



How to make your windows more energy efficient

August 2022

**ZERO
CARBON
2040**
Westminster Climate Action



City of Westminster

Contents

About the Retrofit how-to guides

Our series of planning 'How to' guides provide simple practical advice on a range of retrofit measures commonly proposed in Westminster. These guides are being prepared to enable householders and developers to find effective and sensitive ways to upgrade existing buildings to improve their energy performance. They:

- Provide information on retrofit measures and how effective they are;
- Explain what permissions you may need and how to apply;
- Explain what issues you should consider and how you can make a successful planning application.

You can find advice on retrofit more generally in our [Environmental Supplementary Planning Document](#). The guides build on and provide advice on the full range of measures set out in the SPD.

If you want to achieve optimal improvements for your property we strongly recommend you consider developing a retrofit plan which identifies the best measures for your property following a **'Whole house' approach**. This will ensure that measures that optimise environmental performance are suitable, properly integrated and well-coordinated. In that way, no harm comes to building or occupants nor is money wasted on ineffective or damaging changes.

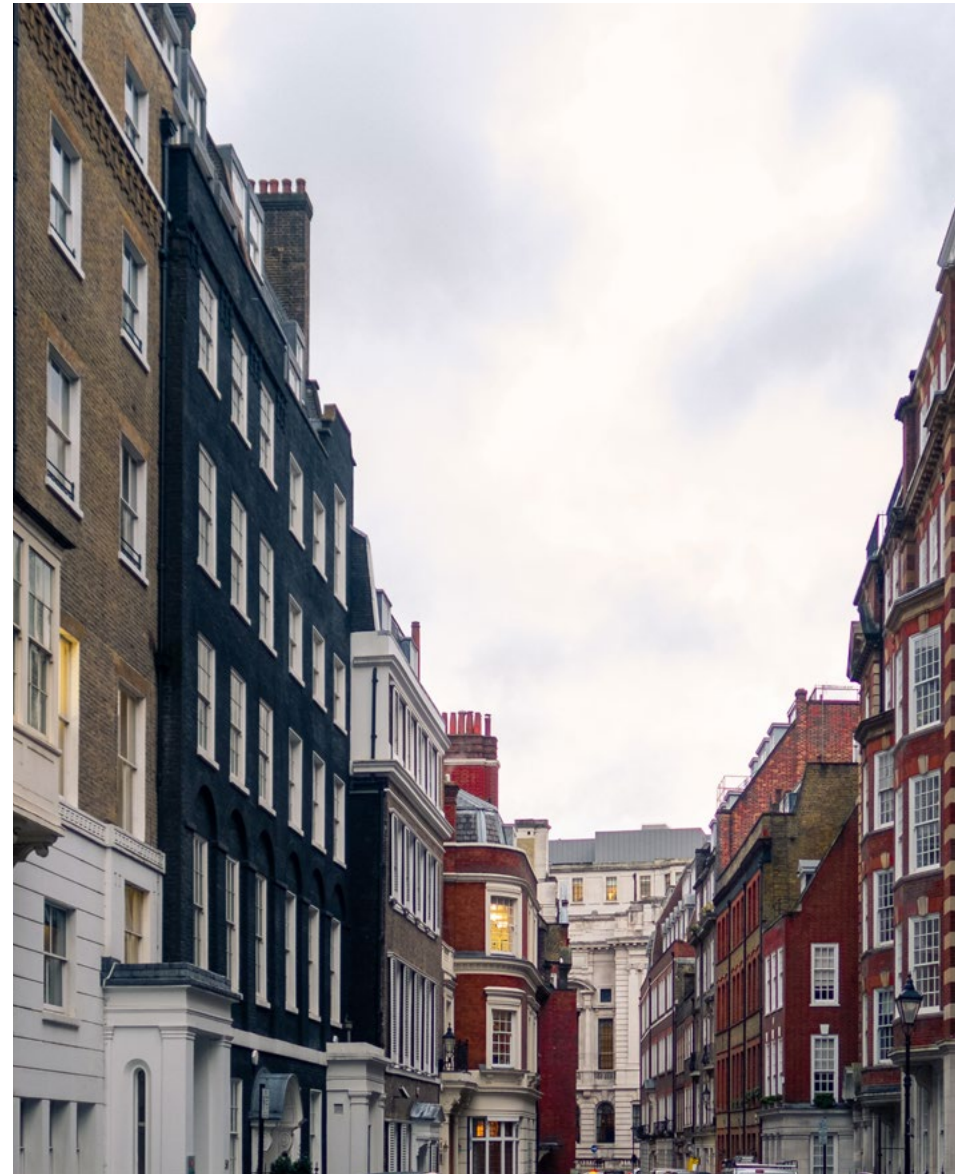


Introduction

Overhauling, upgrading or replacing your windows to make them more energy efficient could help to reduce your carbon footprint and your energy bills.

This guide will help you understand the different ways you can upgrade your windows, what permissions you may require and how you can make a successful application, where permission is required. Whether you are leaseholder/freeholder or live in purpose-built mansion block or a conversion, there are a variety of options regarding the upgrading of your window system.

While this guide focuses on windows, it is important to remember that upgrades are likely to be most effective in combination with other measures as part of a **'whole-house'** approach to retrofit. If you consider improvements in the context of a whole building approach, this makes sure all the upgrades work well together and delivers higher energy savings, ensuring you minimise both risks to building fabric and carbon emissions. You can find more advice and information in our [Environmental SPD](#).



Part 1

What are the options?



How can I make my windows more energy efficient?

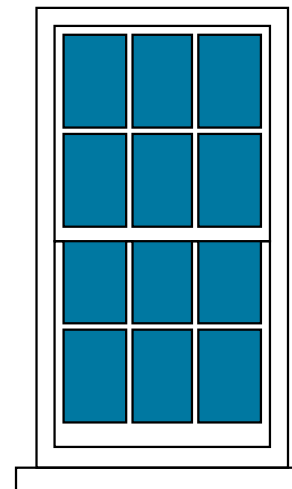
There are a range of ways to improve the efficiency and performance of your windows:

- Draught-proofing;
- Secondary glazing;
- Thermally efficient single or double glazing within existing frames; or
- Complete window replacement.

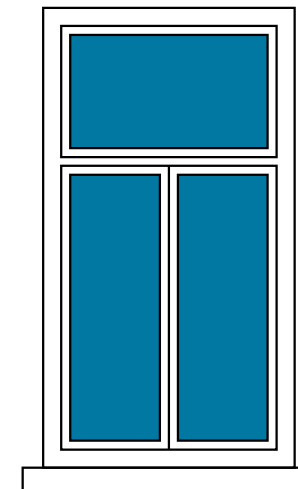
There are three main window types found in buildings throughout Westminster – timber sliding sash windows, timber casement windows, and metal framed windows. Most of these windows can be found in buildings from the Georgian period through to the early 20th Century and, as a result, many are in listed buildings and in buildings in conservation areas. The most appropriate option will depend both on your budget and on the age and type of building and window.

You will need to consider what permissions are required including whether your building is **listed** or in a **conservation area**.

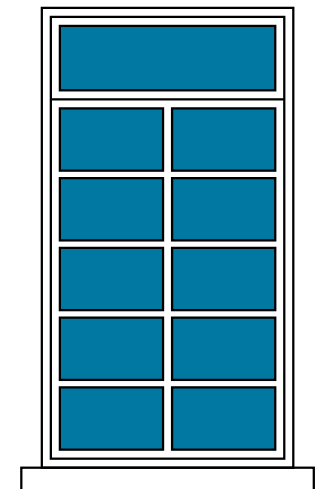
Advice on the different options you may wish to pursue and issues to consider for each is set out on the **next page**.



