

Potential Daylight and Sunlight impact of Proposed
Strategic Housing Development on Lands at
Palmerstown Retail Park,
Kennelsfort Road Lower,
Palmerstown,
Dublin 20

Applicant: Randelswood Holdings Ltd.

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1. Introduction

This report is being prepared in response to the request for specific information from An Bord Pleanála's Opinion Letter regarding residential amenity including also item 1 which reads as follows:

'Full and complete analysis and drawings that detail the impact of the proposed development on the residential amenity of existing residents in relation to daylighting, overshadowing and overlooking. Specific attention should be paid to proposed accommodation and interactions with existing development to the north along Rose View'.

This proposed development will consist of the demolition of all existing structures on site and the construction of a residential development of 250 no. 'build to rent' apartments (134 no. 1 beds, 116 no. 2 beds) in 5 no. blocks; with a café and ancillary residential amenity facilities, to be provided as follows:

- Block A containing a total of 27 no. apartments comprising of 13 no. 1 beds and 14 no. 2 beds, in a building ranging from 3-6 storeys over basement in height, with 1 no. communal roof garden (at third floor level), and most apartments provided with private balconies/terraces. Block A also provides a café, a reception/concierge with manager's office and bookable space at ground floor level; meeting rooms and workspace/lounge at first floor level; a gym at second floor level; and a cinema and a games room at basement level;
- Block B containing a total of 46 no. apartments comprising of 18 no. 1 beds and 28 no. 2 beds, in a building 6 storeys over basement in height, and all apartments provided with private balconies/terraces;
- Block C containing a total of 47 no. apartments comprising of 30 no. 1 beds and 17 no. 2 beds, in a building 6 storeys over basement in height, and all apartments provided with private balconies/terraces;
- Block D containing a total of 67 no. apartments comprising of 33 no. 1 beds and 34 no. 2 beds, in a building 7 storeys over basement in height, and most apartments provided with private balconies/terraces;
- Block E containing a total of 63 no. apartments comprising of 40 no. 1 beds and 23 no. 2 beds, in a building 8 storeys over basement in height, and all apartments provided with private balconies/terraces.

The development also includes the construction of a basement providing 120 no. car parking spaces, 10 no. motorcycle spaces, 250 no. bicycle spaces, and a plant room and bin stores. The proposal also incorporates 5 no. car parking spaces and 26 no. bicycle spaces at surface level; upgrades and modifications to vehicular and pedestrian/cyclist access on Kennelsfort Road Lower; utilisation of existing vehicular and pedestrian/cyclist access via Palmerstown Business Park (onto Old Lucan Road); 1 no. ESB sub-station; landscaping including play equipment and upgrades to public realm; public lighting; boundary treatments; and all associated engineering and site works necessary to facilitate the development.

The calculations are based on the drawings prepared by Downey Planning and Architecture.

The results find that there will be minimal impact on the daylight & sunlight to neighbouring properties and there will be good quality light in the apartments analysed and sunlight in the amenity areas proposed. The proposed development meets the recommendations of the BRE guidelines.

2. Methodology

2.1 Notes on the use of BS 8026-2 2008 and BRE guidance document (2011) “Site layout planning for daylight and sunlight”.

To date, it is understood that no standards or guidance documents (statutory or otherwise) on the subject of sunlight access to buildings or open spaces or daylight access to buildings have been prepared or published in Ireland. Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018 directs Planning authorities to have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide ‘Site Layout Planning for Daylight and Sunlight’ (2nd edition) or British Standard BS 8206-2: 2008 – ‘Lighting for Buildings – Part 2: Code of Practice for Daylighting’. The standards for daylight and sunlight access in buildings (and the methodologies for assessment of same) suggested in both of these documents have been referenced in this Sunlight and Daylight Access Analysis.

Neither the British Standard nor the BRE Guide set out rigid standards or limits. The BRE Guide is preceded by the following very clear warning as to how the design advice contained therein should be used:

“The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aims is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.”

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts is of particular importance in the context of national and local policies for the consolidation and densification of urban areas. Given that the British Standard and the BRE Guide was drafted in the UK in the context of UK strategic planning policy, recommendations or advices provided in either document that have the potential to conflict with Irish statutory planning policy have been disregarded for the purposes of this analysis.

