Daylight and Sunlight Report

21 Bloomsbury Street

London

WC1

Capital 38 Limited

1st July 2022

LUMINA
LONDON • LIMITED

9 Heneage Street, Spitalfields, London E1 5LJ

CONTENTS

APPENDICES

1 INTRODUCTION AND SCOPE OF REPORT

1.1 Lumina London Limited are retained by Capital 38 Limited to assess the performance and impact of the proposed extension and development at 21 Bloomsbury Street, London WC1 in respect of Daylight and Sunlight to determine whether the proposed development will result in any material or significant impact on the amenity enjoyed by existing neighbouring residential dwellings. The assessment of the potential impact has been undertaken in accordance with the standards in the Building Research Establishment (BRE) Guidelines "*Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice*" 2022 to assess whether the proposed development will result in any material impact on the amenity enjoyed by existing neighbouring residents so as to determine if it satisfies the aims and objectives of the Council's Policy Standards.

2 SOURCES OF INFORMATION AND LIMITATIONS

2.1 The existing and surrounding buildings have been modelled from a 3D survey produced by Arena Property Services Ltd Ref:

- 21 BLOOMSBURY STREET 3D-CAD MODEL
- Stiff + Trevillion 3D Survey 21 Bloomsbury Nov 21 Existing

2.2 The "massing" of the proposed development has been taken from the:

- Stiff + Trevillion 3D Model 3677-ST-XX-XX-M3-A-Central

2.3 A review of the Council's planning archives has been undertaken and a number of record drawings of 99 Great Russell Street and the Radisson Kenilworth Hotel have been found which show the room uses and layouts within those buildings. The room uses and layouts from those record plans have been used in the analysis.

2.4 The site was inspected on 17th May 2022.

3 DAYLIGHT AND SUNLIGHT STANDARDS

3.1 The BRE Guidelines: *"Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice"* are well established and are adopted by most Local Authorities, including the London Borough of Camden as the appropriate scientific and empirical methods of measuring daylight and sunlight in order to provide objective data on which to apply their planning policies. The Guidelines are not fixed standards but should be applied flexibly to take account of the specific circumstances of each case.

3.2 The Introduction of the Guidelines states that:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the developer. Although it gives numerical guidelines, these should be interpreted flexibly because natural light is only one of many factors in site layout design."

3.3 The "flexibility" recommended in the Guidelines should reflect the specific circumstances of each case being considered. For example, as the numerical standards within the Guidelines have been derived on the basis of a low-density suburban housing model, it is entirely appropriate to apply a more flexible approach when dealing with a denser urban environment where the height and scale of buildings is generally greater. In addition, where existing and proposed buildings have specific design features such as projecting balconies, deep recesses, bay windows etc….., it is equally valid to apply a suitable degree of common sense and flexibility to take account of the effect of these particular design features. This does not mean that the recommendations and targets within the Guidelines can be disregarded, but instead, the "flexibility" that should be applied should be founded on sound scientific principles that can be supported and justified. This requires a certain level of professional value-judgement and experience, but general guidance on setting alternative numerical targets in such circumstances, is set out in Appendix F of the Guidelines.

Daylighting

3.4 It is not always necessary for detailed modelling and testing to be undertaken in every case as this can be costly and time-consuming especially with relatively small developments or domestic extensions. The Guidelines therefore contains two initial rudimentary trigonometric tests that can be applied to determine if there is a probability of daylight being affected by a proposed development. It is probably fair to describe the initial trigonometric tests as "screening" tests.

3.5 The first is a simple height and distance calculation. If the distance of the new development is more than three times its height above the lowest window serving a habitable room, daylight is unlikely to be seriously affected and it is unnecessary for any further detailed modelling and testing to be undertaken.

3.6 The second is similar in application and relies upon a simple angular measurement taken from the midpoint of the lowest window serving a habitable room in an existing neighbouring dwelling. If the profile of a new development will not subtend an angle of more than 25° from the midpoint of the lowest window serving a habitable room, then daylight is again unlikely to be seriously affected and it is unnecessary for any further detailed modelling and testing to be undertaken.

3.7 The scientific basis of the 25° angle test is that if a proposed development is below an angle of 25°, the corresponding Vertical Sky Component (VSC) value will remain above 27% VSC.

3.8 This angular test is simple and crude as it does not take account of buildings or obstructions that present an irregular profile that is not directly opposite and parallel to the plane of the window being assessed.

3.9 If these initial screening tests are satisfied it is unnecessary for more detailed modelling and testing to be undertaken.

3.10 Where detailed testing is required, the primary method for measuring the adequacy of daylight received by existing neighbouring buildings is the use of Vertical Sky Components (VSC).

3.11 VSC is a "spot" measurement of daylight taken on the outside face of a window and is a measure of the availability of direct light from the sky received from over and around the "existing" and "proposed" obstruction caused by the buildings or structures in front of the window. It effectively is a measure of "sky visibility". As it is measured on the outside face of the window, one of the inevitable shortcomings is that it does not take account of the size of the window, or the size of the room served by the window or where a room is served by more than one window nor is it representative of the amount of light received within the room itself. For this reason, the BRE Guidelines recommend that where the internal layouts of the neighbouring properties are known, the internal Daylight Distribution is measured in addition to VSC by plotting the position of the No Skyline contour to determine the extent of daylight penetration and direct sky visibility from within the room. Where the internal room uses and layouts are not known, it is usual practice to still assess the impact on internal Daylight Distribution by using reasonable estimated and assumed room layouts as this provides an indication of internal daylight quality. It should however be recognized that where the internal Daylight Distribution results are based on estimates and assumptions, they should be afforded less weight, and be sub-servient to, the results of the VSC analysis.

3.12 The maximum VSC value that can be achieved for a totally unobstructed vertical window is just under 40% VSC. The target VSC value on an absolute scale for good daylighting conditions is 27% VSC and this represents a typical VSC value that would be achieved on the face of a window on the main elevation of a well-spaced two storey suburban housing development where the vertical angle to a neighbouring building does not exceed 25 degrees.

3.13 In simple terms, 27% VSC equates to being able to see 27% of the Sky Dome, i.e. the hemisphere of sky, from a given reference point. A VSC value of 27% will be achieved where the obstruction in front of a vertical window is continuous and parallel to the plane of that window and where it subtends a vertical angle of 25 degrees when measured from the midpoint of that window. It therefore follows that if a proposed new development is below a vertical angle of 25 degrees, the resultant VSC value will remain above 27% VSC. This is the scientific basis for the initial "screening" test in the BRE Guidelines where it is unnecessary for any

further daylight (or sunlight) tests to be undertaken where a proposed development will remain below a vertical angle of 25 degrees. It is clear that in an inner-city urban environment, the relationship with the vast majority of existing buildings already exceeds a vertical angle of 25 degrees and the general profile of the skyline will be irregular. The VSC values that prevail will therefore invariably be below 27% VSC as a norm. In such circumstances, VSC values in the mid-teens are typical and therefore represent the reasonable expectation of daylight in an urban environment and values in excess of 20% of VSC will be considered to be good. It is only where VSC values fall in single figures that it becomes difficult to achieve good interior lighting conditions without the need to provide supplementary artificial lighting for longer periods during the day.

