Guidance

Solar Panel Installation
Clifton Local Listed Building Consent Order

February 2025

Contents

1 Preface

Approximately 41,5% of all energy generated in the UK is renewable, while most of it comes from fossil fuels and other non-renewables (Department for Energy, Security and Net Zero, 2023: UK ENERGY IN BRIEF 2023). However, in the face of environmental concerns, renewable sources are becoming more common.

Renewable energy source not only help in reducing the amount of carbon emissions produced, but switching to some types of renewable energy can also be a good way of cutting household expenditure in the long term.

Solar energy is one of the most common types of renewable energy and installing solar panels Is the main way of generating it. Solar panels could cut electricity bills in half if selected and installed properly.

Normally the installation of solar panels to the roofs of a listed building would require listed building consent. Bristol City Council are introducing a Local Listed Building Consent Order (LLBCO) covering the installation of solar panels to listed residential properties within the Clifton Conservation Area that will remove the need for consent for these works, subject to conditions of the Order.

This guidance aims to provide useful information for residents to be able to make effective use of this LLBCO. It will cover information about solar panels installation, different types of solar panels and where they would be of best fit, their potential impact on historic environment, their benefits for people and reasons to install them, considerations required when deciding on installing solar panels, and the initial steps that need to be taken to go solar.

2 The importance of Clifton's historic environment

Preserving the historic environment is crucial for any place at any scale, be it a neighbourhood or the whole town, small village, or a metropolis. It helps people to be more aware of the story of the place and feel a sense of place.

Bristol is one of England's most renowned cities with a long history. Clifton, in turn, is one of Bristol's most iconic areas with a lot of historic attractions: from the brutalist Roman Catholic Cathedral to Georgian terraces and the famous Suspension Bridge.

More than 1000 of the city's 4000 listed buildings lie within the Clifton Conservation Area.

The installation of solar panels within this context has the potential to have a harmful impact on the historic environment. This could result from damage to historic fabric or negative influence on a building's appearance and character when panels are clearly visible.

Conversely, it is crucial that the heritage and the historic environment are not barriers to the city's efforts to address the challenges of Climate Change.

3 What is a Local Listed Building Consent Order (LLBCO) and what is it needed for?

A Local Listed Building Consent Order (LLBCO) for solar panels has being introduced for the Clifton Conservation Area. This will make the process of installing solar panels easier and quicker whilst ensuring the preservation of Clifton's listed buildings and the area's historic character.

LLBCOs provide consent for certain types of works, as defined by the Order, that would otherwise require listed building consent. In this case, it will grant consent for households to install solar panels on the roofs of their properties.

At the same time, LLBCOs can specify types of works and buildings it applies to as well as conditions under which the works are allowed to be carried out. This helps to ensure the preservation of the historic environment in accordance with national policy and guidelines.

The conditions under which the installation works can be carried out are defined by the Order (Appendix A) and the area and buildings to which the Order applies is shown on the accompanying map (Fig.1).

4 Why install solar panels?

The main benefit of solar panels and reason to install them is that going solar can improve the energy efficiency of a building and consequently reduce household energy bills. As the vast majority of the listed assets within Clifton are residential, the LLBCO has the potential to make a significant contribution to addressing the neighbourhoods energy use.

Some types of solar panels, such as monocrystalline, cut up to 70% off electricity bills, which means it can recoup the cost of installing solar panels and be profitable in the long term. This means that panels can become cost neutral after approximately 8 years.

The other key benefit is that the installation of solar panels can contribute to reducing household carbon emmissions and contribute to efforts to tackle Climate Change.

However, the production and installation of solar panels has its own carbon cost. It is recommended that a ‘whole house’ thermal performance assessment is undertaken prior to solar panel installation. This assessment has the potentisl to reveal more cost and carbon efficient measures to improve the thermal performance of an asset.

See below for further details.

5 Considerations when installing a solar panel

Visual impact on heritage significance

The historic significance of a building and the potential impact that solar panels installation might have to that significance will need careful consideration.

The LLBCO webmap shows where the careful location of solar panels can be accomodated without causing visual harm to the heritage significance of listed buildings in Clifton.

This web map (fig.1) has been created through a views assessment study and shows where the installation of panels will not be visible in short and medium distance views and/or blend into long-distance views where suitable solar products are applied (see below).