Timber sash window



Timber casement window



Metal-framed window

Upgrading existing windows

Draught proofing

New windows

What are U-values?

U-value is a measure of how easily heat passes through a material. The lower the u-value the better. It is not a complete measure of how efficient a window is. Windows that have an energy rating will have the 'u-value' of the window displayed on the energy label. Glazing u-value is an indication of how the glazing itself will retain heat while the frame is also an important part of the window's thermal performance.

What is it?

One of the cheapest and most cost-effective ways to save energy, which enables retention of existing windows by eliminating or reducing the gaps to openable windows.

How effective is it?

Can reduce air leakage from windows by between 33% and 50%, therefore significantly reducing the heating requirement needed for the room.

Draughtproofing will be most effective when introduced and implemented alongside other measures outlined in this guide.

Cost

Draughtproofing windows is likely to be a less expensive method to improving window performance and efficiency.

Issues to consider

- Planning Permission not required.
- See [technical advice on draughtproofing in Appendix 3](#).
- Means of background ventilation should be considered (avoid blocking up vents)



Upgrading existing windows

Secondary glazing

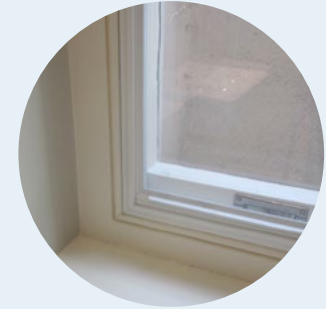
New windows

What are U-values?

U-value is a measure of how easily heat passes through a material. The lower the u-value the better. It is not a complete measure of how efficient a window is. Windows that have an energy rating will have the 'u-value' of the window displayed on the energy label. Glazing u-value is an indication of how the glazing itself will retain heat while the frame is also an important part of the window's thermal performance.

What is it?

A good and cost-effective option which allows historic windows to be retained. There are a variety of systems – operable – hinged or sliding, fixed, and lightweight removable. Double glazed secondary glazing can be considered, particularly where noise is a significant issue.



How effective is it?

Heat losses can be reduced by over 60% using secondary glazing with a **low emissivity (Low-E)** hard coating facing the outside. Going from a U-value of 5.4 W/m²K to 1.7 W/m²K. This also has benefits in terms of noise reduction.

Cost

The installation of secondary glazing is likely to result in a moderate expense to improving window performance and efficiency.

Issues to consider

- Best undertaken in combination with repair of existing window.
- Take care not to damage existing windows if shutters are present.
- Planning permission not required. However, Listed Building Consent may be required for listed buildings.
- Means of background ventilation should be considered. Do not draught proof primary glazing, so the interspace has some ventilation by external air, reducing the condensation risk.

Upgrading existing windows

Upgrading glazing

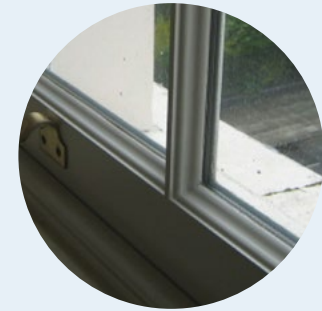
New windows

What are U-values?

U-value is a measure of how easily heat passes through a material. The lower the u-value the better. It is not a complete measure of how efficient a window is. Windows that have an energy rating will have the 'u-value' of the window displayed on the energy label. Glazing u-value is an indication of how the glazing itself will retain heat while the frame is also an important part of the window's thermal performance.

What is it?

Thermal (**Low E**) **single glazing** and slim section double glazing units can in some circumstances be retro-fitted into the existing sash or casements frames, enabling you to upgrade the thermal efficiency of your windows without losing the original character and at lower cost.



How effective is it? 🍷🍷 / 🍷🍷🍷

Heat losses can be reduced by over 35% using thermal single glazing. Going from a U-value of 5.4 W/m²K to 3.6 W/m²K.

With thin-section double glazing heat losses can be reduced by over 60%. Going from a U-value of 5.4 W/m²K to 1.5 W/m²K

This also has benefits in terms of noise reduction.

Cost £ £

The installation of improved glazing is likely to result in a moderate expense to improving window performance and efficiency.

Issues to consider

- Existing frames need to be robust enough to accommodate the increased thickness and weight of double glazing.
- Listed Building Consent required for listed buildings
- New glazing should achieve Building Regulations compliance (heritage assets may be exempt).

Upgrading existing windows

Shutters or heavy curtains

New windows

What are U-values?

U-value is a measure of how easily heat passes through a material. The lower the u-value the better. It is not a complete measure of how efficient a window is. Windows that have an energy rating will have the 'u-value' of the window displayed on the energy label. Glazing u-value is an indication of how the glazing itself will retain heat while the frame is also an important part of the window's thermal performance.

What is it?

Can be a low-cost solution and help reduce heat loss, particularly in combination with other measures. Historic buildings may have existing shutters – it may be possible to restore these to working order so that they can be used at night to retain heat, and during the day (particularly in hot summer weather) they can be partly or fully closed to reduce the amount of solar gain.



How effective is it?

The simple use or re-use of shutters can reduce heat losses by over 50%, while heavy curtains can also reduce losses and in combination with other measures significantly reduce losses.

If implemented on their own, these methods will lead to a noticeable improvement in energy and window efficiency. This method will be most effective when introduced and implemented alongside other measures outlined in this guide.

Cost /

The installation of heavy curtains is likely to be less expensive than the re/installation of shutters.

Issues to consider

- Planning permission not required but Listed Building Consent is required for new internal shutters in listed buildings.

Upgrading existing windows

New windows

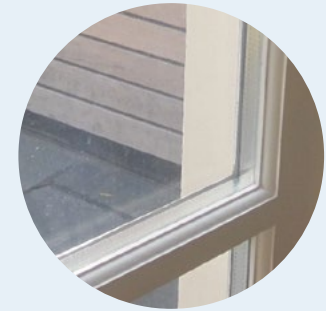
Double or triple glazed

What are U-values?

U-value is a measure of how easily heat passes through a material. The lower the u-value the better. It is not a complete measure of how efficient a window is. Windows that have an energy rating will have the 'u-value' of the window displayed on the energy label. Glazing u-value is an indication of how the glazing itself will retain heat while the frame is also an important part of the window's thermal performance.

What is it?

Double or triple glazing is formed by two or three window panes separated by a gap filled with air or another gas such as Argon, to create an insulating barrier limiting heat transfer through windows. The panes are separated with spacers that should be designed to prevent heat loss and condensation. There are slim profile options as well as those with low emissivity coatings which improve performance.



How effective is it?

Use of energy efficient glazing and modern double-glazed windows can achieve improved thermal performance as well as security and acoustic benefits.

Slim section (typically a maximum of 14mm) – as with retrofitted units these can reduce U-value from 5.4 W/m²K to 1.5 W/m²K.

Standard section (typically 28mm) – these can reduce U-value from 5.4 W/m²K to 1.1 W/m²K.

Triple – to ensure a better U-value than standard then likely to require very thick sections of 36mm and above but can reduce U-value to 0.8 W/m²/K.

Cost

The installation of new window units is likely to be the most costly option.

Issues to consider

- You may need planning permission and listed building consent.
- **Building Regulations** Compliance required.
- Design should be sympathetic to existing building. See **Part 3** for design advice.

Part 2

**Will I need planning permission
to improve my windows?**

This depends on a number of factors including the type of dwelling, whether your home is a listed building or in a conservation area, and how you plan to improve your windows.

Secondary glazing

You will not need planning permission to install secondary glazing, but if your building is a listed building then you are likely to require listed building consent. This is likely to be acceptable, subject to detailing. (See advice on [listed buildings](#) in Part 3 and design advice on secondary glazing in the appendices).