3.14 For VSC, the Guidelines state that:

"If this Vertical Sky Component is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the Vertical Sky Component with the new development in place is both less than 27% and less than 0.8 times its former value, then the occupants of the existing building will notice the reduction in the amount of skylight".

We have emphasised the word "*notice*" as just because a change in lighting conditions is noticeable does not necessarily equate to the loss of light being a material reduction to the level of amenity enjoyed by the neighbouring property.

3.15 In context, as mentioned above, the maximum VSC value that can be achieved for a totally unobstructed vertical window is just under 40%VSC. It is therefore permissible for an obstruction to reduce the amount of visible sky seen from that window by an absolute percentage of 13% of the Sky Dome to 27% VSC, even before the level of daylight received by the window could be below standard. There are however many circumstances where the VSC value is already below 27%. In such circumstances, the Guideline advise that it is permissible to reduce existing VSC values by a factor of 0.2 (i.e. 20%) so that the VSC value under "proposed" conditions remains more than 0.8 times its former value. The scientific foundation for this permissible margin is that through the research undertaken at the Building Research Establishment, they have found that existing daylight (and sunlight) levels can be reduced by a

factor of 20% before the loss becomes materially noticeable. This factor of reduction applies to VSC, Daylight Distribution, Sunlight and Overshadowing. Where existing windows enjoy very high levels of daylight under existing conditions, the percentage reduction can be higher provided that the residual VSC value remains adequate. At the other end of the scale, where existing VSC values are very low, higher percentage losses above 20% may also be acceptable as a relatively small change in absolute terms can sometimes result in a large percentage reduction if the initial starting point is already very low even though the absolute change is so small as to be imperceptible.

3.16 In a built-up urban environment it is unusual to achieve VSC values above 27% but instead, values in the mid-teens are more common. As mentioned above, it is generally accepted that in a built-up urban environment the expectation of daylight (and sunlight) is lower than in a low-density suburban environment and that residual VSC values in the mid-teens will be acceptable and that it is only when the residual VSC values fall into single figures, that compromised levels of natural daylighting will arise.

3.17 The second technical test is the plotting of "No Skyline" contours for the purpose of measuring internal Daylight Distribution to identify those areas within the room, usually measured on a horizontal working plane set at worktop level, where there is direct sky visibility. This therefore represents those parts within the room where the sky can be seen through the window. The second measure takes account of the size of the window, number of windows where a room is served by more than one window and the size of the room, and when interpreted with the VSC value, provides more information from which to determine the likely internal lighting conditions, and hence the overall quality of lighting within the room can be better assessed. It should however be noted that one of the inevitable shortcomings of using a "No Skyline" contour is that by definition, it only measures those parts of the room where there is visibility of the sky without quantification, and therefore does not measure the amount and intensity of direct light from the sky received in front of that contour. It therefore does not measure the actual amount of light received within each room, but merely where the sky can and cannot be seen.

3.18 Finally, it should be noted that the tests and standards in the Guidelines only apply to "*habitable*" rooms which are defined as a Kitchen, Living Room or Bedroom. Bathrooms, hallways and corridors are excluded from this definition. In addition, there is often a further distinction in

respect of small kitchens. Where the internal area of a small kitchen limits the use of the kitchen to food preparation only and is not of sufficient size to accommodate some other form of "*habitable*" use such as dining, the kitchen need not be classed as a "*habitable*" room in its own right. A net area of 13m² is usually taken as an appropriate threshold. This can also apply to relatively small internalised or galley-type kitchens and can also apply to relatively small kitchen areas which form part of a larger Living/Kitchen/Diner.

Sunlighting

3.19 The requirements for protecting sunlight to existing residential buildings are set out in Section 3.2 of the BRE Guidelines. As with daylight, it is unnecessary for detailed sunlight tests to be undertaken if a proposed development will be below a vertical angle of 25 degrees drawn from the midpoint of the lowest window serving a habitable room as in such circumstances, the availability of sunlight will remain adequate.

3.20 The availability of sunlight varies throughout the year, with the maximum amount of sunlight being available on the summer solstice and the minimum on the winter solstice. In view of this, the accepted test date for measuring sunlight is the median between the two, the Spring Equinox (21st March), on which day the United Kingdom has equal periods of daylight and darkness, and meaningful sunlight is available from approximately 0830 to 1730. In addition, on that date, sunlight received perpendicular to the face of a window will only be received where that window faces within 90 degrees of due south. The BRE Guidelines therefore limit the requirement for testing for sunlight to where a window faces within 90 degrees of due south.

3.21 The sunlight standards are normally applied to the principal Living Room within each dwelling rather than to kitchens and bedrooms.

3.22 The recommendation for sunlight is:

"If this window reference point can receive more than one quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months of 21st September and 21st March, then the room should receive enough sunlight…….any reduction in sunlight access below this level should be kept to a minimum. If the availability of sunlight

hours are both less than the amounts given and less than 0.8 times their former value, either over the whole year or just during the winter months, then the occupants of the existing building will notice the loss of sunlight".

3.23 A good level of sunlight will therefore be achieved where a window receives more than 25% APSH, of which 5% APSH should be received in the winter months. Where sunlight levels fall below this suggested recommendation, a comparison with the existing condition should be undertaken and if the reduction ratio is less than 0.2, i.e. the window continues to receive more than 0.8 times its existing sunlight levels, the impact on sunlight will be acceptable.

3.24 It should however be noted that during the winter months, the angle of the sun is much lower, and sunlight is much more only available at relatively low vertical angles. A consequence of this is that even relatively small and modest increases in the height or "massing" of a new development can have a disproportionate impact on the availability of winter sunlight. This is a further example of where commonsense and greater flexibility may be appropriate in order to reach a pragmatic conclusion.

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4 SCHEME ASSESSMENT

4.1 As mentioned at Paragraph 3.3 above, the numerical targets in the BRE Guidelines have been drafted on the basis of a low-density suburban housing model of relatively well-spaced two-storey houses and for windows in a principal front or rear elevation. In a typical urban environment where the general height of existing buildings and general development is more than 2-3 storeys in height, it is difficult and rare to find residual VSC values above 27%, i.e. development that is generally below a vertical angle of 25 degrees between existing neighbouring buildings. This part of the Borough is mixed-use in character ranging from the four storey terraces of Georgian houses on Bedford Square and on the opposite side of Bloomsbury Street to the six and seven storey buildings of Bedford Court Mansions and the Radisson Kenilworth Hotel. The character, height, massing and relationship of the buildings around the site is therefore varied and significantly different from the more uniform model used in the BRE Guidelines.