Solar panel will not be permitted on a roof slope that faces the main street as it will be clearly visible from any distance causing harm to the asset.

Impact on the building fabric and structural loading

It is important to minimise any harm to the asset from installation, maintenance, and later removal of a panel. The fabric of most roofs of listed buildings will not be affected by installation of panels. However, some older roofs can be more 'delicate' requiring additional works to carry the weight of panels and provide adequate mitigation for any climatic factors such as high winds or heavy snow.

In addition, as lifespan of a solar panel is shorter than that of a roof, there will potentially be several panel installations throughout its lifetime.

The advice of a structural engineer with experience of historic buildings should be sought prior to developing any proposals.

Ecological and environmental issues

Where there is potential for the installation of solar panels to disturb any bats' or birds' nests or roosts, whether they are on the roof or inside it, an ecological assessment will be required and Natural England should be contacted for advice on wildlife licenses.

System efficiency and sizing

Solar panel installations should maximise their yield to provide the best return on investment. The factors that affect this can be shading, soiling, temperature, orientation and inclination of the panels, latitude of the location and losses in the electrical components of the system (Historic England, 2024).

To achieve maximum efficiency, it is important to install an inverter of an appropriate size so that it efficiently transforms generated electricity into usable electricity and the peak power from the solar panels is at its maximum (Historic England, 2024).

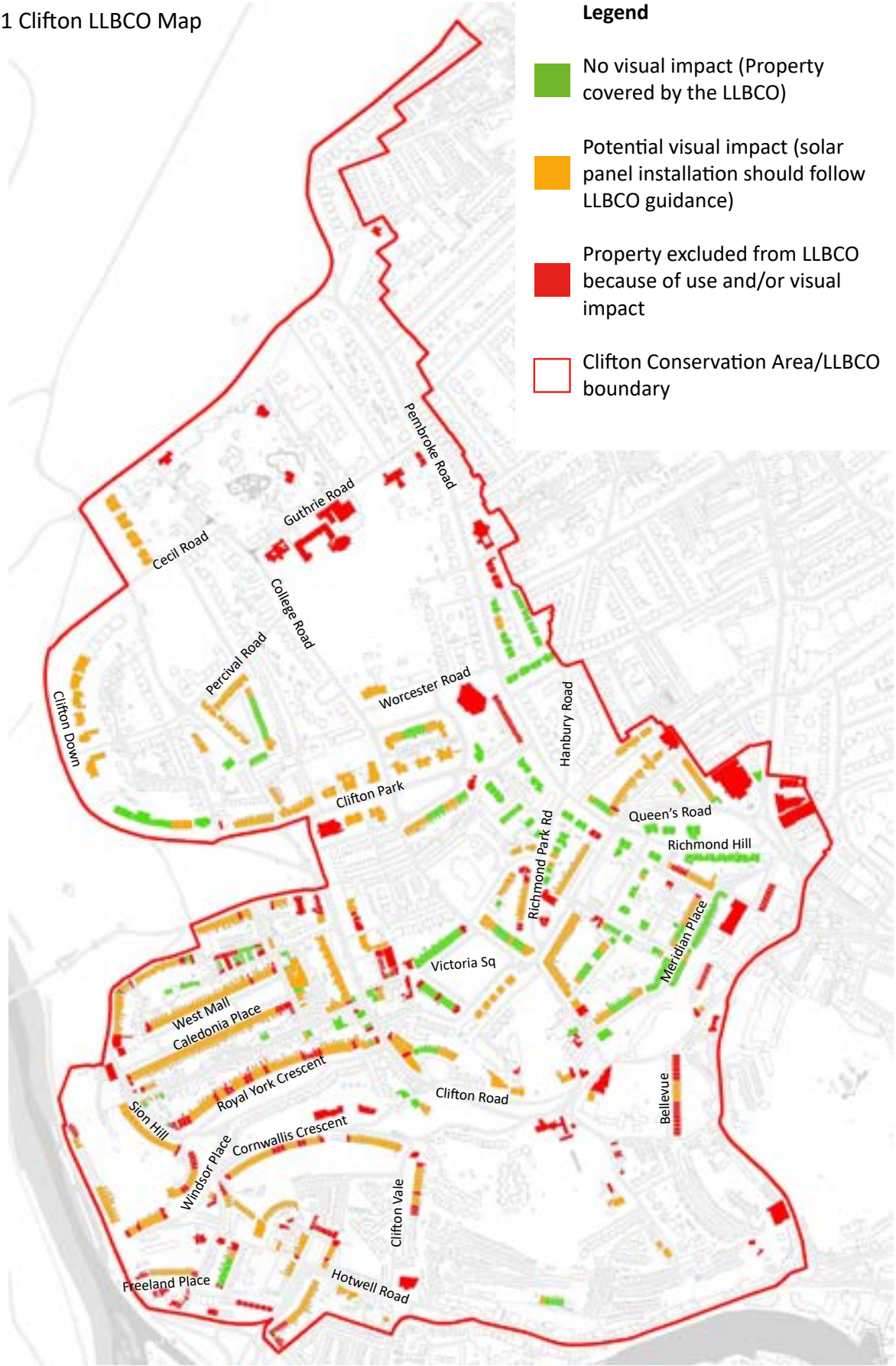
The amount of electricity generated decreases throughout the life of a panel, which means that the yield will also decline (Historic England, 2024).