Replacing glazing in existing frames

Replacing glazing in existing frames does not need planning permission but if your building is listed will usually require listed building consent. Building Regulation Approval may be required ([see below](#)).

New windows

In many circumstances replacing windows are covered under what is known as 'permitted development'. This means that you do not need to apply for planning permission.

If you live in a single dwelling house (where the whole building is in use as a house) you will not normally need our permission to replace windows unless the following apply:

- The new window will be made from a different material than the existing. For example, the replacement of a timber window with a uPVC window.
- Your house has had its permitted development rights removed – this may be the case if it is covered by an [Article 4 Direction](#) (there are 8 such areas in Westminster where we restrict minor alterations in conservation areas – you can see a map at [Appendix 2](#)) or if your permitted development rights have been removed by planning conditions attached to an earlier planning permission.

If you live in a flat you do not have permitted development rights and if the design, method of opening, materials and profile of the replacement windows are not the same as the existing windows, then planning permission will be required. In some circumstances you might not need permission for 'like-for-like' replacement windows, when there is no external change to the appearance of the building. However, replacing single-glazed windows with double-glazed is rarely 'like-for-like' and you will usually require planning permission. This is because double-glazed frames tend to be thicker than single-glazed frames and as such they change the appearance of a building.

If you live in a listed building, you must apply for listed building consent for any replacement or alteration works to windows. You can use our [online map](#) to check if your building is listed and read the advice below on issues to consider when submitting an application for listed building consent.

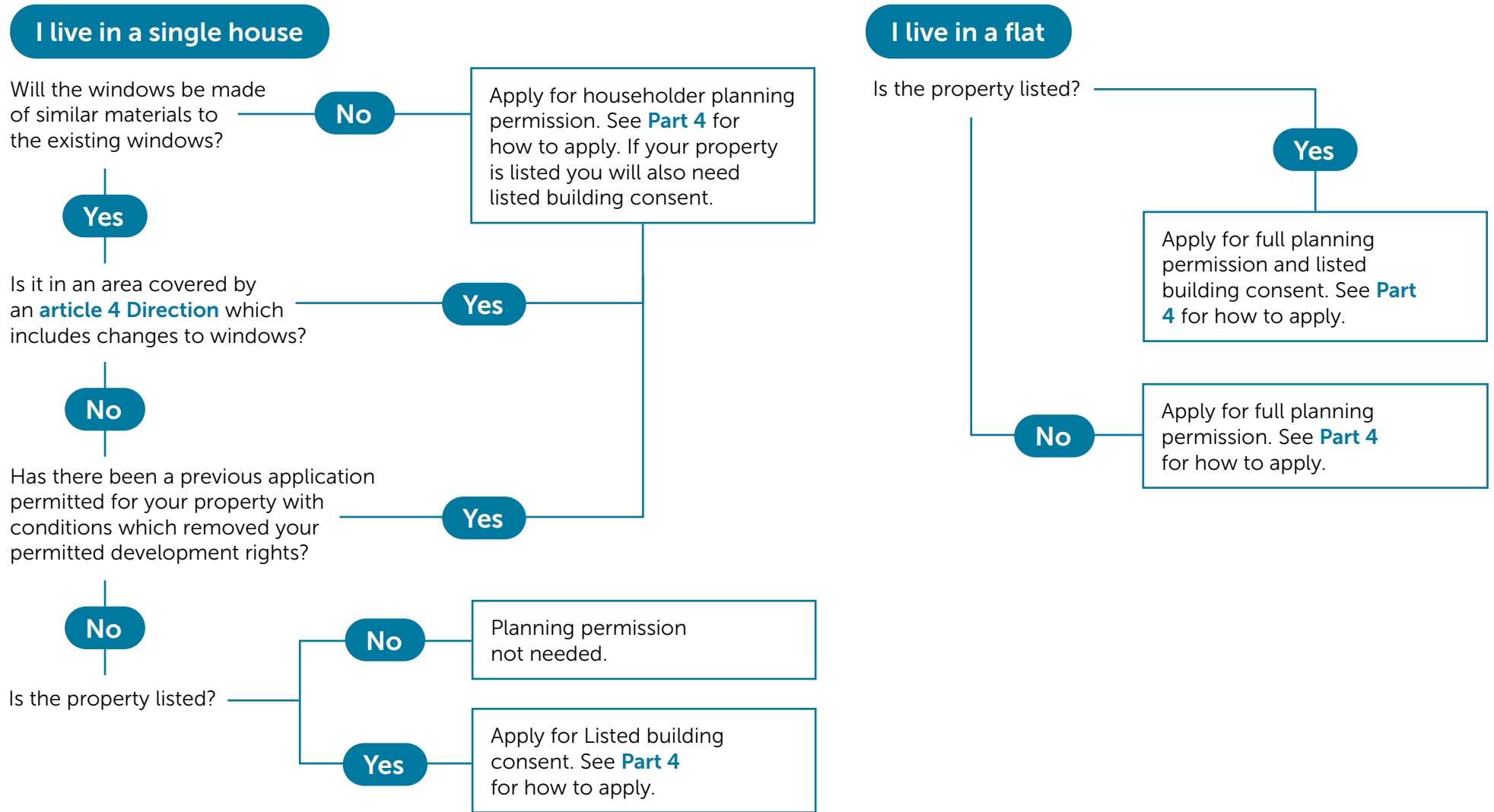
See [Part 4](#) for advice on how to make your application.

The thicker frames of replacement double-glazed windows can be significantly thicker than the older single-pane windows and change the appearance of a building.



If you are a City of Westminster leaseholder, please note that you would require formal permission from Leasehold Operations in order to make changes to your property. Please visit the Leasehold Alterations webpage www.westminster.gov.uk/alterations

The following flow chart provides a guide on when you need permission to replace windows:



Can I get written confirmation that I do not need planning permission and/or listed building consent?

You can apply for a [Certificate of Lawfulness](#) to prove that window replacement is lawful and you do not need to make a planning application. For unlisted buildings you can establish whether planning permission is required by applying for a Certificate and this can apply to proposed windows or to establish whether installed windows would not have needed permission. In the case of listed buildings you can apply for a Certificate of Lawfulness for Proposed Works to a Listed Building – this certificate has to be applied for and obtained before the works take place.

Do I need building regulations approval?

You need to apply for Building Regulations Approval when existing windows are replaced. In most cases installation work will be carried out by FENSA registered installers (Fenestration Self-Assessment) who can 'self certify' the installation. An application to Building Control only needs to be made when windows are replaced by an installer not registered as a 'competent person' or where the opening is new or enlarged. Replacement windows generally have to comply with thermal insulation and ventilation standards as set out in Building Regulations, as well as maintaining escape routes. However, there are exemptions for heritage assets. You can see advice on our website [building control pages](#).



Part 3

What alterations are likely to get permission?

A hand holding a pen over a document, with a blue overlay. The background shows a window with a view of a house.



Design guidance for new windows and for upgrading windows in historic buildings.

This section provides advice on window replacement and alterations, and design issues to consider if you are submitting an application.

Can I have double/triple glazed windows?