4.2 Annexed at Appendix 1 are Drawing Numbers BS2022-002-03-1000 to 1005 which are images of the Site Plan and 3-D Massing Models of the “existing” and “proposed” buildings set in context with their neighbours. They are followed in Appendix 2 by Drawing Numbers BS2022-002-03-3000 to 3003 which are the No Skyline Daylight Distribution Contour Plans for the neighbouring residential buildings and show the location of each room and property tested. The room and window references on those drawings should be cross-referenced with the equivalent room and window references in the Tables annexed at Appendices 3, 4 and 5. Appendix 3 contains the numerical results of the Vertical Sky Component (VSC) Daylight Analysis, Appendix 4 is the No Skyline Internal Daylight Distribution Analysis and Appendix 5 is the Annual and Winter Sunlight (APSH) Analysis.

4.3 The only existing neighbouring residential property which could be affected by the proposed development is Bedford Court Mansions. That building has two main blocks separated by a relatively large longitudinal lightwell/courtyard which runs on an east-west axis

Bedford Court Mansions

4.4 No record drawings in the Council Planning Archives have been found for any of the flats within Bedford Court Mansions, but from an external visual inspection from the roof of 21 Bloomsbury Street, it has been possible to identify some room uses. The internal room layouts and dimensions have however been estimated. This does not affect the results of the VSC analysis as Vertical Sky Components are measured on the outside face of the windows but could affect the accuracy of the No Skyline Daylight Distribution results. In the present circumstances, greater weight should therefore be given to the VSC values.

4.5 The main area of additional "massing" will be on the roof of 21 Bloomsbury Street adjacent to rear block of Bedford Court Mansions. The image below shows the rear block on the southern side of the lightwell/courtyard.

The next image is of the rear of the main northern block.

4.6 The numerical results of the VSC and Daylight Distribution tests are at Appendices 3 and 4. The results of all three tests for daylight and sunlight show full and comfortable compliance with the BRE Guidelines. No window will experience a percentage reduction of VSC or internal Daylight Distribution in excess of 20% and it therefore follows that as the change is within 20% of current values, any change in natural lighting conditions will not be materially noticeable. All of the dwellings within Bedford Court Mansions will therefore continue to receive adequate levels of natural daylight.

4.7 The targets for sunlight in the BRE Guidelines should be applied primarily to the principal Living Room in each dwelling rather than to Kitchens and Bedrooms, but although sunlight to Kitchens and Bedrooms are of lesser importance, it should nonetheless be tested. All rooms/windows that fall within the BRE Sunlight Criteria have been tested and the results are collated in the table at Appendix 5.

4.8 Those results show full compliance with the BRE Guidelines for both Annual and Winter Sunlight APSH with very little change of sunlight availability at all.

5 SUMMARY AND CONCLUSION

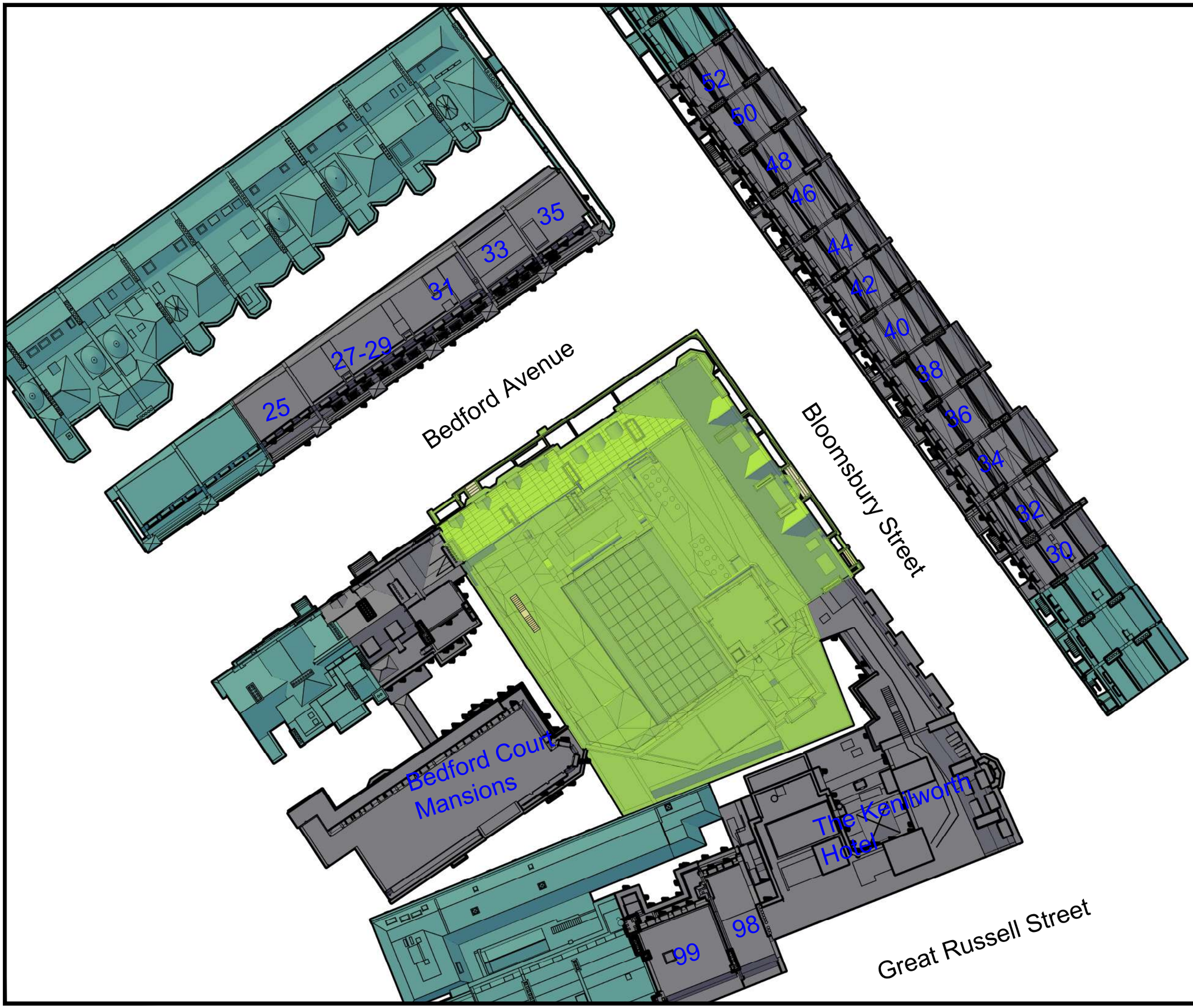
5.1 The only existing neighbouring residential property that could be affected by the proposed development is Bedford Court Mansions. All of the rooms/windows servings the flats in close proximity of the development have been tested for VSC, internal Daylight Distribution and Annual and Winter Sunlight and the results show that there will be full and comfortable compliance with the tests and standards in the BRE Guidelines. As all of the results are within the BRE margins of impact, any change in natural lighting conditions will not be materially noticeable in comparison to present conditions and there will therefore be no material impact on the existing levels of amenity.

