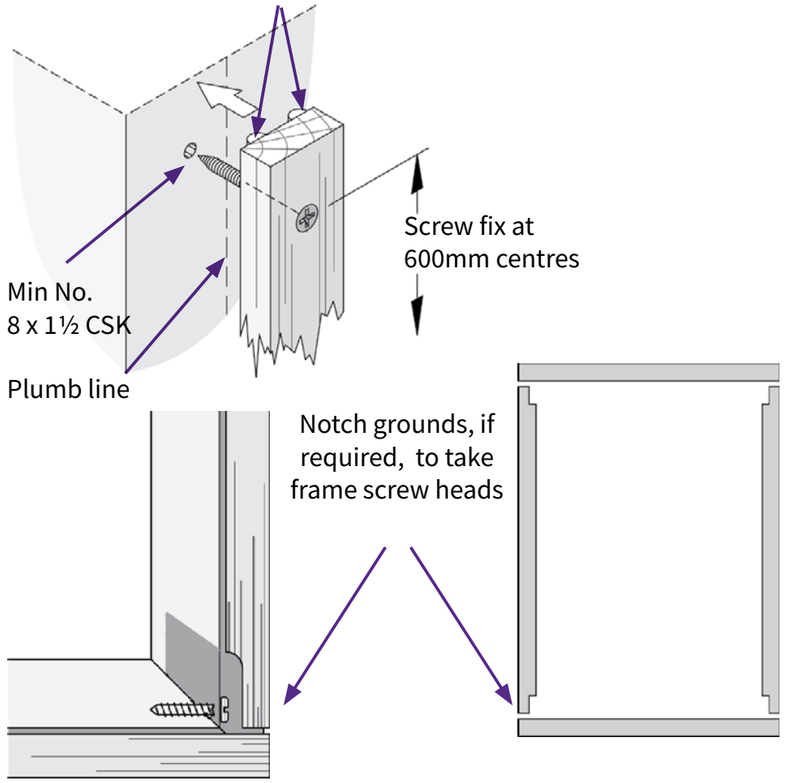


Image:

Typical Selectaglaze fixing detail

Fixing centres

- (Same across all types) *150-250 from light duty corners no greater than 600 mms*

Hinge centres

- (Same across all types) *177.5mm from corners no greater than 1000 mm less than 2300 unit height, no greater than 600 mm above 2300 unit height*

Fixing into Masonry

- Series 10, 20, 25, 30, 45, 47 &60 - Grounds; *Masonry nails, no6 (ø3.50) or 8 (ø4.20) screws and plug.* Frame; *no6 (ø3.50) screw hinges to be through fixed.*
- Series 90 heavy duty units - Grounds; *No8 (ø4.20) screws and plug*. Frame; *no8 (ø4.20) screws, hinges to be through fixed*

Fixing into Plaster board -

- Series 10, 20, 25, 30, 45, 47 &60 - Grounds; *plaster board fixing & no8 (ø4.20)*. Frame; *no6 (ø3.50) screws not hinged units*
- Series 90 heavy duty units - Grounds; *plaster board fixing & no8 (ø4.20).* Frame; *no8 (ø4.20) screws not hinged units*

Fixing into Timber panelling (series 90 Heavy duty units)

- Series 10, 20, 25, 30, 45, 47 &60 - Grounds; *no6 or 8 (ø4.20) screws*. Frame; *no8 (ø4.20) screws hinges to be through fixed.*
- Series 90 heavy duty units - Grounds; *no8 (ø4.20) screws*. Frame; *no8 (ø4.20) screws hinges to be through fixed*