2.2 Daylight to the existing dwellings

The site is analysed in plan & section, and building use. Windows and amenity area are selected to test for impact from the proposed development.

BRE guideline recommends that: “Loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window.”

“To check for this if part of a new building measured in a vertical section perpendicular to the main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse light of the existing building may be adversely affected.” If a window falls within a 45° angle both in plan and elevation with a new development in place then the window may be affected and should be assessed.

For loss of daylight and sunlight to existing buildings BRE guidance document (2011) “Site layout planning for daylight and sunlight” is used and BS8208 Part 2:2008 Lighting for Buildings, Code of Practice for Daylighting.

For loss of light the report recommends calculation of the Vertical Sky Component. This is the ratio of direct sky illuminance falling on the outside window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE Overcast Sky is used and the ratio is usually expressed as a percentage. The maximum value is just under 40% for a completely unobstructed vertical wall. The vertical sky component on a window is a good measure of the amount of daylight entering it.

The BRE guidelines set out a two stage assessment for the vertical sky component:

- a) Where the Vertical Sky component at the centre of the existing window exceeds 27% with the new development in place then enough sky light should still be reached by the existing window.
- b) Where 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 area lit by the window is likely to appear more gloomy, and electric light will be needed more of the time.

2.3 Sunlight to gardens and open spaces

For calculations of sunlight analysis it is general practice to use March 21 and the recommendations of the BRE guidance document (2011) "Site layout planning for daylight and sunlight". P.J Littlefair, in relation to Gardens and open spaces section 3.3.17 state:

"It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March."

The BRE Guidance document recommends "To assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90° of due south."

2.4 Daylight in the proposed development.

The proposed project is analysed in plan & section, and building use. The rooms are assessed for Average Daylight Factor (ADF).

3. Daylight to Existing Dwellings

The site is bounded by the Chapelizod Bypass dual carriageway to the South, an elevated walkway and Palmerstown Lodge public house to the East, residences to the north and industrial units to the West.

The residential properties have been assessed in this report. The closest of these are 4a & 5a Rose View, No. 7 Old Lucan Road and No. 15 Kennelsfort Road Lower.