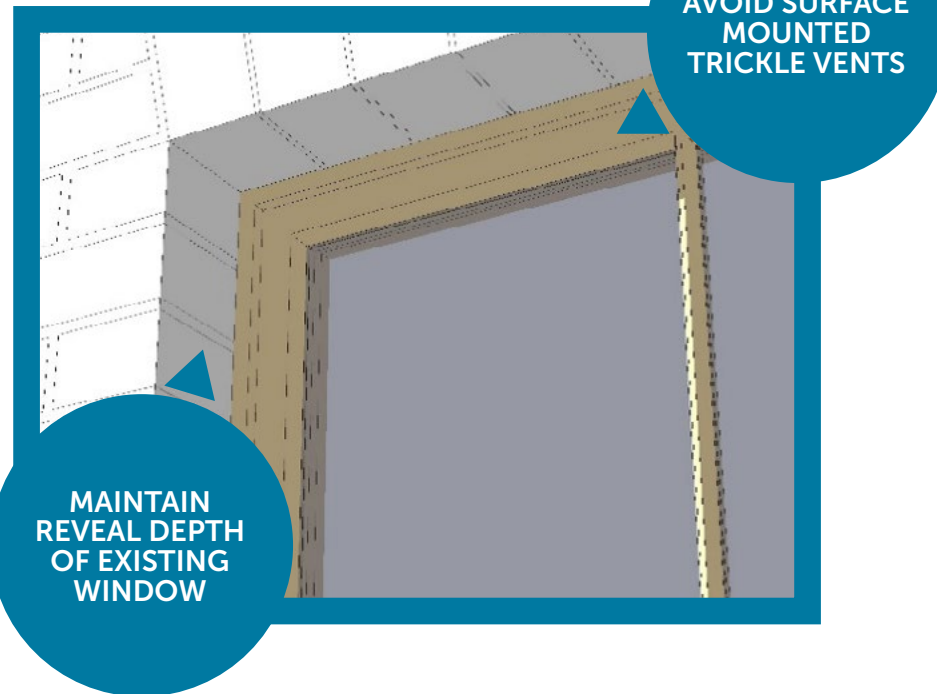
In many instances the principle of installing new double or possibly triple glazed windows will be acceptable and the issue to consider will be the appearance of those windows and how this relates to the overall building. Issues to consider may include:

- 1 If windows to be replaced are part of a larger building where the windows are of the same appearance and made of the same materials, e.g. to one property within a block of flats. In such cases while replacing with double or triple glazed windows may be acceptable the new windows will need to be designed to ensure that they complement those to the rest of the building. If your property is in a block of flats try to reach agreement with the other residents so that all the windows in the building are the same;
- 2 If windows to be replaced are to one building which forms part of a larger group e.g. a house, within a longer terrace, where the windows are all of the same style and materials. Again, the principle of replacement may be acceptable, but the design of the new windows should complement the appearance of the group.

Detailed Design Advice

As a general rule, if you are replacing windows the design of replacement windows should:

- Try to replicate the frame dimensions and pattern and profile of glazing bars – avoid 'stick on' or non-integral glazing bars particularly on listed buildings.
- Replicate the original style of opening – such as sliding sash or hinged casement
- Ensure windows fit neatly into existing openings, recessed into the established reveal depth.
- Avoid visually obtrusive **trickle-vents**.



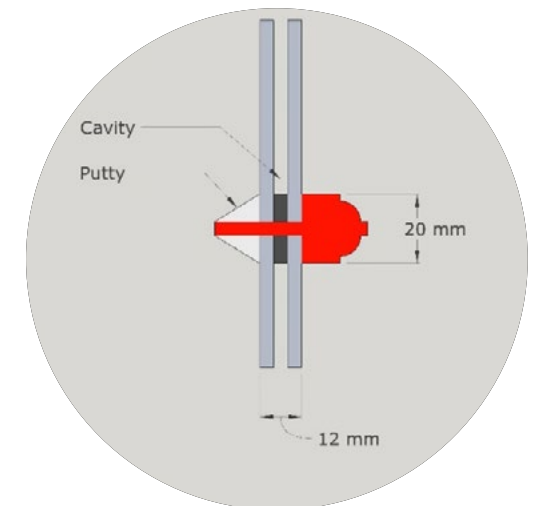
Slimline Double Glazing

Usually, the most appropriate form of double glazing in Westminster is 'slim section'. Slimline double glazing is typically defined as a window unit that has an overall thickness of 14mm or less. Ordinarily the panes of glass will be 4mm thick, with either a 4mm or 6mm cavity separating the panes.

How should slimline double glazing be installed?

- The glazed units should be no greater than 14mm. This is measured as the two panes of glass and the cavity.
- The colour of the spacer bar should match the colour of the frames.
- The profile of the glazing bars should replicate the original glazing bars.

Slimline double glazing can also in some circumstances be incorporated within existing frames. Should the recess/rebate be sufficiently deep, the panes can be fixed in putty beading to match the original glass. The spacer bar that is used to separate the glass should be matched to the colour of the joinery.



What about materials?

Replacement windows should usually be the same materials as the original windows, this also means permission is less likely to be required. For many Westminster building types, timber will be the most appropriate material. Timber window frames offer good levels of performance and have a lower embodied carbon content than uPVC and aluminium – this is the carbon dioxide emissions from the extraction, refinement, transport and process. For metal windows, where the existing are steel, their replacement with double-glazed steel windows is encouraged as they are likely to have the closest matching section sizes.

uPVC windows are strongly discouraged for both aesthetic and environmental reasons.

Are there any risks or technical issues I need to consider in upgrading my windows?

While air changes and room ventilation in modern buildings is likely to be provided within walls, windows and mechanically, it is often the case that older buildings benefit from a high-level of trickle ventilation from windows which are not airtight. So, in improving a window's air tightness or in replacing draughty windows with new windows this may significantly reduce ventilation, which can lead to internal condensation and excessive moisture – which in turn can produce mould and create problems with dampness. It is therefore important to maintain adequate ventilation when upgrading or replacing windows.





What about upgrading historic windows and windows in listed buildings?

Existing historic windows may have lasted over 100 years and in many cases it may be possible to repair existing windows rather than replacing them. Repair is often the preferred option for historic buildings. The carbon cost of replacement is also likely to be higher than retention and upgrading (for example by draught-proofing).

Within a conservation area, the principle of replacing existing windows is likely to be acceptable but you should follow the design advice on previous pages. If your building is a listed building, a number of factors need to be taken into account, including whether the existing windows contribute towards the special historic and architectural interest of that building. Where this is the case, then alternatives to replacement, such as secondary glazing, are likely to be a better option to pursue. However, there will be circumstances where the introduction of new thermally efficient glazing may be possible and these include where historic glass does not survive in the existing windows; where the window(s) to be replaced are not original or historic whose design does not follow a historic design. In such circumstances the introduction of slim-profile double-glazing will often be acceptable. In each case we need to have regard to the significance of that individual building and degree of alteration and justification for the chosen approach will need to be provided in your heritage statement (see [part 4](#)).

You can read Historic England Advice on [modifying Historic Windows as Part of Retrofitting Energy-Saving Measures](#).

A summary of our approach for listed buildings is set out below.

Refurbishment and Repair

Refurbishment and Repair of original historic windows

Where there are original historic windows which contribute to the appearance and special interest of the building, these should be retained and repaired, with draught-proofing and secondary glazing or other upgrading used to improve thermal efficiency. Double glazed secondary glazing may be an option particularly where noise is a significant issue. Refurbishment of original shutters should be considered and installation of new shutters may be acceptable. See advice in appendices on secondary glazing and draughtproofing.



Works to listed buildings can be complicated and we strongly recommend you seek [pre-application advice](#) before submitting your application.

A summary of our approach for listed buildings is set out below.

Upgrading

Upgrading existing historic windows to incorporate slimline double glazing or thermal single glazing

In historic windows or later replacement windows which follow the historic pattern and survive without historic glass, it is possible to introduce slim-profile double glazing within existing frames in the following circumstances:

- i. where a historic window retains no significant historic glass, has sufficiently deep glazing rebates and is robust enough to accommodate the increased thickness and weight of double glazing without significant alteration;
- ii. where an existing replacement window of sympathetic design is to be retained and is capable of accommodating slimline double glazing;
- iii. steel windows sections that are able to accommodate slim double glazing.