3.9 Future repairs

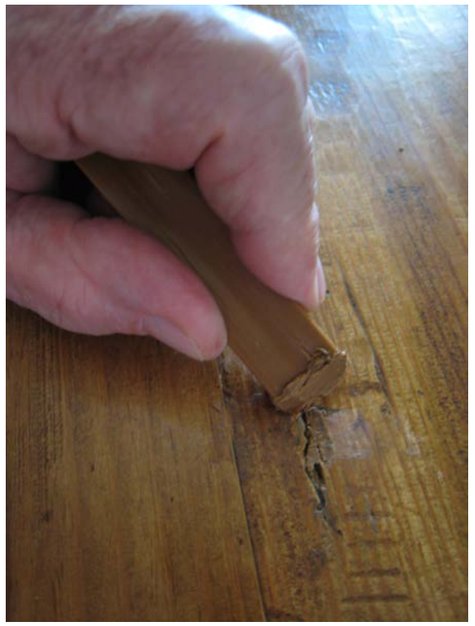
As noted earlier in this document, the proposed secondary glazing installations contained within this application are proposed as a temporary measure only as required to mitigate increased noise via construction through the Energy Centre Programme delivery period on site. Once this activity has been completed, the proposed interventions within this application will be reversed and the condition returned to the existing status quo. Where fixings into existing fabric are required to support the temporary installations, these will be repaired in-situ following SPAB guidance and methods.

For future repair of fixings locations:
Where repairing minor wear from screw fixings in timber panels, follow SPAB guidance and fill with hard, coloured wax.

Where repairing minor wear from screw fixings in plaster, allow for repair & repainting at point of fixing.

SPAB Guidance - 'How can you repair a split timber panel?'

Panels often split when they shrink but are prevented from moving within their framework, frequently due to paint accumulation. If freed, panels may be glued back together. Sometimes a timber spline is glued into the split (which may need widening) and planed flush with the panel face. The panel is held until the glue sets with temporary attachments clamped either side of the split or using suitable tape. Another option when dealing with painted panelling, and adopted at the SPAB's headquarters, is to cover splits with a fabric-based intumescent tape. ***Minor splits in panels might be filled with hard, coloured wax.***



Minor wear filled with wax

Excess wax removed

Surface polished/finished to match existing timber

Clockwise from top left:

Images showing process of wax filler repair to timber panelling, as per SPAB guidance.

3.10 Existing Window Repairs

The Museum holds a fabric condition survey completed in 2022, which assesses the condition of some, but not all, the windows contained within this application. The findings from the condition survey are summarised within the Window Schedule contained within the application documents.

The survey categorises recomended remedial works as either required in the short, medium, or long term. Short term works are typically associated with minor cleaning, replacement of cracked panes, or investigation of water ingress.

It is proposed that short term remedial maintenance work is undertaken as part of the proposed works if they:

- are applicable to the existing window unit itself, and do not require wider works to surrounding fabric such as external roofs or walls and;
- have not already been undertaken since the 2022 survey and;
- are able to be undertaken safely from the interior of the building (and therefore not require external scaffold and associated fixings into external fabric) and;
- are required to keep the window operational i.e. openable

For the avoidance of doubt, where remedial work to exsisting windows is undertaken, these will be undertaken on a like for like maintenance repair basis.

Prior to the secondary glazing units proposed being installed, a supplementary condition survey of the existing windows will be undertaken to include windows not assessed in 2022 as well as note any remedial works or further dilapidation that has ocurred since 2022.

If further short term remedial work is found to be required, these will be undertaken on a like for like maintenance repair basis if they met the stipulated criteria as bulleted above.

Finally, it should be noted that all of the proposed secondary glazing units are openable, and therefore provide access to the existing windows for cleaning and maintenance works throughout the period of is installation.

3.11 Other Considerations

Sustainability

The applicant is aware of the benefits that the proposed secondary glazing will bring not only with regards to acoustic perforamnce but also energy efficiency during the time of their install. These benefits are sumamrised further in recent Historic England Guidance note in section 3.2 of this chapter.

The project team has chosen proposed products which have high percentages of recyclability and also utilise recycled material in their making.
The proposed product is 99% recyclable and the aluminium used made from 60% recycled material, the glass 35% from recycled material. The proposed supplier also notes their commitment to sustainability through:
• Minimising production waste using lean processing techniques
• Ensuring all timber and paper products are FSC certified
• Actively promoting reduction of waste and recycling
• Selecting vehicles with are ultra-low emission or as low emission as is practical encouraging safe and efficient driving
• Adopting strategies to reduce the environmental impact of business travel
• Monitoring and seeking ways to reduce energy
• Investing in energy efficiency measures for company premises
• Ensuring that fair procurement practices are applied and suppliers are paid on time
• Adhering to any Government recognized trading sanctions
• Avoid trading with suppliers which don't have the same social ideals

Condensation

There is a perception with secondary glazing that it may lead to an increased risk of condensation between the existing and new secondary glazing units.