5.2 In overall conclusion, although there will a very small reduction in daylight and sunlight, as those reductions will all be within the permissible margins of reductions in the BRE Guidelines, the impact on amenity enjoyed by existing neighbouring residential dwellings will not be noticeable and it should therefore follow that Camden's policy standards and objectives will be satisfied.

Lumina London Limited

APPENDIX 1

Drawing Numbers BS2022-002-03-1000 to 1005



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VIEWS

Legend

- Existing Site
- Proposed Scheme
- Analysed Buildings
- Surrounding Buildings

N

Source of Information

Existing And Surrounding Buildings
Arena Property Services Limited
3D Survey
21 BLOOMSBURY STREET 3D-CAD MODEL

Stiff + Trevillion
3D Survey
21 Bloomsbury Nov 21 Existing

Proposed Scheme
Stiff + Trevillion
3D Model
4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
-

Drawing Title
Existing Site Plan

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Drawing No	**Rev**
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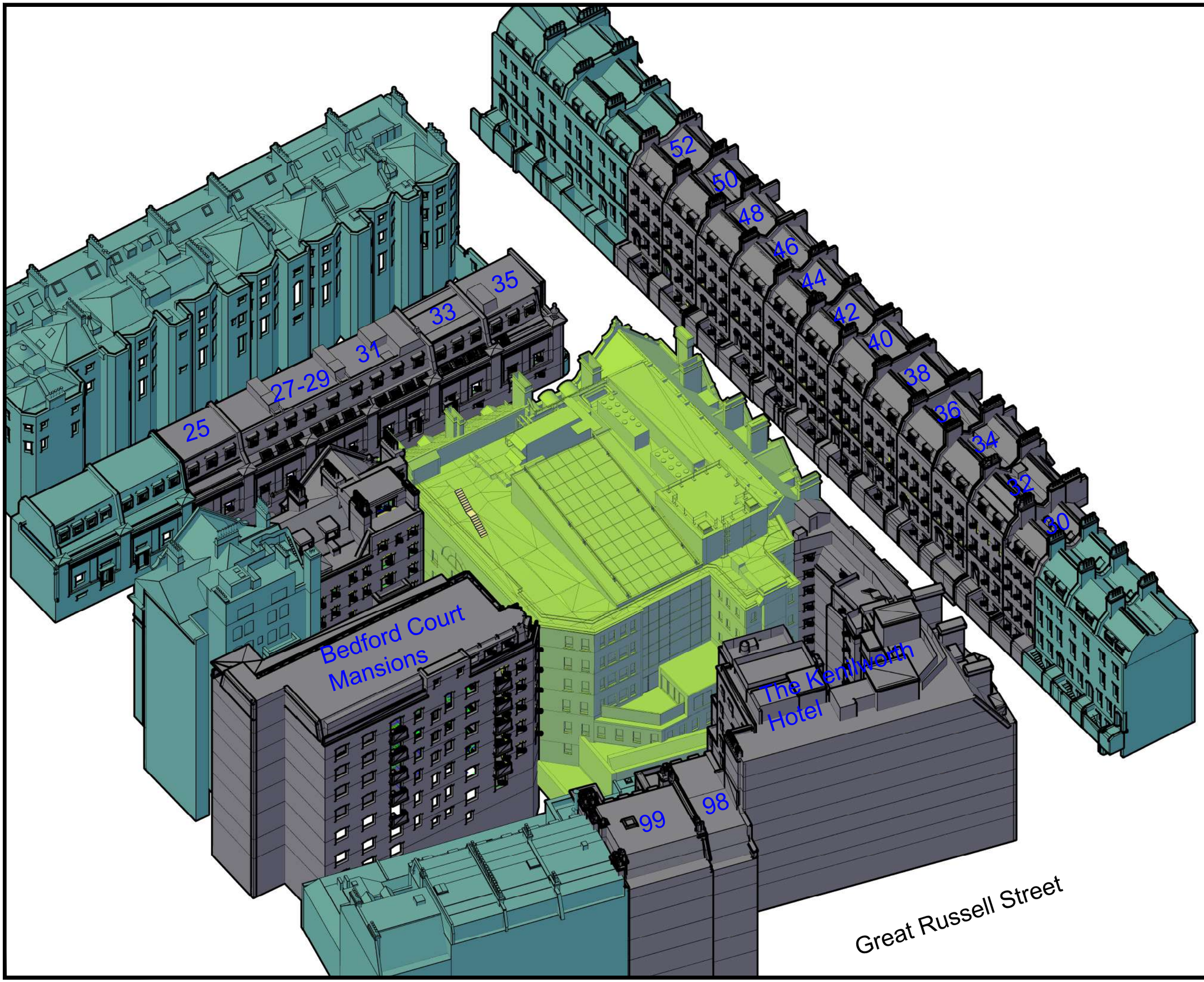

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Project Title
21 Bloomsbury Street
London
WC1B