If an existing historic (original) window cannot be adapted to take double glazing, then thermal single glazing may be considered.



Works to listed buildings can be complicated and we strongly recommend you seek [pre-application advice](#) before submitting your application.

A summary of our approach for listed buildings is set out below.

New windows

New windows incorporating slim profile double glazing or thermal single glazing are acceptable in the following circumstances

- In any new extension to a listed building, including roof extensions, or in later or altered parts which are not of special interest, subject to appropriate design detail (see above advice).
- In cases where the significance of a building has been harmed by the installation of replacement windows of poor design,

and where:

- i. new windows are of a more sympathetic design and the impact on significance will be neutral or positive;
- ii. no damage to the building fabric will result from the removal of the existing windows.

Where windows with double glazing are acceptable in principle they should be of a detailed design appropriate to the character of the building, with integral glazing bars following design guidance on new windows above.



Works to listed buildings can be complicated and we strongly recommend you seek [pre-application advice](#) before submitting your application.

Part 4

How to make an application to replace your windows

What does my application need to include?

For us to understand what your proposed windows look like we will need drawings and information which clearly identify which windows are being replaced or altered and what the new windows will look like.

Your application should include the following:

✔ Completed application form

Signed and dated. Make sure you complete the ownership certificate at the end of the form – for most people this is likely to mean completing either Certificate A – where you own all of the property affected; or Certificate B where there are other interested parties e.g. where you live in a flat or own the freehold jointly with others.

✔ A location and site plan

This is to clearly identify the building affected. Your location plan needs to be a scaled plan of the site at 1:1250 or 1:2500 scale, which outlines in red the boundary of the application site. You can read this national guide on [how to prepare a site plan \(external website\)](#) and you can [buy a plan online](#).

✔ Elevation drawings

These are needed to identify which windows are affected by the proposal. These will be scaled drawings which show what the building looks like from the outside. Only those elevations where windows are to be altered are needed.

✔ Drawings and sections of existing and proposed windows

These should show the glazing bar pattern, how the windows open and include larger scale section details of glazing bars, beading, or spacing between panes of glass. They should also show the position of the window in relation to the window opening e.g. are the windows set back from the face of the building with a reveal. The contractor who is making your windows should be able to supply these drawings. See [Appendix 1](#) for examples of drawings.

✔ Fee

Listed Building Consent has no fee. For both Householder and full planning permission applications, see [schedule of fees on our website](#). A full application applies if you live in a flat/apartment. For example, if you live in a mansion block.

For applications located within a conservation area or a listed building:

✔ A Design & Access and/or Heritage Statement

This is to explain the impact on the heritage significance of the building. Both a Design and Access and Heritage statement are required for listed buildings but this can be one document. There is guidance and a template you can use on our website, see [heritage statements](#) and [heritage statement template](#).



You can apply online via the [national planning portal website](#). You can see advice on our website on '[making a planning application](#)'.

If your application includes other works for example if you are also building an extension, other documents may be required and you should check the guidance on our website. To find out more about information needed with your application, you can review the information on [validation requirements](#) as this explains what documents you have to include.

How long does it take to get permission and/or consent?

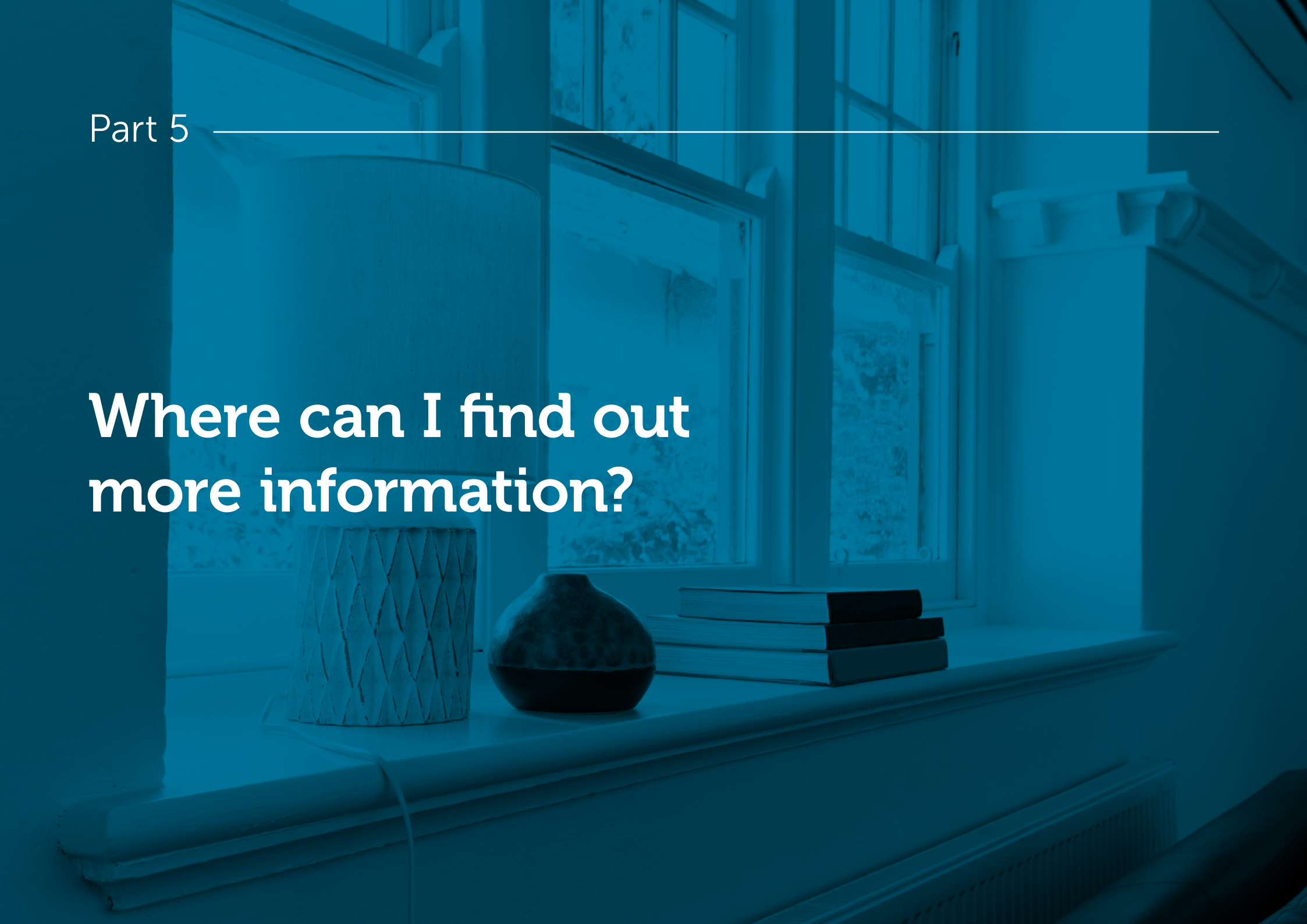
For planning applications and listed building consents for retrofit measures, decisions are usually completed within 8 weeks from the date of validation (this is the date we confirm all the required information has been submitted).

Can I get any planning advice before I submit my application?

To find out whether your proposal is likely to be accepted, you can also apply for [pre-planning application advice](#). We now offer a [discounted pre-application advice fee](#) for householder environmental performance improvements, including windows.