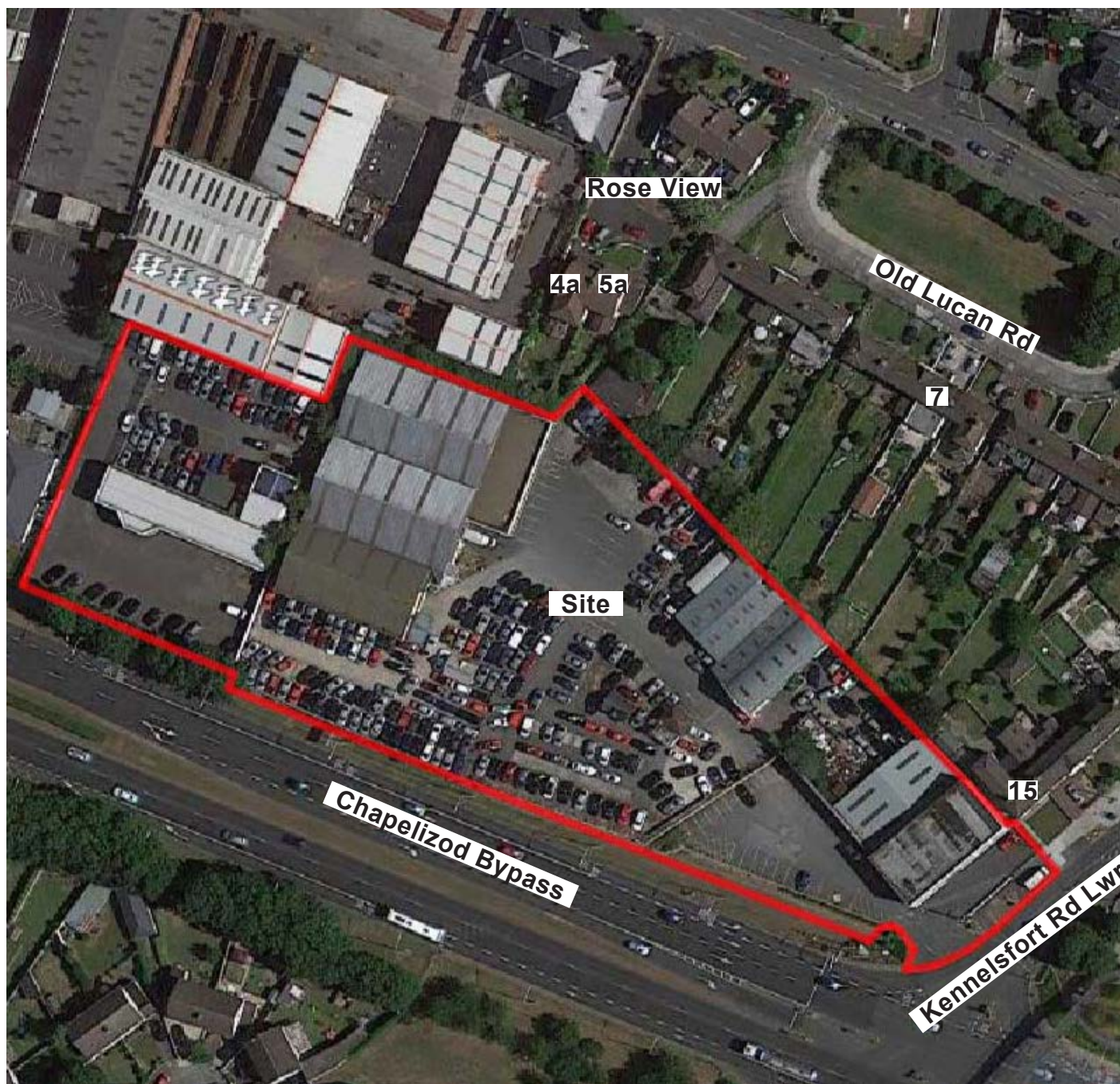


Fig 1. Ariel view of site.



BRE guideline recommends that: *“Loss of light to existing windows need not be analysed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window.”*

“To check for this if part of a new building measured in a vertical section perpendicular to the main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse light of the existing building may be adversely affected.”

If a window falls within a 45° angle both in plan and elevation with a new perpendicular development in place then the window may be affected and should be assessed.

Preliminary analysis identified residential properties that may potentially be impacted by the proposed development. Figure 2 indicates the position of windows on the closest dwellings. A section is generated through these window walls. The exact layout of each house is not known so the guidelines recommend a height of 1.6 from floor level to represent the centre of the window. See Figure 3 below.