Shading

Shading from nearby objects, such as buildings, trees, chimneys, dormer windows or objects located further away, can also significantly drop panels' efficiency and should be avoided.

The impact of near or far shading tends to vary depending on the time of the day or the time of the year. It is also important to consider future growth of trees or other greenery that may shade the panels (Historic England, 2024).

Fig.1 Clifton LLBCO Map



Clifton Draft Local Listed Building Consent Order (LLBCO)

6 Where can solar panels be installed?

The LLBCO map (fig.1 and online map) shows the area and properties to which the Order applies.

This map indicates where the installation of solar panels will or will not have a visual impact.

Where there will be no visual impact these properties are shown in green and no listed building consent will be required in accordance with the Order.

Where there will be a visual impact or where the property is excluded from the order because of its use then the installation of solar panels will still require consent.

Where the siting of panels will determine the impact because of the roof type these properties are shown in orange. These are roofs are generally buttefly roof types with a central value gutter. In these instances the solar panels can be installed within the sloping roofs of the valley without causing a visual impact and would be covered by the Order.

7 Types of solar panels

For further information about the different types of panels visit https://www.theecoexperts.co.uk/solar-panels/solar-panels-

Type	Pros	Cons	Notes
Polycrystaline	Environmentally better than Monocrystalline in terms of manufacture Often the cheapest option	Less efficient than Monocrystalline because they have a higher cost per watt of power Aesthetically less pleasing	
Monocrystalline	The most efficient option in terms of the commercially available solar panels Break even point: 14.1 years Cuts the typical electricity bill by 65%	More expensive than other options	
Solar Thermal	Easy to install Relatively cheap Typically cuts heating bills by 50%	Provides hot water rather than electricty Cannot provide 100% of your hot water so a boiler is still required	Use the sun's rays to heat water supply rather than generate power
Solar Tiles	Blends in with the roof so minimises visual impact More durable than solar panels	Not as efficient as solar panels More expensive	

Type	Pros	Cons	Notes
PERC	More efficient than traditional panels Less likely to lose eficiency through over heating Cheaper than top tier panels	Less efficient than leading panels Increasingly upopular with main manufacturers	Passivated Emitter and Rear Contact (PERC) is a system that can be added to a solar panel during manufacture to boost efficiency by adding reflective material to the rear. However, most modern panels use alternative systems to boost efficiency.
Perovskite	Higher efficiency than any other panels Takes up same space as monocrstalline panels	Not yet on the market Will likely be more expensive than other types of panels	
Transparent	Lets more sublight through Can be used on multiple surfaces No aesthetic drawbacks	Bad efficiency rating Expensive Low savings	Is not likely to be suitable for residential buildings because there needs to be hundreds of windows to make large savings
Thin Film	Flexibility Perfect for mobile homes Cheaper	Poor efficiency rating Low power output	Not as efficient as other types of solar panels but can be used in a wider variety of locations
CPV	Up to 50% efficient Generates solar energy with very little light	Not available to households Very expensive	Concentrated Photovoltaics is a process using curved mirrors or lenses to concentrate sunlight on to super efficient solar cells

8 Steps to take to install solar panels

Step 1 *Check that the building is listed/covered by LLBCO and the relevant conditions.*

Most of the listed buildings in Clifton are covered by the LLBCO either with some conditions or without any. These buildings are shown in Figure 1 above or on the accompanying online map. The information on which buildings are covered and the associated conditions can be found in the Order (Appendix A).