The applicant has worked closely with the proposed secondary glazing manufacturer in developing proposals which mitigate this risk. This includes:

- Where existing radiators are present, locating the new secondary glazing unit so that the radiator is not contained within the cavity between the window units
- Not installing new brush seals to the existing outer windows - the secondary glazing manufacturer advised against this as the trickle ventilation provided through the existing historic window aids ventilation of the cavity
- Ensuring all installed secondary glazing units are openable to provide access for cleaning and maintenance to the cavity, but also allow for ventialtion to the cavity if required.

Shutters

HEguidance on secondary glazing notes:
4.3: Shutters
Where shutters or other joinery are present, careful thought will be required. Sometimes secondary glazing can be positioned between the primary window and the shutters so that the shutters still function.

Unfortunately, this is not appropriate in the cases within these proposals due the minimal space between the shutters and existing windows (a minimum offset is also required from the existing window to the secondary glazing unit to achieve the certified acoustic performance).

If the shutters are housed within the window reveal it may be possible to install secondary glazing on the room side of the shutters.

This is not desired within the proposals as the windows typically have decorative internal architraves which would be harmed, or have radiators within the shutter zone which would cause heating and condensation issues were it to be enclosed by the secondary glazing.

If the secondary glazing cannot be inserted without making the shutters inoperable the shutters could be fixed shut but not altered so that they can be brought back into use at a later date.

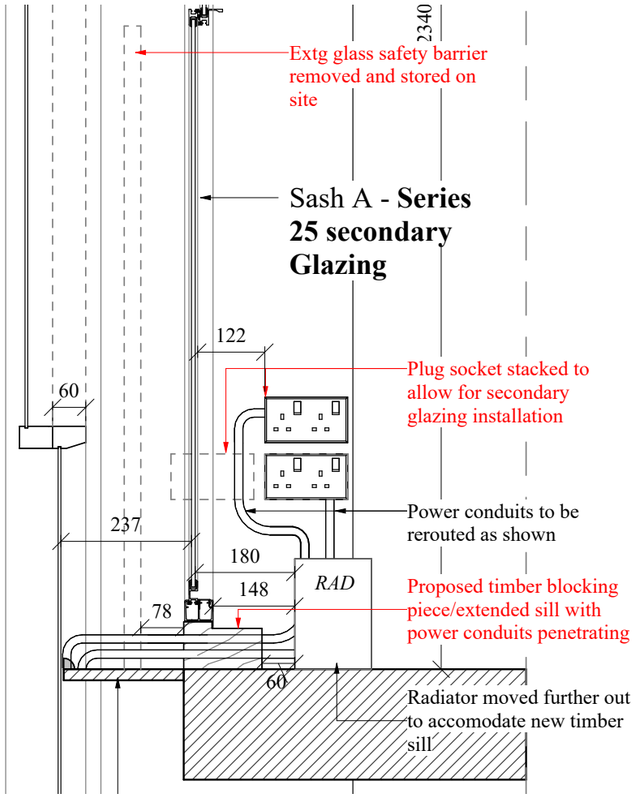
This is what is proposed within this application, where shutters will be carefully pinned back for the duration of the temporary units installation, and reinstated to use upon its removal.

3.12 Items for removal to be stored on site

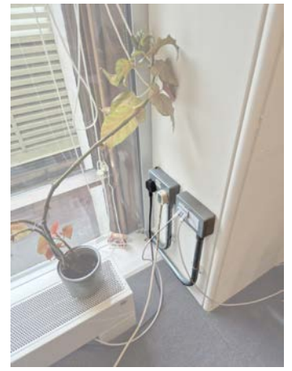
There are a number of modern elements or sundry items that will require minor alteration or removal in order to for the new secondary glazing to be installed. Full reference should be made to the proposed window schedule and detail drawings provided within the application documents, but in summary these include:

Modern Glass balustrades (White Wing)
to be removed to allow for construction of proposed timber blocking piece/extended sill with power conduits penetrating through. Shown dashed in the adjacent drawing. These will be removed and stored on site for the duration of the ECP works before being reinstated.