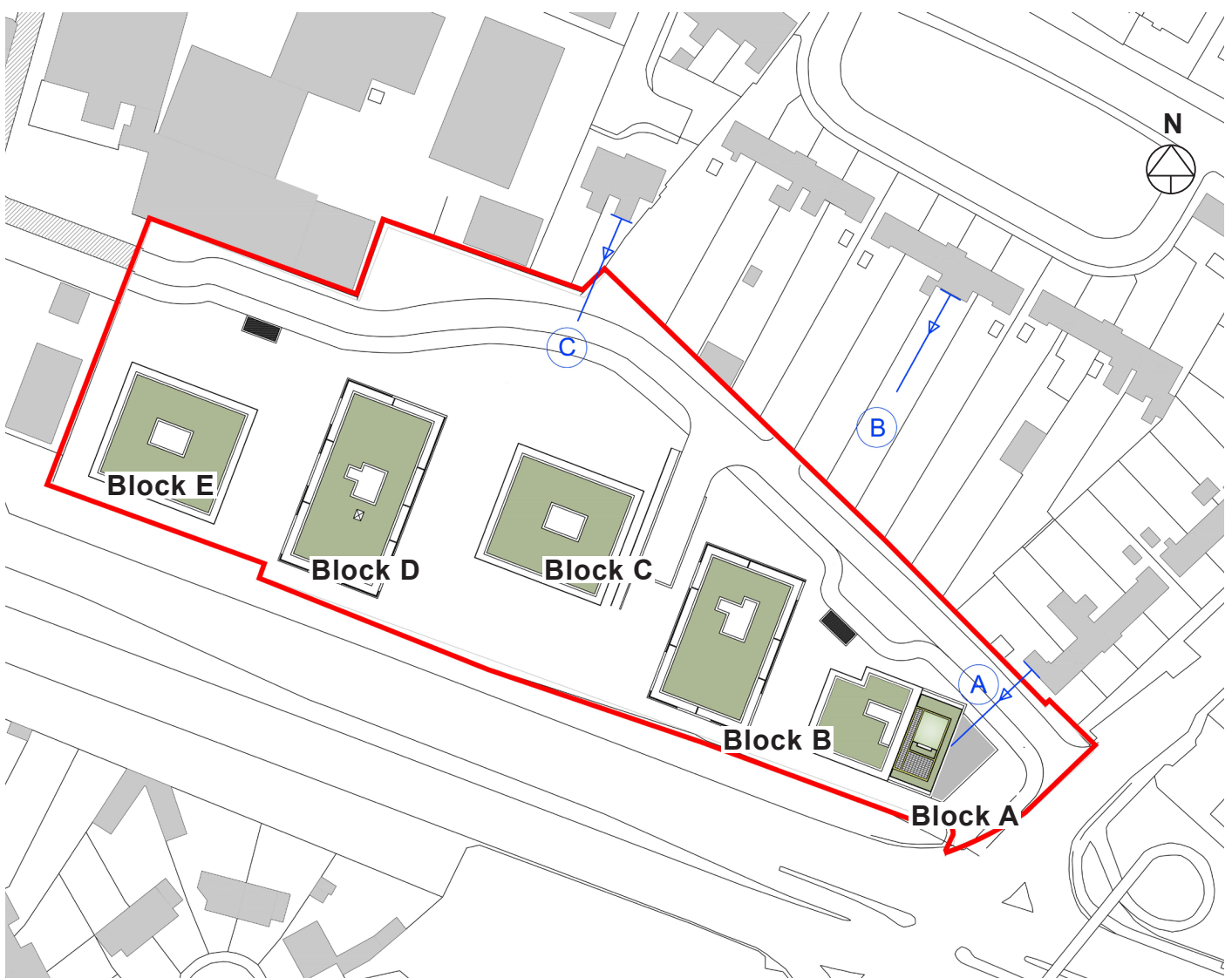


Fig 2. Proposed Site Plan noting properties with the closest windows facing onto the development.