Step 2 *Site survey and installation*

Before installing solar panels, a site survey should be conducted. It is a crucial process that provides understanding of whether a site is suitable for solar panels or not and which types it is suitable for. A solar surveyor will assess various factors that impact energy production (roof condition, shading, overall solar resource availability, and so on), which will help to evaluate a system's feasibility and advise on system design.

Several steps are taken during a solar site survey. Prior to the actual visit, a surveyor collects general information about the site (location, roof tilt and orientation, records of historical energy consumption, and so on).

Then, during an on-site visit, factors that could influence design of the system, such as roof condition (any signs of leaks, damage, or structural issues), shading potential (including analysing obstructions that cast shadows on panels, such as buildings, trees, or chimneys), solar resource availability (which depends on site's latitude, climate and local weather patterns) are evaluated, as well as roof measurements are taken.

Using the obtained data, solar system design (number of panels, their sizing and positioning, as well as appropriate inverter capacity) can be altered in accordance with specific conditions.

This data is referred to by an electrician during the integration of the system into an existing electrical infrastructure to make this process safe and effective.

Step 3 *After installation*

After the system is installed, regular site surveys would be useful to ensure high-quality maintenance. It helps to identify changes in factors that define system's efficiency and condition of the panels, which allows to understand maintenance needs and make timely adjustments to keep the system's performance optimal. This will help to ensure that the system operates efficiently and safely.

Among the possible factors that can affect panels' operation are accumulation of dust or debris on the surface of a panel, which make them less efficient, and damage to the system from weather elements, such as water, rain, hail, etc., which can pose a safety risk.

The cleaning is recommended to be done by a solar panel cleaning professional to ensure that the system is cleaned thoroughly. The maintenance of the solar system should be conducted by either a licenced electrician or the installer at least once a year.

Further Information

Bath & North East Somerset Council, 2024: Solar panels, planning permission and other consents | Bath and North East Somerset Council

Historic England, 2024: Considerations When Planning a PV Installation | Historic England

https://www.energymatters.com.au/renewable-news-solar-panels-maintenance/

https://us.solarpanelsnetwork.com/blog/solar-site-surveys/

LLBCO online map

https://bcc.maps.arcgis.com/apps/mapviewer/index.html?webmap=1d48e282325647c98656068f109c7789

Appendix A

LOCAL LISTED BUILDING CONSENT ORDER FOR [THE INSTALLATION OF SOLAR PANELS ON GRADE II AND GRADE II* LISTED BUILDINGS IN THE CLIFTON CONSERVATION AREA IN THE CITY COUNCIL OF BRISTOL

This Local Listed Building Consent Order is made under the provisions as set out in the Planning (Local Listed Building Consent Orders) (Procedure) Regulations 2014 and Sections 26D-G and Section 28A and Schedule 2A of the Planning (Listed Buildings and Conservation Areas) Act 1990

1. INTRODUCTORY

THE LOCAL LISTED BUILDING CONSENT ORDER is made on the 2nd day of July 2025

2. THE LISTED BUILDINGS COVERED BY THE ORDER

i) Grade II listed buildings within the Clifton Conservation Area as identified on the accompanying Local Listed Building Consent Order (LLBCO) map, excluding any ecclesiastical building which for the time being is in use for ecclesiastical purposes.

ii) Grade II* listed buildings within the Clifton Conservation Area as identified on the accompanying LLBCO map, excluding any ecclesiastical building which for the time being is in use for ecclesiastical purposes.

3. DESCRIPTION OF THE CONSENTED WORKS

3.1 **The consented works are as follows:**

Installation of microgeneration solar PV or solar thermal equipment and associated infrastructure.