Client
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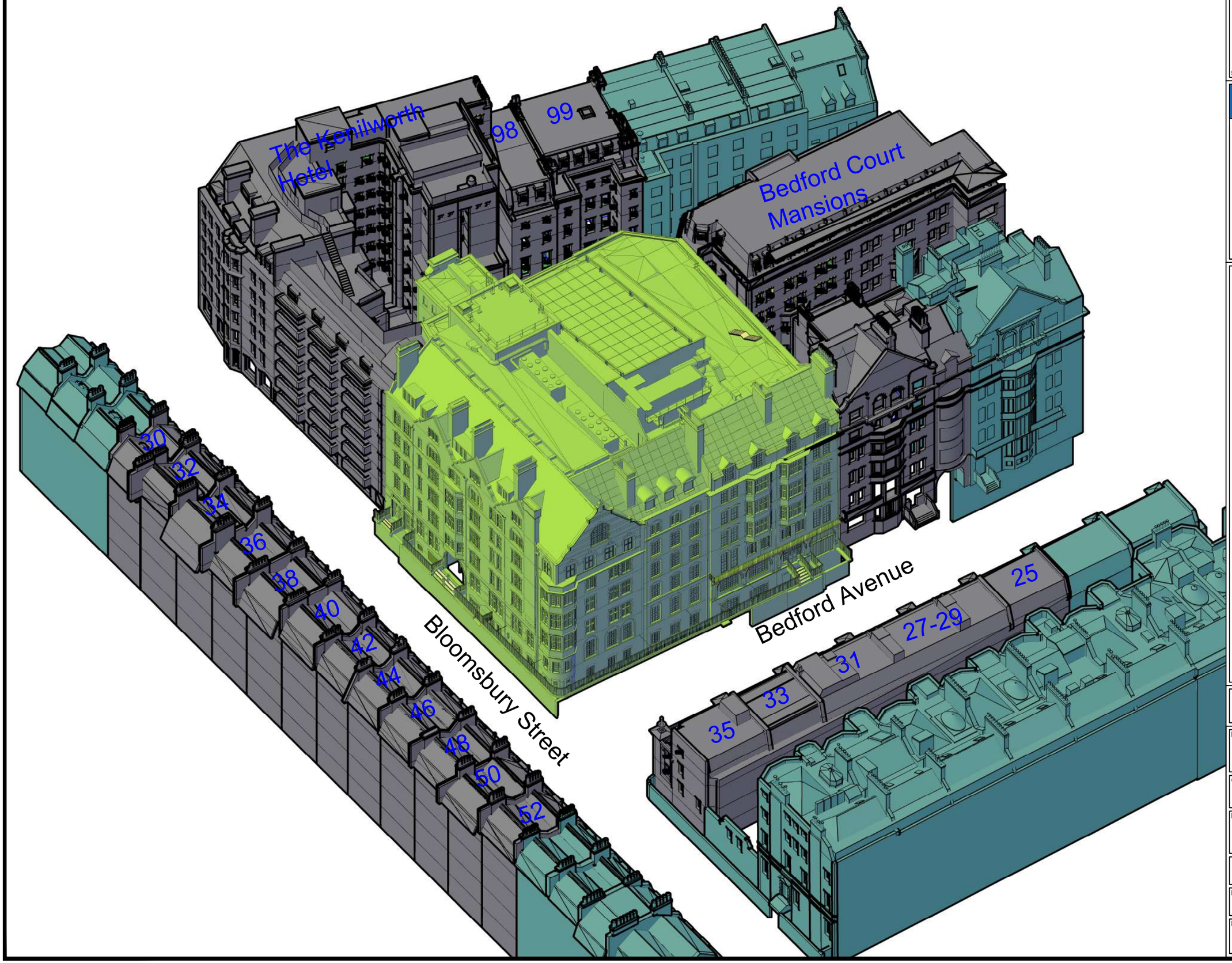

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3D Model
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London
WC1B

Client
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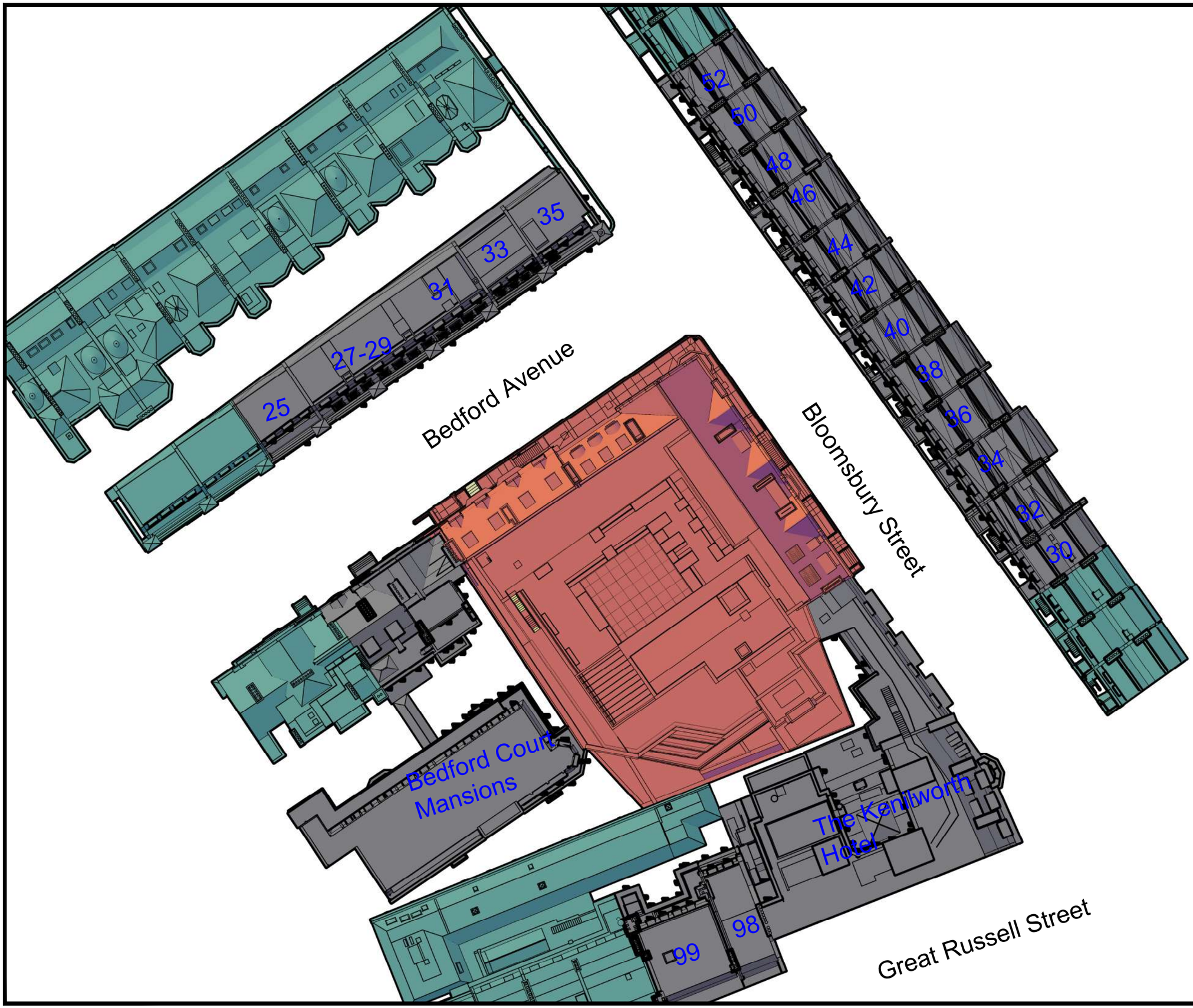

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Proposed Scheme
Stiff + Trevillion
3D Model
4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
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Drawing Title
Proposed Site Plan