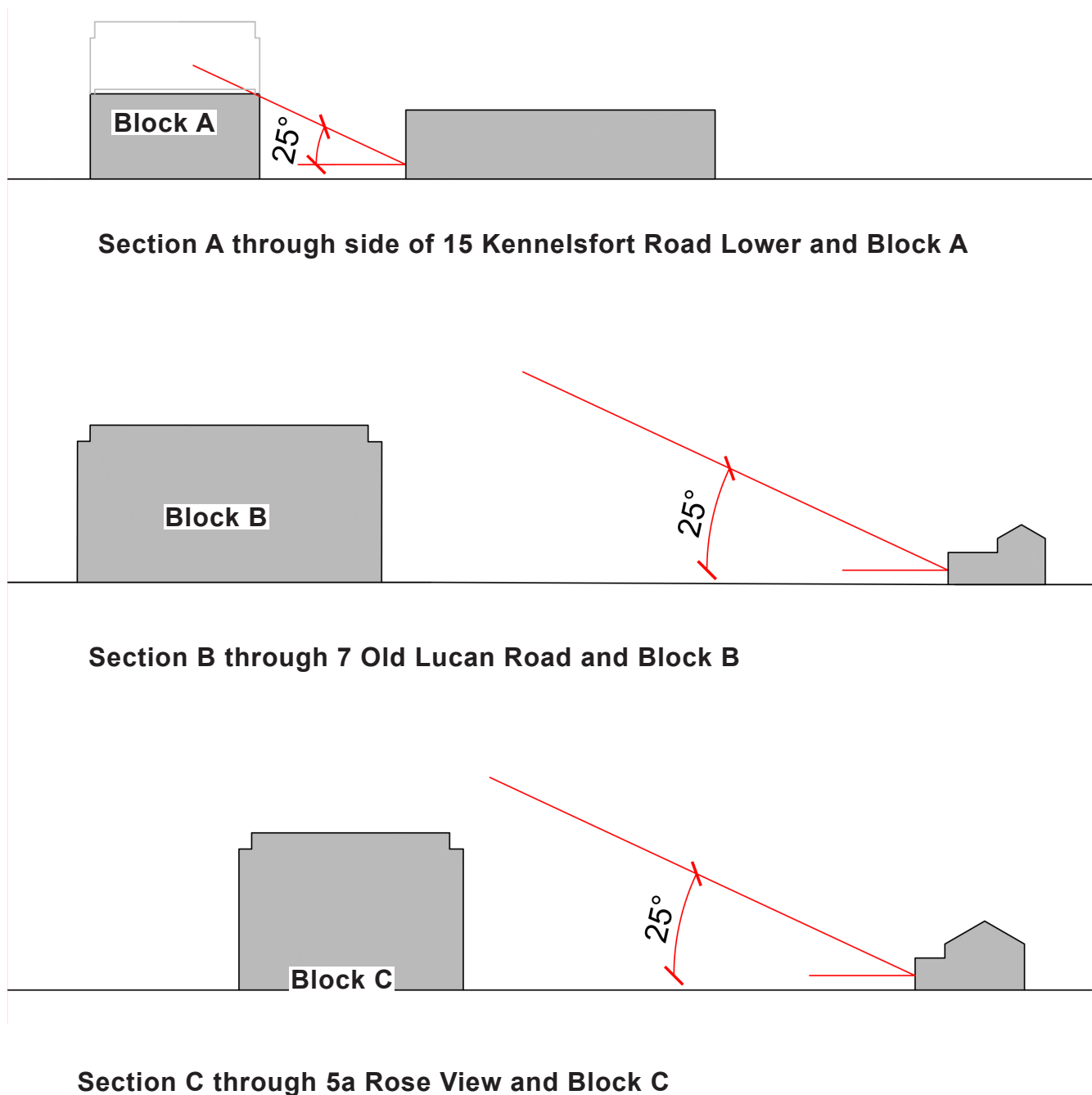


Fig 3. Site sections through the window wall of adjacent properties.

Analysis in section shows that the proposed development will not subtend the 25° angle at any of the locations tested except for at location Section A, the house at 15 Kennelsfort Road Lower.

Preliminary analysis also shows that the houses in Rose View and on the Old Lucan Road would not be impacted. In the interest of completeness, the rear facing windows on 4a & 5a Rose View were assessed, as they are close to the proposed development. Figures 4 and 5 show test points locations of the windows assessed for impact on their Vertical Sky Component.



Fig 4. Test point locations on 4 & 5 Rose View.



Fig 5. Test point locations on 15 Kennelsfort Road Lower

The BRE guidelines set out a two stage test for impact on Vertical Sky Component (VSC):

a) Where the VSC at the centre of the existing window exceeds 27% with the new development in place then enough sky light should still be reached by the existing window.

b) Where the VSC with the new development in place is both less than 27% and less than 0.8 times its former value, then the area lit by the window is likely to appear more gloomy, and electric light will be needed more of the time.

Available Daylight to Selected Windows				
Test Point	Vertical Sky Component Recommended 27%		Available daylight Ratio as a % of existing value Recommended 0.8	Comment
	Existing VSC	Proposed VSC	Ratio	
Rose view No.4a				
L1	34	30.5	0.90	Meets Criteria
Rose view No.5a				
L2	37	32.5	0.88	Meets Criteria
L3	21	18	0.86	Meets Criteria
15 Kennelsfort Rd. Lwr.				
L4	14	31.5	2.25	Meets Criteria
L5	8	29	3.63	Meets Criteria
L6	8	29	3.63	Meets Criteria
L7	20.5	34.5	1.68	Meets Criteria
L8	17.5	33	1.89	Meets Criteria
L9	16.5	33	2.00	Meets Criteria
L10	15.5	31.5	2.03	Meets Criteria
L11	30.5	31.5	1.03	Meets Criteria

Table 1 Vertical sky component for windows as per test points indicated in Figures 4 and 5.