3.2 **Consent is granted subject to the following conditions:**

i) the solar PV panels are to be installed on a roof structure;

ii) the solar PV panels are not to be placed on any roof slope facing a highway;

iii) the solar PV panels should protrude no more than 0.2 metres beyond the plane of the roof when measured from the perpendicular with the external surface of the roof;

iv) no part of the solar PV panels (and associated equipment) should be higher than the highest part of the roof, excluding chimneys;

v) the solar PV panels are, so far as practicable, sited so as to minimise their effect on the external appearance of the building;

vi) details of the position, size, fixing, colour and finish, associated equipment and any minor strengthening works to the roof shall be submitted to and approved in writing by the Local Planning Authority before works commence;

vii) the solar PV equipment is maintained in good order and removed as soon as reasonably practicable when no longer needed. Works of making good, whether internal or external, shall be finished to match the adjacent work with regard to the methods used and to colour, material, texture and profile.

Reasons: In order to safeguard the special architectural or historic interest of the building.

3.3 Further guidance is provided in the accompanying LLBCO Guidance document.

4. STATEMENT OF REASONS FOR THE CONSENTED WORKS

4.1 Buildings are listed for their special architectural and historic interest, and listed building consent is required for works which affect this special interest. In the case of solar PV panels, effects on special interest may arise from changes to the building's appearance and from any interventions required in historic fabric.

4.2 The law requires that in drawing up the Order the Council has special regard to the desirability of preserving listed buildings 'of a description to which the Order applies', their setting or any features of special architectural or historic interest which they possess. Accordingly, we have reviewed the significance of buildings which conform to the prevailing types within the Clifton Conservation Area as well as the exceptions to these. This has been conducted through review of list descriptions, our own assessments of significance, and through consulting the Clifton Conservation Area Character Appraisal (2010).

4.3 Solar PV panels located on the roof of a listed building may in some circumstances, depending on the design of the building, be able to be concealed completely. For instance, some flat or traditional 'butterfly roofs' are wholly or partially screened by parapet walls. Any potentially harmful effects on the appearance of the listed building itself, and as viewed within the wider townscape, particularly from the public realm, will be limited if any solar panels are restricted to flat roofs or to roof slopes which do not face a highway. If carefully designed and sited, appropriately coloured and normally with a non-reflective finish it is likely that any visual impact from solar panels will be further reduced, even where they are visible to a certain extent. Condition vii) above will allow the Council to have oversight of specific matters such as their position, size, colour and finish.

4.4 Solar panels would appear as an honest and clearly modern intervention where they could be seen on a historic building and would normally be read as part of the equipment necessary for servicing uses conducted within the structure. Equipment of this kind is likely to become commonplace within the townscape as the imperative for carbon reduction measures increases and becomes part of everyday life. The impacts of sensitively designed and discreetly located solar panels have to be considered in this context, and the Council concludes that in this context they would not appear unduly prominent or incongruous features provided they are installed in accordance with the conditions of this order.

4.5 Standard methods of fixing solar panels on rails mounted to hooks attached to rafters would not be harmful to the historic fabric of buildings, while it is not likely that significant interventions in historic fabric would be required for the installation of the associated equipment such as cabling or inverters. Condition vi) also allows some control of fixings of the panels themselves and their associated equipment.

5. PURPOSE OF THE ORDER

5.1 The Council has, in recognition of the Climate Emergency, set out its ambition for the City of Bristol to be carbon neutral by 2030. The Council will continue to support and work with businesses, residents, and local organisations to cut carbon emissions to meet this ambitious target. The City of Bristol is characterised by a rich historic environment with over 4000 listed buildings. Approximately 25% (1307) of the city's listed assets lie within the Clifton Conservation Area. In order to make meaningful reductions in carbon emissions, these must form part of the city's Climate Emergency strategy. Changes in building techniques over the years mean that many of the sustainability measures that are commonly recommended for modern or new buildings are not suitable for historic properties and might harm what is special about them. Nonetheless, with careful design the twin objectives of protecting significance and improving energy performance/reducing carbon emissions can be met.