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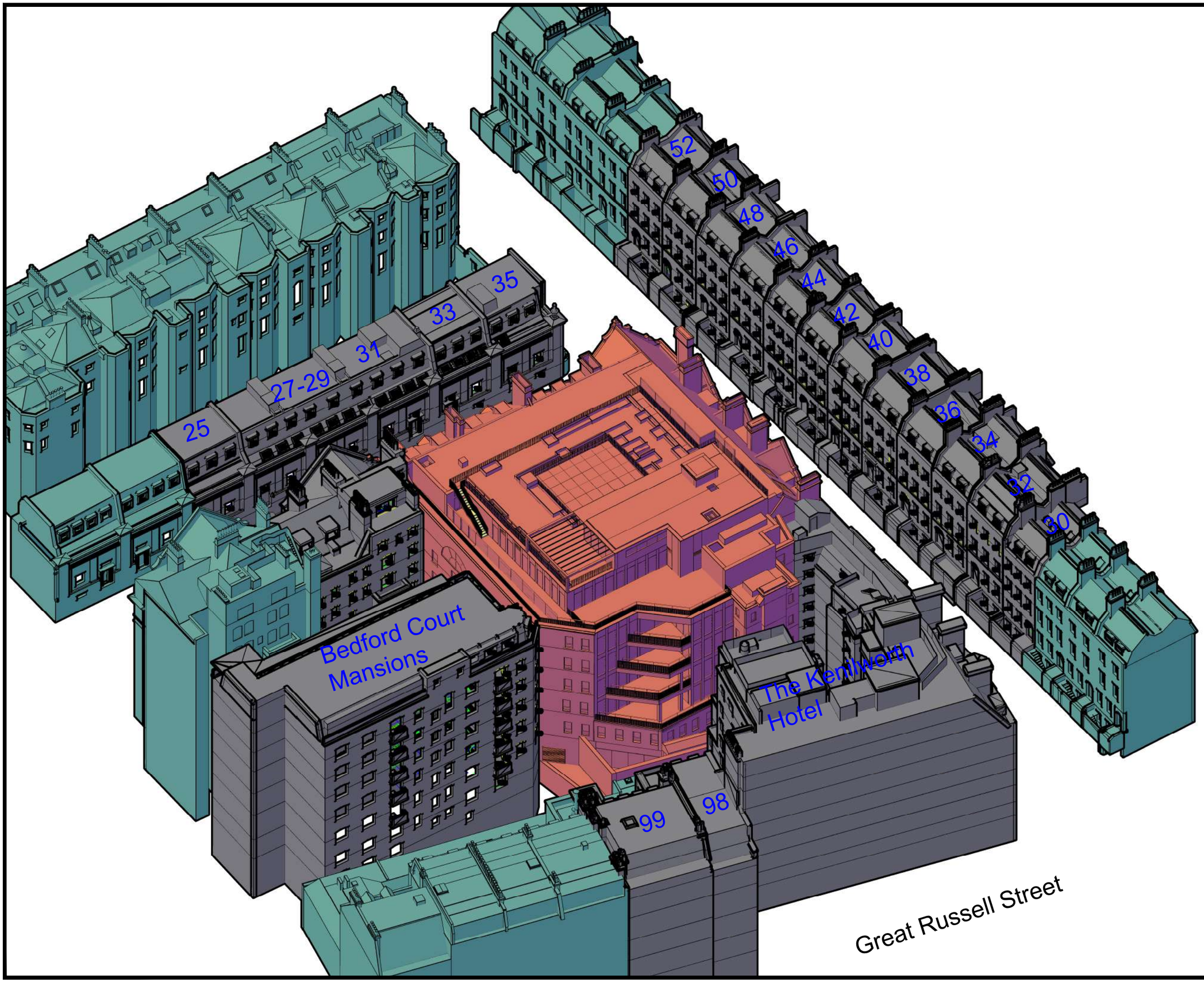

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4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
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Drawing Title
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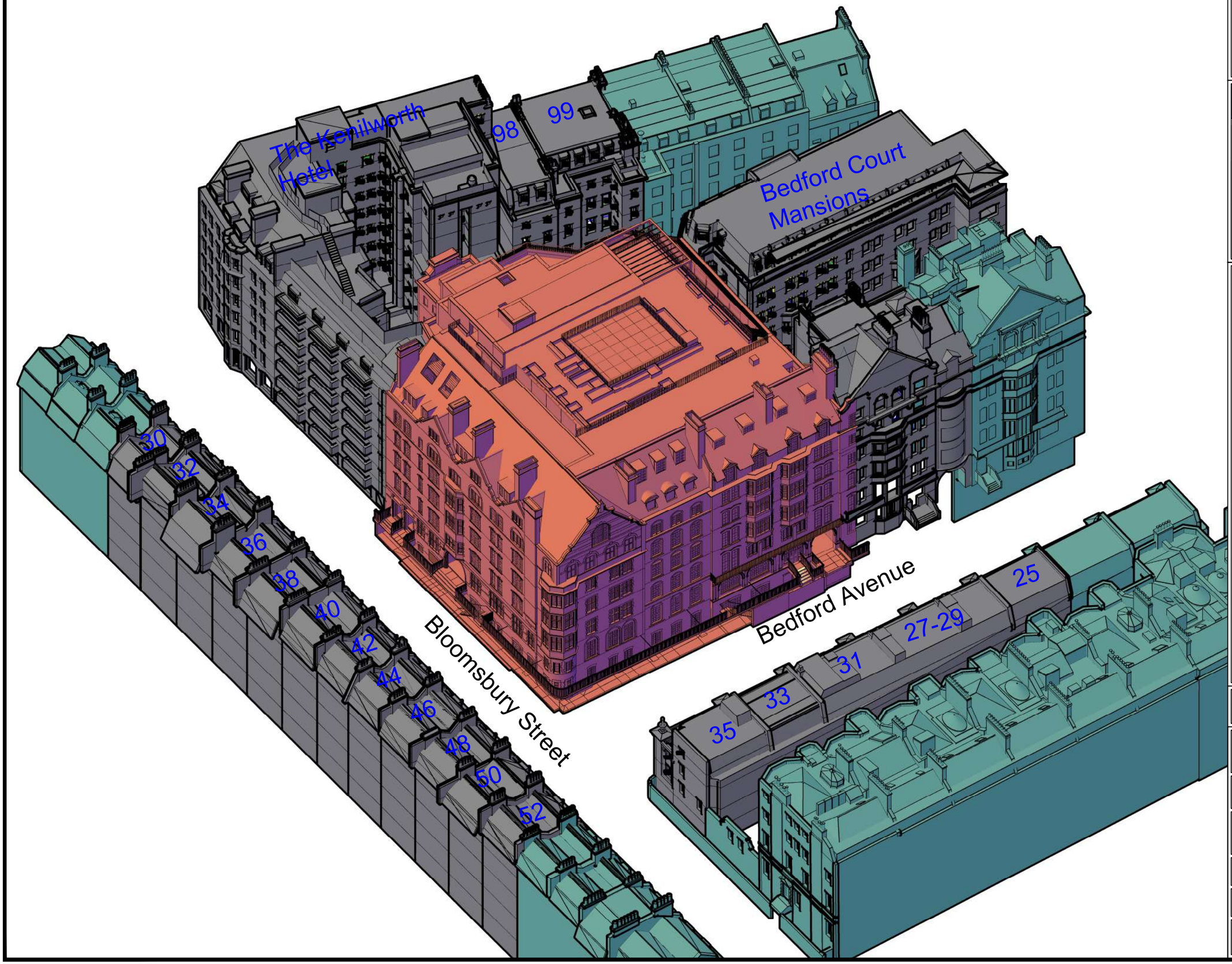