Part 5

**Where can I find out
more information?**



Planning Portal Advice on Greener Homes

www.planningportal.co.uk/info/200140/greener_homes

Energy Saving Trust Advice

energysavingtrust.org.uk/

Historic England Advice

[Historic England advice on modifying historic windows as part of retrofitting energy-saving measures](http://www.historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/windows-and-doors-in-historic-buildings/)

Improving Thermal Performance of Windows and Doors

www.historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/windows-and-doors-in-historic-buildings/

SPAB advice

The Society for the Protection of Ancient Buildings (SPAB) useful information on a wide range of topics regarding the maintenance of your property, including woodworm.

www.spab.org.uk/advice/timber-windows

www.Spab.Org.Uk/advice/technical-qas/technical-qa-8-metal-windows/

Advice on Grants

If you receive benefits, you may be eligible for the Energy Company Obligation (ECO) scheme. Under this scheme some energy companies must pay towards the costs of energy upgrades in your home. Visit the [Ofgem website](#) to check if you are eligible.

You can also apply for the Mayor of London's [Warmer Homes Programme](#) if you meet the eligibility criteria. The criteria are similar to the ECO scheme but slightly wider.

EcoFurb – Low Carbon Home Service

Transform your house into a low carbon, sustainable home with Ecofurb, an end-to-end home renovation service. Ecofurb helps homeowners plan energy efficiency improvements, provides impartial advice and oversees the works.

www.ecofurb.com

Feedback

We will continue to add to and improve this document to make it as useful as possible for you. If you have any feedback, please send this to planningreception@westminster.gov.uk

A person wearing a white glove is working on a wooden structure, possibly a door or window frame, with a blue tint overlay.

Glossary & Appendices

Glossary

Casement window – A window with the sash, or light hinged at the side so as to open outwards or inwards. A top-hung casement has the hinges at the top and opens outwards.

Glazing bars – A ridged supporting strip between adjacent panes of glass.

Low-e glass – The ability of a material to radiate energy is known as emissivity. In general, reflective materials have a low emissivity and dull materials have a high emissivity. Low-e glass is very reflective so does not radiate much energy, which means it acts as an insulator, keeping heat indoors.

Permitted Development – Nationwide planning permission to carry out certain limited forms of development without the need to make a planning application. These provisions are granted under the Town and Country Planning (General Permitted Development) (England) Order 2015. Local planning authorities have the power to remove permitted development rights through planning conditions or Article 4 Directions.

Reveal – the vertical side of an opening in a wall

Sash window – A type of window in which two frames or sashes slide vertically over each other.

Thermal Bridging – It is important to make sure that the gap between the window frame and the wall is well sealed otherwise heat will be lost around the window even if the window itself is very energy efficient.

Trickle vent – A trickle vent is a small opening in a window that provides ventilation. Trickle vents that provide background ventilation are commonly seen in modern windows, these would not have been an original feature on sash windows.

Appendix 1

Example Drawings – Thin-section Double Glazing

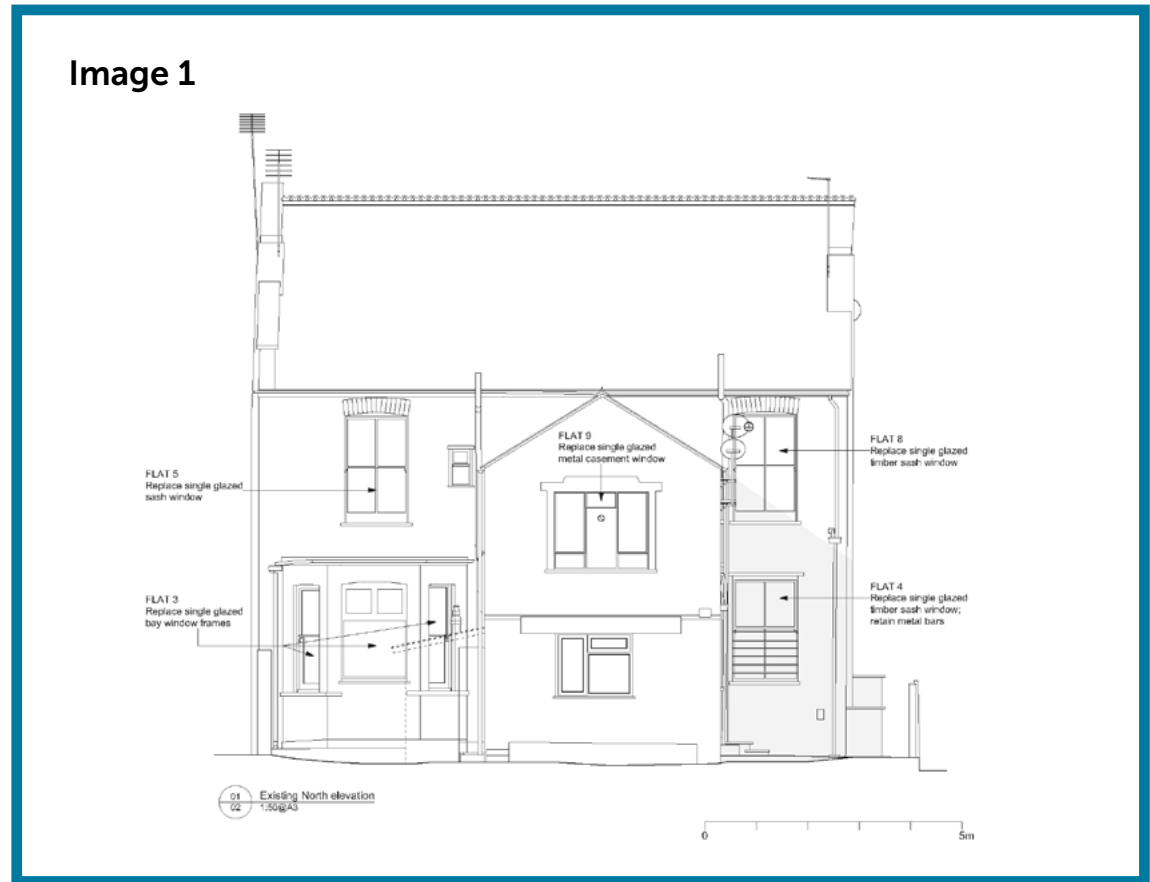
On the right are examples of the types of drawings – elevations and sections you will need to submit if making an application for new windows.

Image 1 and 2 show existing proposed elevations which clearly identify windows to be replaced.

Image 3 and 4 show more details of the windows.

These drawings have been reproduced for this guidance note with the permission of Roger Mears Architects. Please note that planning application plans, drawings and accompanying material are protected by the copyright acts and further copies of these drawings must not be made without the prior permission of the copyright owner.