5.2 The city is very densely developed, where open space, public and private, is at a premium. This means that there are limited opportunities for renewable energy installations that require outdoor space, such as stand-alone solar panels, ground source heat pumps or wind turbines. The visual effects of such installations on the sensitive historic townscape of an area such as Clifton also limit the number of locations in which they would be acceptable. Air source heat pumps, an increasingly popular renewable energy source, would normally be located on the exterior of a building, and at present tend to be bulky, and so their effects on the special architectural interest of a listed building may be harmful. As a result, solar panels attached to roofs have been identified as the renewable energy source most likely to be compatible with the duty to preserve special interest while providing opportunities for widespread adoption within the city to help achieve the net zero carbon target.

5.3 This Local Listed Building Consent Order has therefore been prepared to make it easier for residents to install solar panels on their properties, and to signal the Council's commitment to roll out of renewable energy and carbon saving measures where appropriate in our historic buildings and areas. It is also intended to signal to owners of listed buildings that the principle of use of solar panels on listed buildings is an acceptable one provided careful detailing is applied.

5.4 A visual impact assessment has been undertaken using the views identified within the Clifton Conservation Area Character Appraisal (2010). This has enabled the accompanying LLBCO map to be produced that demonstrates where there is likely to be visual impacts posed by roof top solar panels and where these impacts can be avoided in accordance with the order conditions and supporting guidance document.

5.5 Solar panels are generally dark in colour, and if non-reflective in finish, can be recessive in appearance. The Order therefore restricts the possible locations for such panels to those identified on the accompanying LLBCO map, to reduce likely visibility, particularly from the public realm.

5.6 The great majority of Listed Building roofs in the Clifton Conservation Area are clad in slates or tiles, with some lead roofs. There are now well-established methods for fixing solar panels to historic buildings with these features which minimise potential for damage to fabric.

5.7 The condition requiring approval of details of the position, fixing, size, colour and finish is intended to ensure that the solar panels are as visually unobtrusive as possible. While this condition does require the submission of some information to the Council for approval, the process of approving a condition or a Certificate of Lawful Works is much simpler than that for a full Listed Building Consent application. For that reason, it is considered that a reasonable balance has been achieved between a more permissive approach to these works and control of detailed matters of design.

5.8 Consequently, the Council considers that installation of solar equipment under this Order, subject to the conditions set out above, would have limited and easily reversible effects in terms of their removal on the special architectural and historic interest of any listed building to which the Order applies. The Order is therefore in compliance with the requirement of S. 66 of the Town and Country Planning (Listed Buildings and Conservation Areas) Act 1990 for the local planning authority to have special regard to the desirability of preserving a listed building or its setting or any features of special architectural or historic interest which it possesses. For the same reasons it also follows the requirements of the paragraphs 210 and 212 of the National Planning Policy Framework, dated December 2024, in respect of the need to take account of the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation and the need to give great weight to the conservation of designated heritage assets.

5.9 Where harm is identified, it is highly likely to be less than substantial in degree. Any harm which might be considered to arise from works carried out under the Order would, following the requirements of paragraph 215 of the National Planning Policy Framework, be weighed against any public benefits arising from the works. While there would be a clear private benefit to the owner of the building, the Council also considers that a public benefit may be identified in making greater use of renewable energy and thereby reducing carbon emissions and that this might balance or in some circumstances outweigh the harm.

6. TERM OF ORDER

Dates from 2nd July 2025 to 2nd July 2030 (a period of no more than 5 years form the starting date of the Order)

7. OTHER PARTICULARS

7.1 The Order has been made in accordance with the requirements of the Planning (Local Listed Building Consent Orders) (Procedure) Regulations 2014, including a public consultation of at least 28 days, and consultation with Historic England of at least 28 days.

7.2 The Council will review the operation of the Order on an annual basis both quantitively, in terms of the number of solar installations under its provisions, and qualitatively, in terms of the effects on the listed buildings affected. If at any time during the life of the Order it is considered that it is either ineffective in encouraging use of solar panels or is giving rise to unexpected and unacceptable harm to listed buildings to which it applies, it will be varied or revoked.

7.3 If the Council revokes this Order at any point prior to the end date given above, any works authorised by the Order which have been started but not completed may be completed within six months of the date of revocation. Works which have been started but not completed at the end date given above may also be completed within six months of that date. However, once the Order expires or is revoked, any works previously covered by the Order which have not been started, will no longer benefit from the consent granted through the Order.

7.4 If at the end of the term of the Order it is considered that it is operating effectively and does not give rise to undue harm, it will be renewed, and a longer term considered.