Rose View - All windows tested in Rose View meet the criteria set out in the BRE guidelines and retain a VSC in excess of 27% or are not reduced below 0.8 times their former value where an impact may be noticeable. Both L1 and L2 are windows to ground floor extension rooms which have additional windows and roof lights with different aspects which would further reduce any noticeable impact.

Kennelsfort - No.15 Kennelsfort Rd Lower will have an increased availability of daylight due to the large massing directly adjacent the boundary that will be removed and all windows will have an increased VSC should the development proceed.

Conclusion

The proposed development meets the recommendations of the BRE guidelines. There should be no noticeable loss of available light to the surrounding residential houses and No. 5 Kennelsfort will see an improvement over current conditions. Any impact from the proposed development will be negligible.

4. Daylight to proposed apartments.

Assessment for Average Daylight Factor within the Proposed Development.

The BRE guidelines recommend that the Average Daylight Factor be assessed in new developments. Four units were selected as the worst-case scenarios. They are selected because of orientation, room depth, single aspect and/ or closeness to an adjacent obstruction mass. Only living rooms and bedrooms are required to be assessed. The results are set out in Table 2 with location plans and generated analysis shown below. (See Figures 6-8)

Average Daylight Factor (ADF)				
Location	Use	Daylight Factor		Comment
		ADF	Minimum ADF	
Block C				
C1	Living / kitchen	4.55	2	Meets Criteria
	Bedroom	5.43	1	Meets Criteria
Block D				
D1	Living / kitchen	6.54	2	Meets Criteria
	Bedroom 1	5.17	1	Meets Criteria
D2	Living / kitchen	4.04	2	Meets Criteria
	Bedroom	5.26	1	Meets Criteria
D3	Living / kitchen	7.10	2	Meets Criteria
	Bedroom	6.36	1	Meets Criteria

Table 2 Average Daylight Factor for the units identified as 'worst case'.

BS 8206-2 gives minimum values of ADF of 2% for kitchens and living rooms which include a kitchen, 1.5% for living rooms and 1% for bedrooms. An average daylight factor of 5% is a well daylit space.

Within the development the design was optimised with regard to the BRE guidelines. The blocks are sufficiently spaced apart, they are simple shapes with no internal corners. Living rooms are prioritised over bedrooms, many have dual aspect. Bedrooms and living rooms in 4 units, in the most challenged positions, were assessed. All exceed the minimum ADF, most could be defined as having a well daylit space of 5%.

Conclusion

All living rooms & bedrooms in the units assessed well exceed the minimum Average Daylight Factor. The proposed development would meet the recommendations of the BRE Guidelines and BS8208 Part 2:2008 Lighting for Buildings, Code of Practice for Daylighting.