Modern Power Conduits (White Wing)
Power conduits to be re routed through proposed extended sill



Proposed section Type F, showing removal of safety glass (dashed lines) and replacement with Series 25 secondary glazing



Glass balustrade, Type F

Images:

Bottom left - Proposed section through S.Glazing Type F

Top left - dims between existing RAD and safety glass

Top right - power conduits to be re-routed through

Bottom right - glass safety balustrade to be removed

3.13 Minor vent works

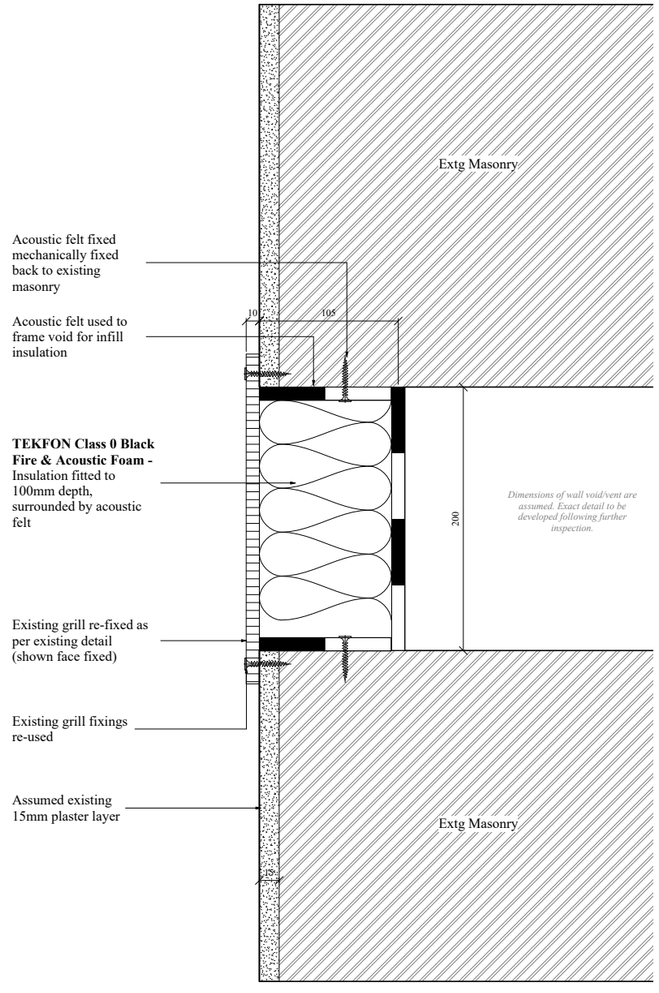
When undertaking photographic surveys on site, a number of internal metal grilles covering voids within the existing external walls were observed within the White Wing. The extent of the voids behind are not known, but there is a concern some may present the chance for noise to flank through the void into the interior space. Therefore, where these are present adjacent to the existing windows where secondary glazing is to be installed, the proposals allow for the existing decorative grilles to be carefully removed, and acoustic felt and foam to be placed within the outer section of the void, before the grille is carefully reinstated.

B/2/032
PREHISTORY & EUROPE
STUDENTS ROOM

B/4/021
OFFICE (one room)

B/2/032
PREHISTORY & EUROPE
STUDENTS ROOM

B/4/021
OFFICE (one room)



Left to right:

Photographic survey showing locations of wall vents.