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VIEWS

Legend

- Existing Site
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N

Source of Information

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Stiff + Trevillion
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21 Bloomsbury Nov 21 Existing

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3D Model
4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
-

Drawing Title
Proposed 3D View

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Project No	**Date**
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Drawing No	**Rev**
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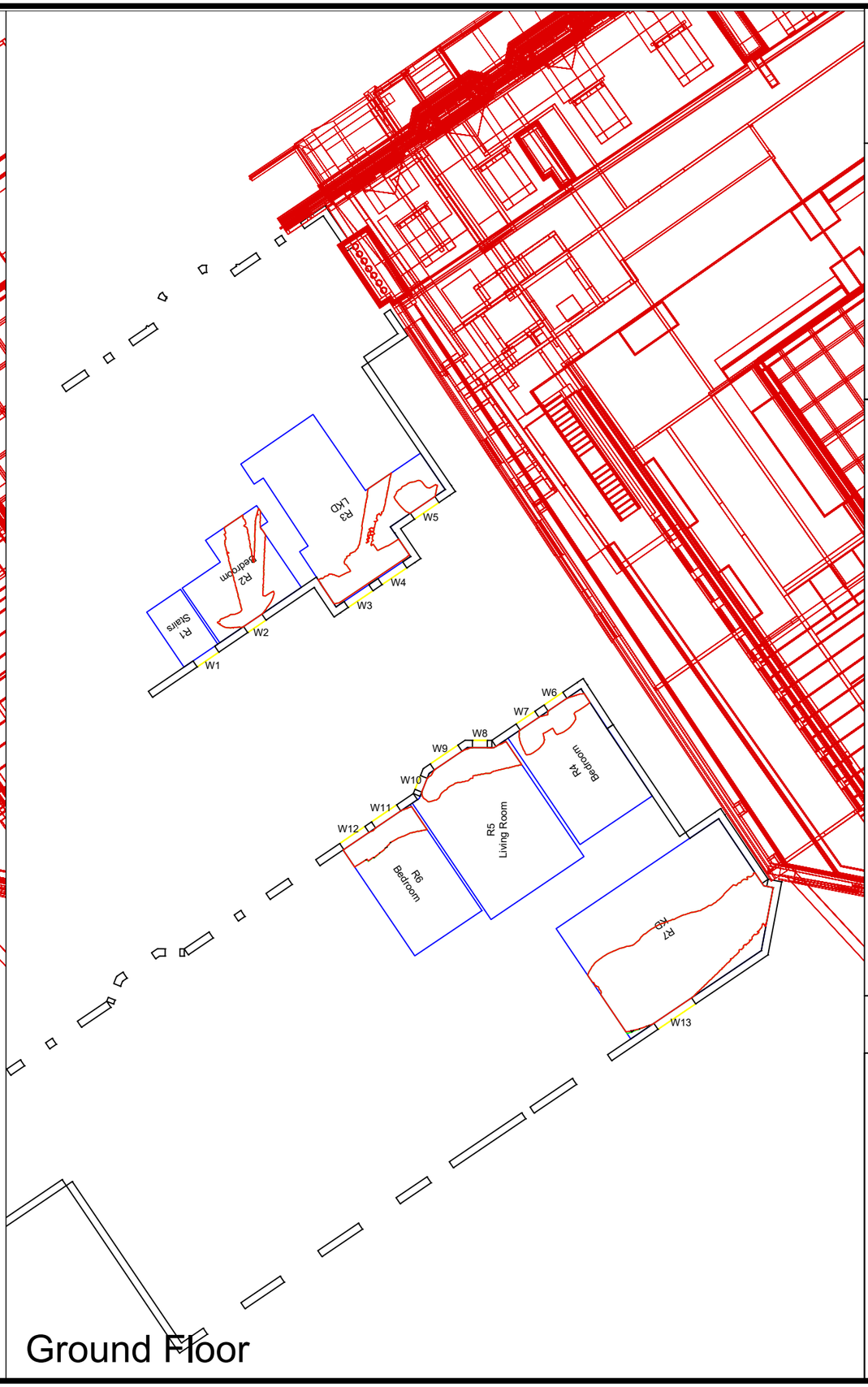
APPENDIX 2

Drawing Numbers BS2022-002-03-3000 to 3003

Basement Floor



Ground Floor

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DAYLIGHT

Legend

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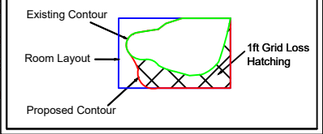

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4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
-