Image 1



Appendix 1

Example Drawings – Thin-section Double Glazing

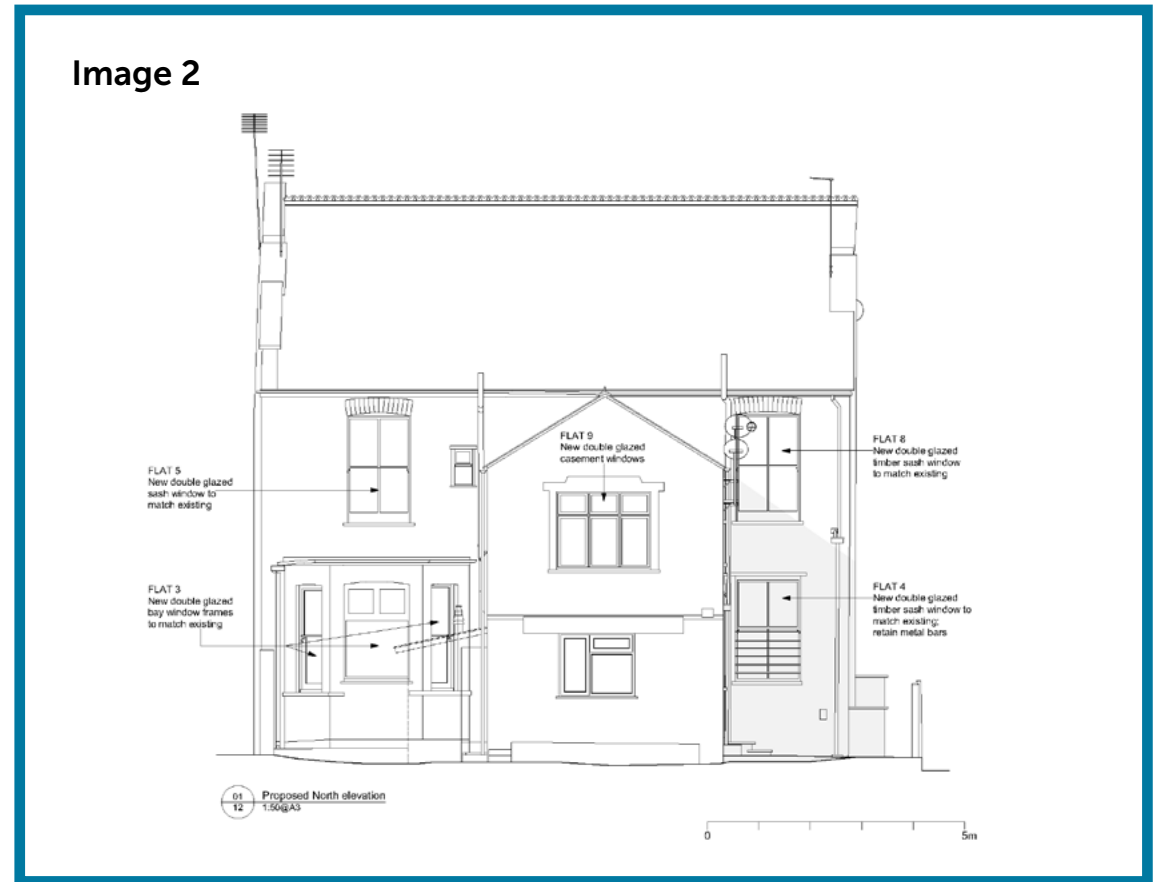
On the right are examples of the types of drawings – elevations and sections you will need to submit if making an application for new windows.

Image 1 and 2 show existing proposed elevations which clearly identify windows to be replaced.

Image 3 and 4 show more details of the windows.

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Image 2



Appendix 1

Example Drawings – Thin-section Double Glazing

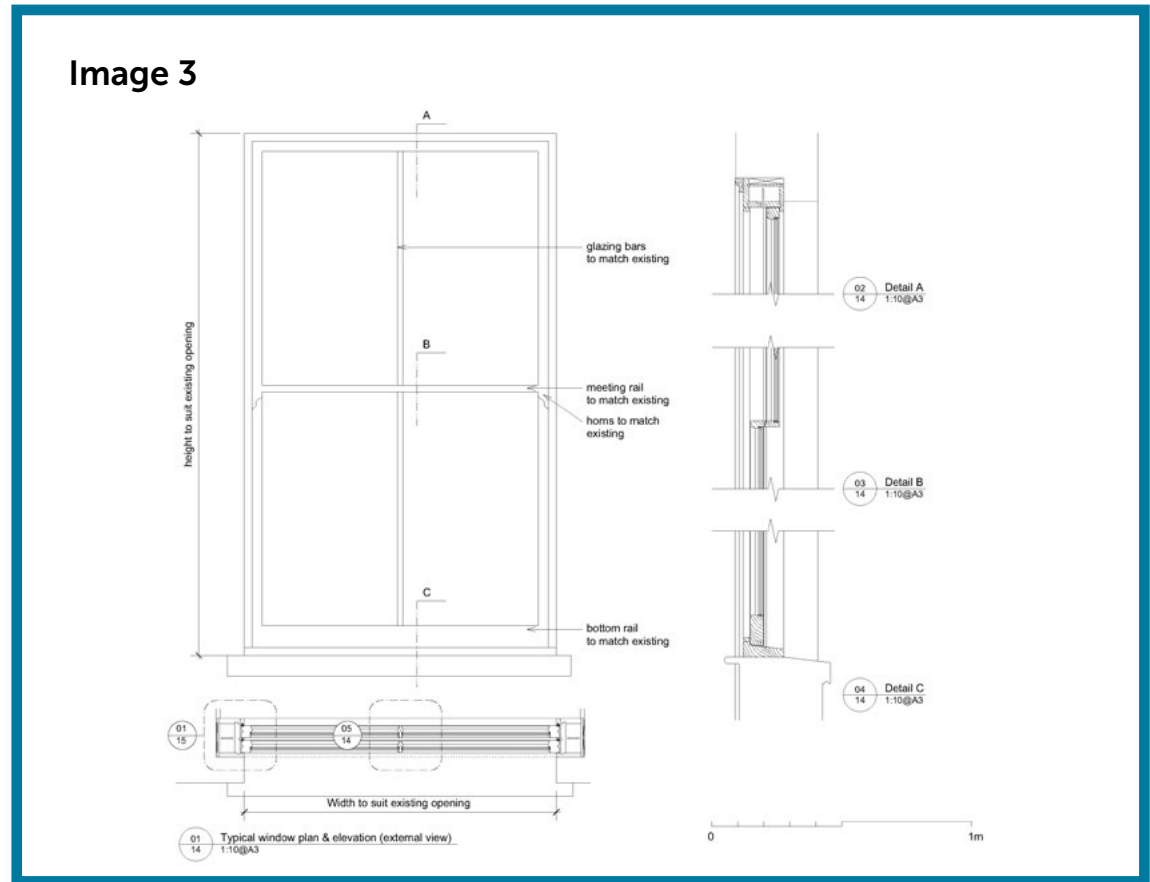
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Image 3



Appendix 1

Example Drawings – Thin-section Double Glazing

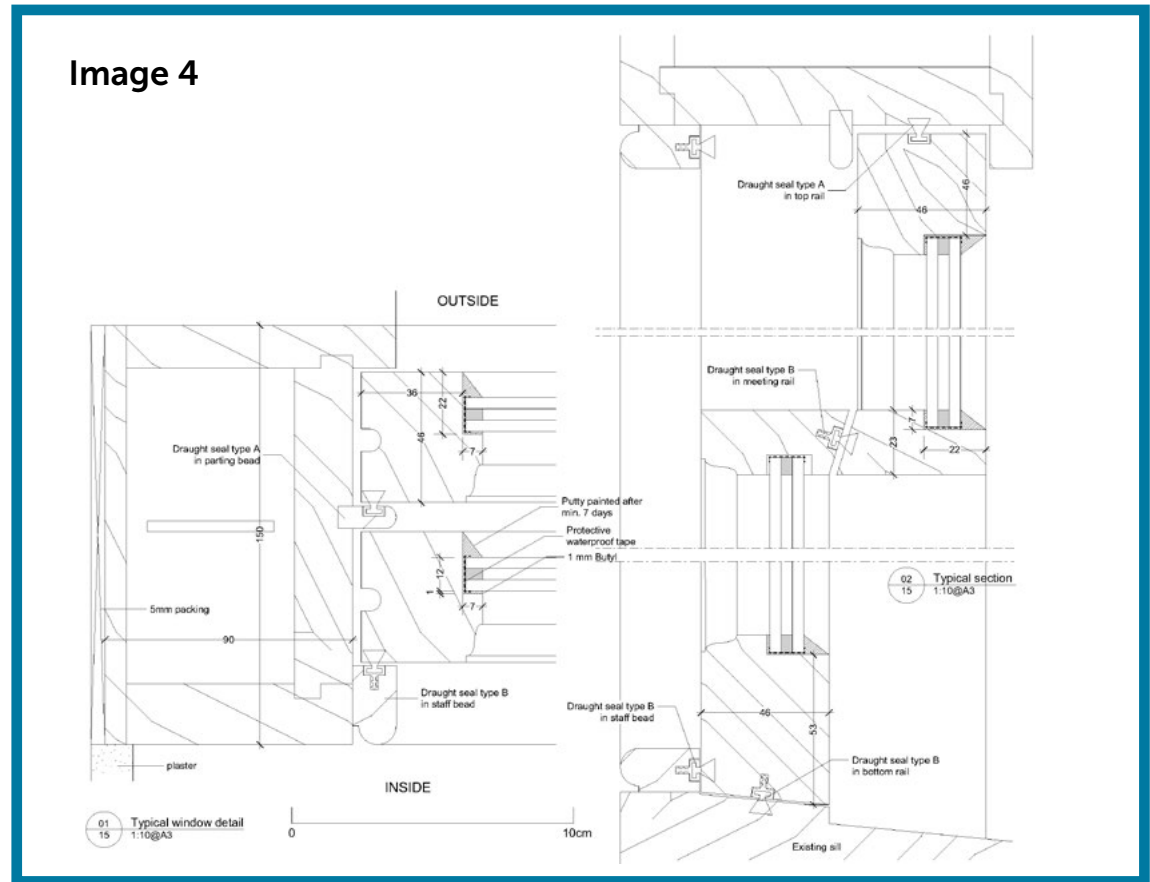
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Image 4