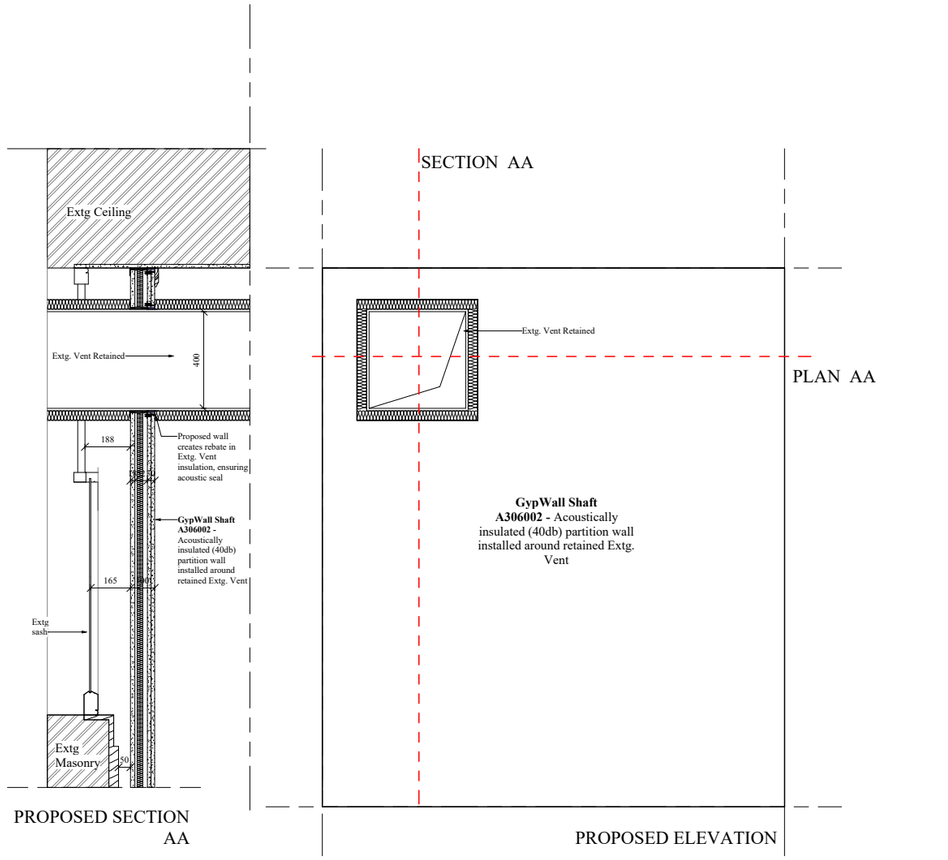
Typical detail showing internal face acoustic treatment.

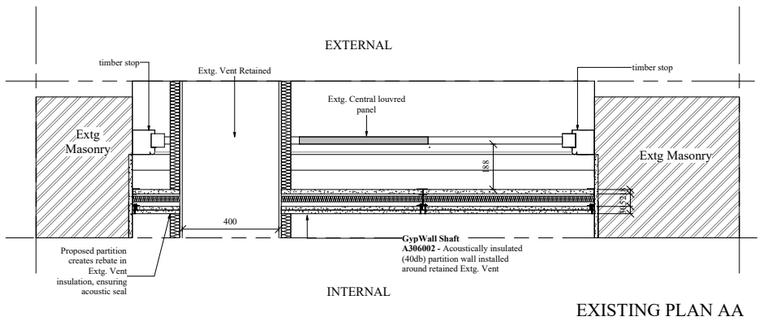
3.14 Proposed vent boarding: Type B1* White Wing Horology Workshop B/1/091

In level 01 of the White Wing, on its northern elevation, the existing 'window' is formed of a small section of louvred glazing with a panel containing an external vent and the remainder of the window boarded up with what appears to be thin timber panelling. The vent serves the Horology workshop and needs to be retained as operational.

Here, secondary glazing is not suitable as the existing vent duct and boarding prevents natural light from entering the internal space. Therefore, an additional acoustic lightweight partition and boxing out around the ductwork is proposed, to mitigate flanking noise through the existing duct and louvred grille as well as the single glazed outer window panes.

These works would be temporary only, with the existing condition reinstated upon completion of the ECP works.





Shown to the right:

Proposed detail drawings showing works to box out wall vent in room B/1/091

3.15 Research into alternative products

As part of the design development, the use of alternative products was explored which would limit the extent of fixings required into existing fabric. These are described below and their limitations/ constraints which unfortunately render them unsuitable for the proposed application are noted.