Drawing Title
Daylight Analysis
Bedford Court Mansions

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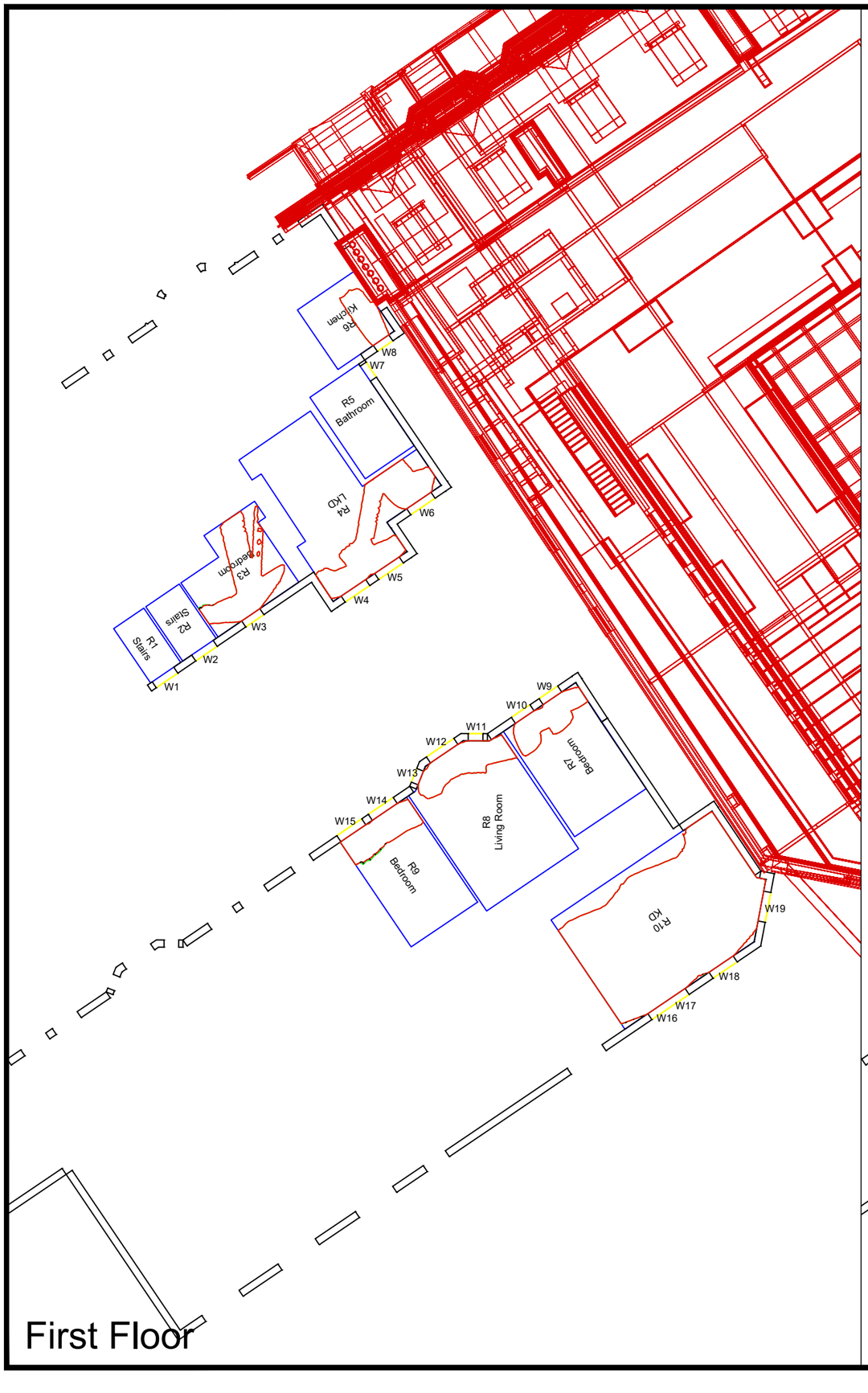
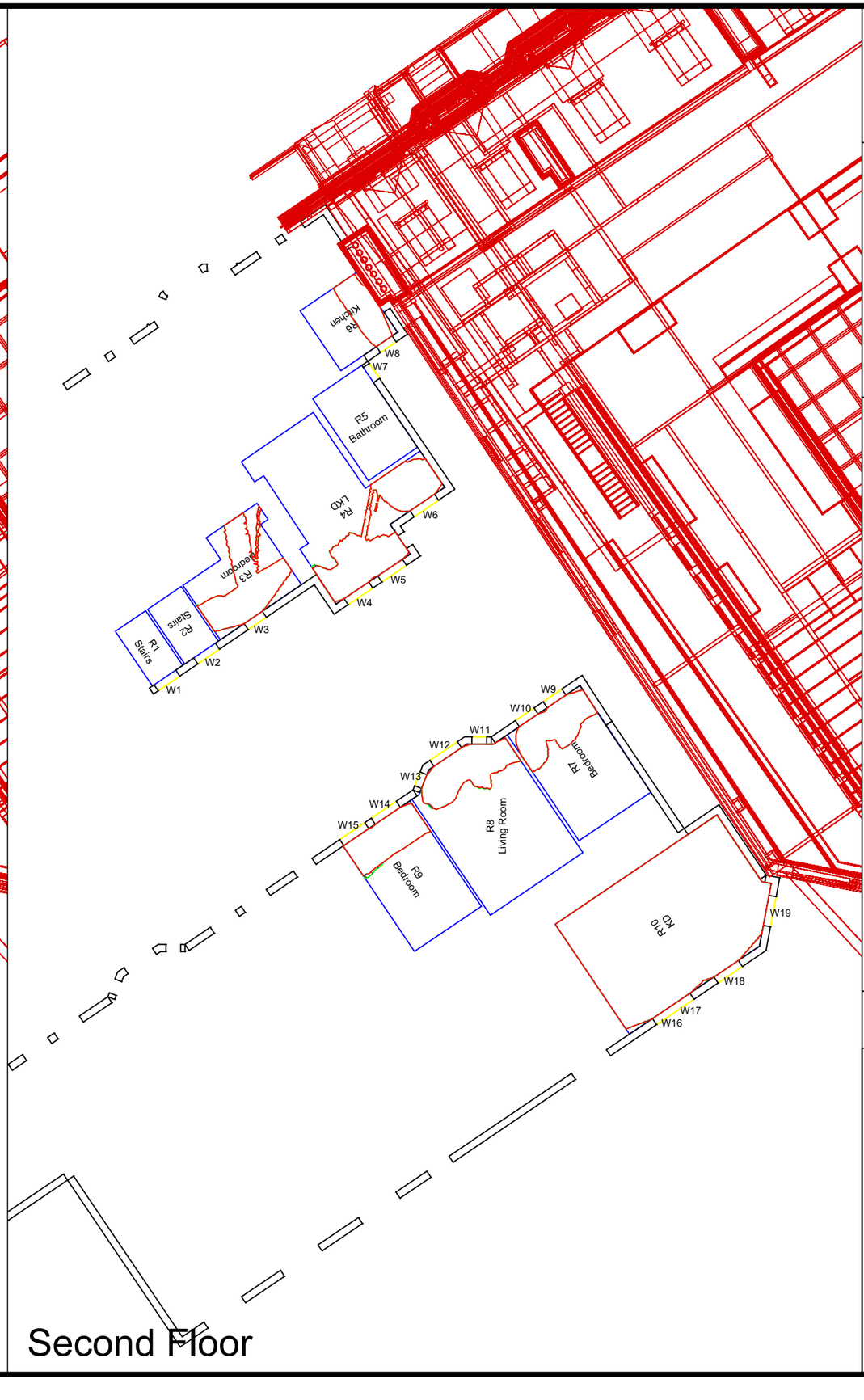


First Floor



Second Floor

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DAYLIGHT

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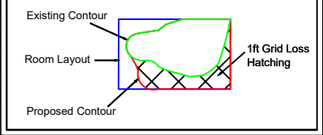

Source of Information

Existing And Surrounding Buildings
Arena Property Services Limited
3D Survey
21 BLOOMSBURY STREET 3D-CAD MODEL

Stiff + Trevillion
3D Survey
21 Bloomsbury Nov 21 Existing

Proposed Scheme
Stiff + Trevillion
3D Model
4677-ST-XX-XX-M3-A-Central

Project Title
21 Bloomsbury Street
London
WC1B

Client
-

Drawing Title
Daylight Analysis
Bedford Court Mansions

Drawn By	Scale @A3
Mo	1/200
Project No	**Date**
BS2022-002	24/06/2022
Drawing No	**Rev**
03-3001	