7.5 As an Order confers listed building consent for specified works, a breach of the Order by carrying out works not authorised by the Order may lead to enforcement action.

8. SUPPLEMENTARY INFORMATION

8.1 The Order applies to those listed buildings identified in this Order and in the accompanying LLBCO map (The Clifton LLBCO).

8.2 An associated LLBCO guidance document sets out how solar panels on these roofs can be installed in accordance with the conditions of this Order.

8.3 Further advice is available from Historic England's 'Energy Efficiency and Historic Buildings Solar Electric (Photovoltaics)' that defines issues to be considered when planning the installation of solar equipment on historic buildings. The Campaign for the Protection of Rural England (CPRE) has also produced advice on 'Ensuring Place-Responsive Design for Solar Photovoltaics on Buildings'. This, while primarily focused on rural locations, addresses in some detail approaches which can secure a satisfactory and contextual design standard. In particular, it sets out a number of principles to consider when planning a solar installation, including the colour, size, symmetry and framing of the panels, and how they might sit in relation to other buildings or solar arrays in the vicinity. These are summarised in a separate CPRE document, 'Solar Design Tips – Your 10 Point Guide'. These considerations remain relevant in the urban environment, particularly where there is some visibility of the roof which is to host the solar equipment.

8.4 Planning permission will not be required for solar PV or solar thermal equipment consented under this Order on residential houses and flats provided it complies with Class A, part 14, Schedule 2 of the General Permitted Development Order 2015 (as amended). For non-residential

listed buildings, planning permission will still be required. For both residential and non-residential listed buildings, the installation of solar panels on buildings within the listed building's curtilage will require planning permission.

8.5 Notwithstanding the Order, solar equipment will require building regulation approval. It may be helpful to contact the Council's Building Control department or other approved inspectors before submitting details under the Order. Please note that a range of issues will need to be considered in order to ensure that the proposed work complies with the building regulations. These include:

- Roof Structure: There will be an additional loading on the roof and thought must be given as to how this will be supported. If the roof needs to be strengthened for structural reasons details of these works should also be approved under the Order. Strengthening works should be only what is necessary to support the panels, and if they involve any change in roof profile or removal of roof members such as joists or principal rafters it may be necessary to apply for Listed Building Consent.

- Fire: Electrical wiring of panels can cause fires due to poor connections. Precautions need to be taken to enable the direct isolation of the power generated by the panels. Means of escape needs to be considered for maintenance operatives. Minimum distances between panels need to be considered to maintain a clear escape route. Separation distance between panels need to be considered to prevent fire spread between the panels.

- Access: Consideration needs to be given to how access will be provided for maintenance purposes for CDM (health and safety purposes). Guardrails or other kinds of fall protection may be needed on flat roofs to prevent falls. Care will be provided in providing safe access to sloping roofs.

Further issues to bear in mind when planning the installation of solar equipment include: -

- Efficiency and energy ratings: solar equipment will be most worthwhile where it repays the financial investment of installing it and the carbon investment made in its manufacture. It may take a number of years to achieve this, and the most energy efficient equipment will do this most effectively.

- Regular maintenance and cleaning will ensure that solar equipment retains its efficiency. Safe access to the equipment will enable this and will be considered in relation to Building Control requirements.

- Solar equipment does not normally give rise to noise nuisance, but care in installing it will ensure there are not loose elements such as cables which could give rise to wind noises, and that associated equipment such as inverters are located internally.

8.6 8.6 Helpful advice from Historic England on planning the installation of solar equipment on historic buildings and its maintenance can be found on their web pages Installing Solar Panels | Historic England.

9. DEFINITIONS

9.1 In relation to this Order:

"associated infrastructure" includes elements such as supporting frames and external fixings as well as equipment necessary for the operation of the system such as cabling, inverters, controllers, heat transfer pump and any other necessary infrastructure

"microgeneration solar PV equipment" includes solar tiles or solar slates as well as solar panels

"roof structure" shall include the roof of any extension, outrigger or other ancillary structure which forms part of the principal listed building but shall not include any chimney(s)

9.2 The Historic England advice signposted above contains a Glossary setting out the definitions of technical terms relating to solar technology.