Magnetic Window research

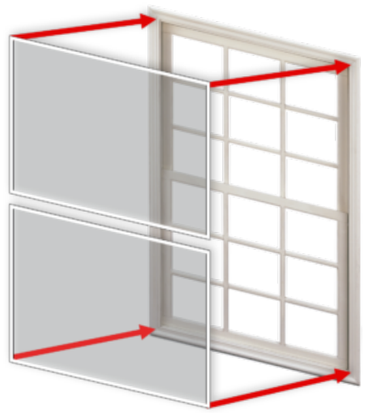
Magnetic ‘clip on’ style Magneglaze secondary glazing was explored, which minimises the use of mechanical fixings

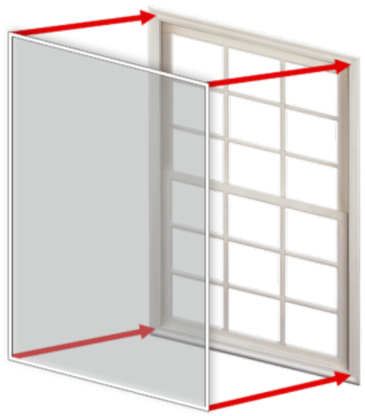
Unfortunately, these units are not suitable as they only achieve a 10.4db reduction, where the project aims for a 35db reduction across all windows to achieve required internal noise levels as advised by Bickerdyke Allen & Partners.

Additionally the larger window sizes and curved head requirements are not able to be manufactured by this product range.

Furthermore, units cannot be opened for ventilation without being entirely removed, limiting occupants ability to attain some natural ventilation in times of lower external noise in summer months. Requirements for manual removal and storage also create further issues.

Finally, there was some concern as to the scars that would be left by adhesive used to stick the magnetic strips to the existing window frames, particularly where these are finished in stained timber.





Shown to the right:

Images showing typical applications of Magneglaze secondary glazing units

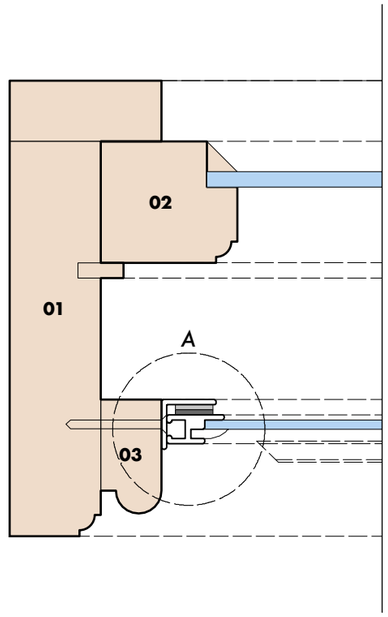
Storm windows

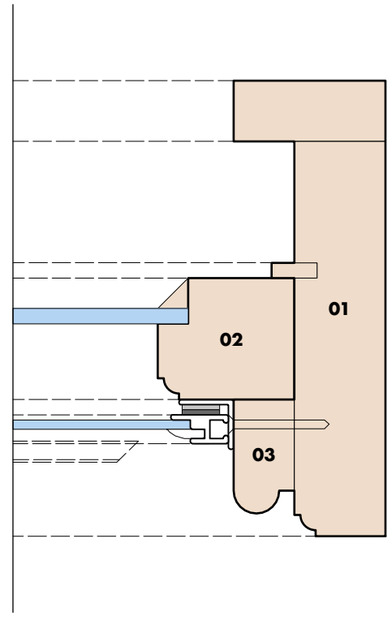
Storm windows, as used in the SPAB headquarters, are a 'hybrid system which combines magnetic and mechanical fixings.

Although achieving the targeted 35db acoustic drop, these products were deemed unsuitable as they are only available in powder coated finishes (removing capacity for enhanced anodised finishes for Type E1 windows).

Additionally, units have a width restriction of 1.8m, window types B1, B1*, require greater widths than this, meaning Storm window products cannot be used.

In summary therefore the product put forwards in the proposals represents the minimum intervention required whilst still meeting the required acoustic performance, sizes, and finishes selections.





Top to bottom:

Typical Storm windows vertically sliding unit detail in plan, with L bracket mechanical fixing.

Typical applications, taken from Storm Windows website.

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