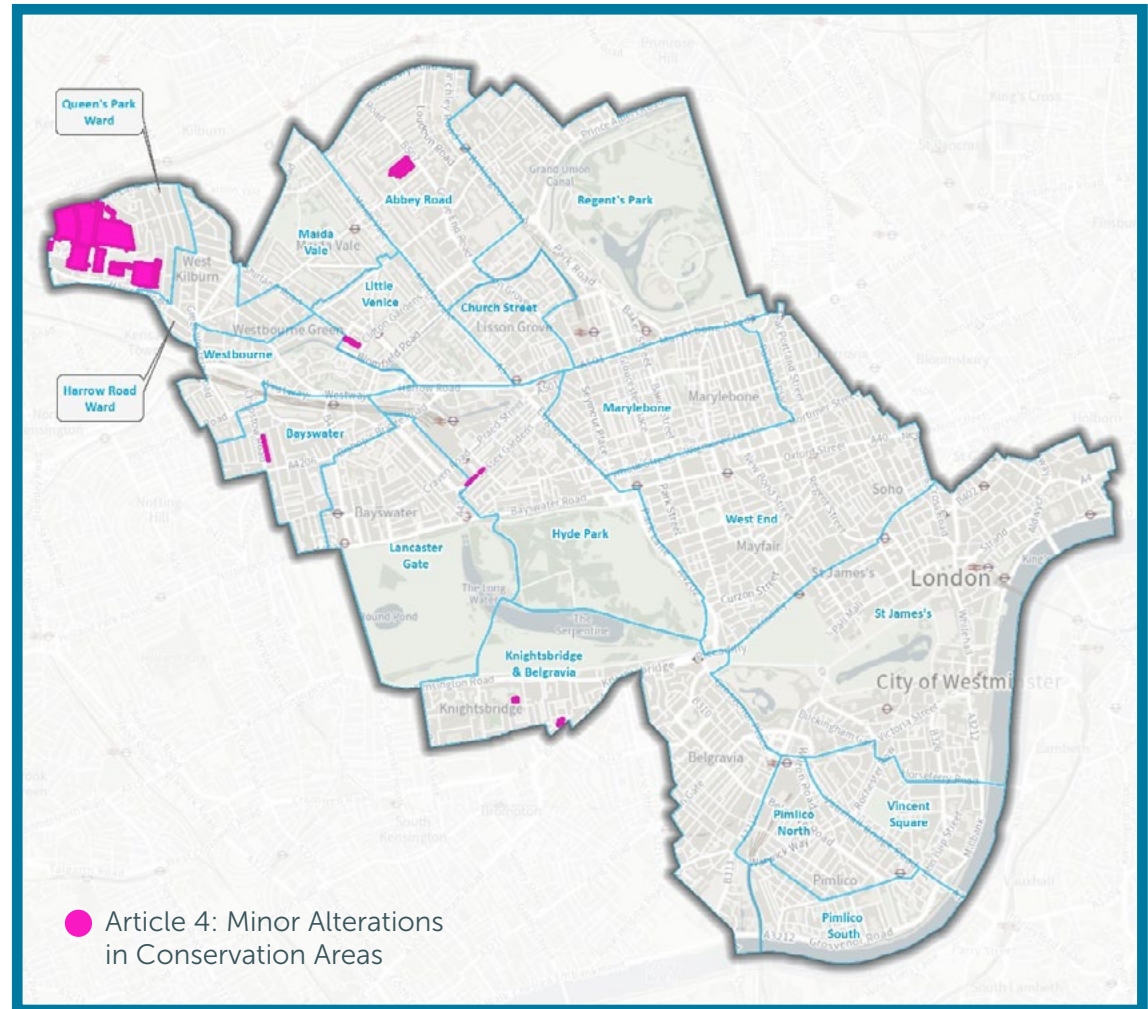


Appendix 2

Map of Article 4 areas in Westminster

Article 4 Directions

- 1-47 (odd) and 2-56 (even) Abbey Gardens, NW8
- 1-27 Bridstow Place, W2
- 1-37 (odd) Bristol Gardens, W9
- 6-10 Moncorvo Close, SW7
- Queen's Park Estate, W10
- 1, 4, 8, 11, 12 and 13 Relton Mews, SW7



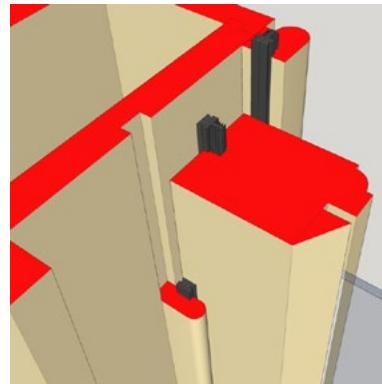
Appendix 3

Window upgrades advice

Draughtproofing

There are a range draught proofing strips you can use to fill the gap between the windows and frame including foam, metal or plastic, or brush seals for sash windows. Many of these you can install yourself. For historic windows particular care is needed and you should ensure:

- Any mastic draughtproofing method is as discreet as possible.
- Unobtrusive products are used.
- The loss of historic fabric is avoided.
- Professional installation is used for products such as rebated edge seals.
- The strength of the frame is not compromised. This is particularly the case with slender late 18th century sash windows where the timber sections are often very narrow. See [Historic England advice on draughtproofing](#).

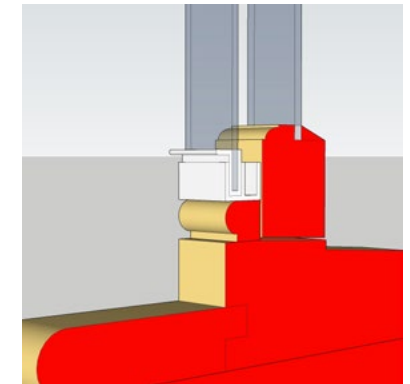


How to choose secondary glazing

There are many different types of secondary glazing - this can be openable or removable and have low e glass or even double glazing. In listed buildings, you should select a system in keeping with the design and materials of the room – and to complement the design of the existing window.

Ensure that the design does not obscure distinctive architectural detailing, including careful alignment of any glazing bars and use of slim frames of appropriate colour.

Be careful not to compromise functioning of shutters where these exist. See [Historic England Advice](#) on secondary glazing.



Secondary glazing tight-fitting to the frame of the original window, which may be useful if operating shutters are in place.