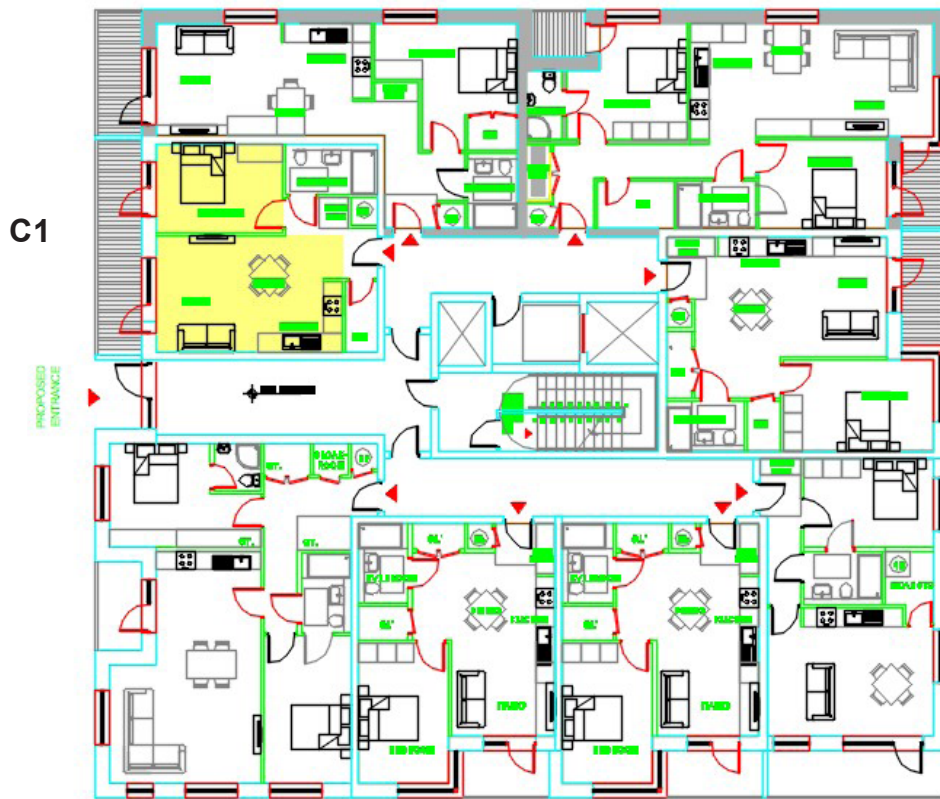


Fig 6. Ground Floor Plan of Block C indicating rooms assessed for Daylight

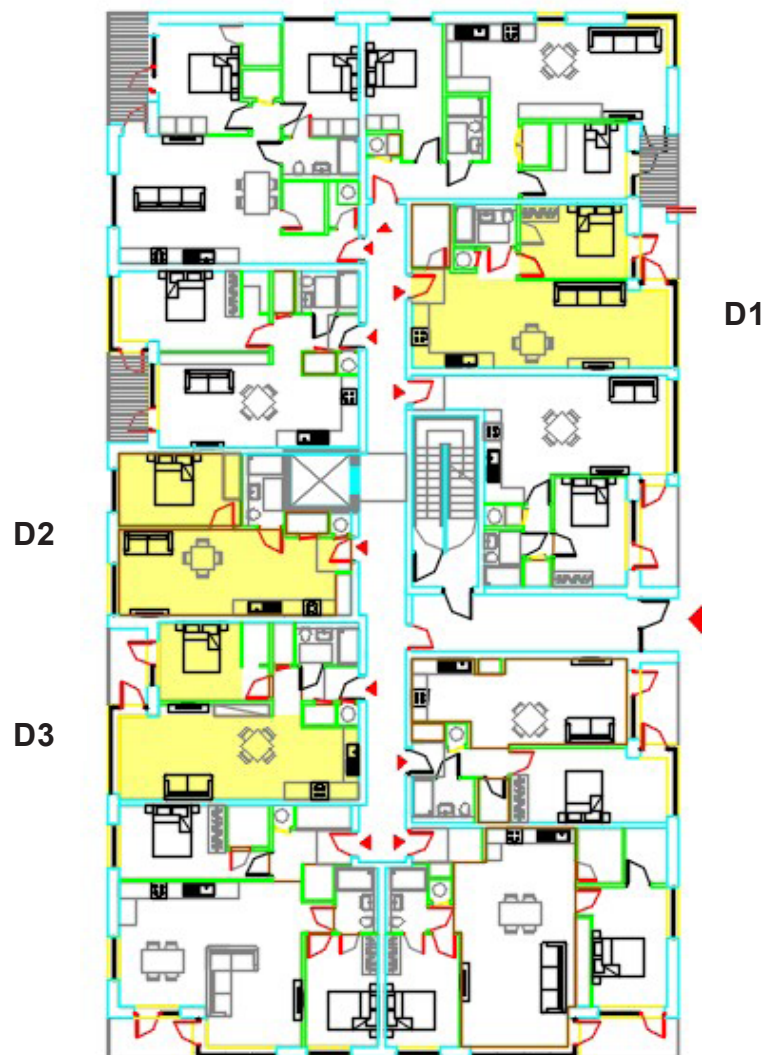


Fig 7. Ground Floor Plan of Block D indicating rooms assessed for Daylight

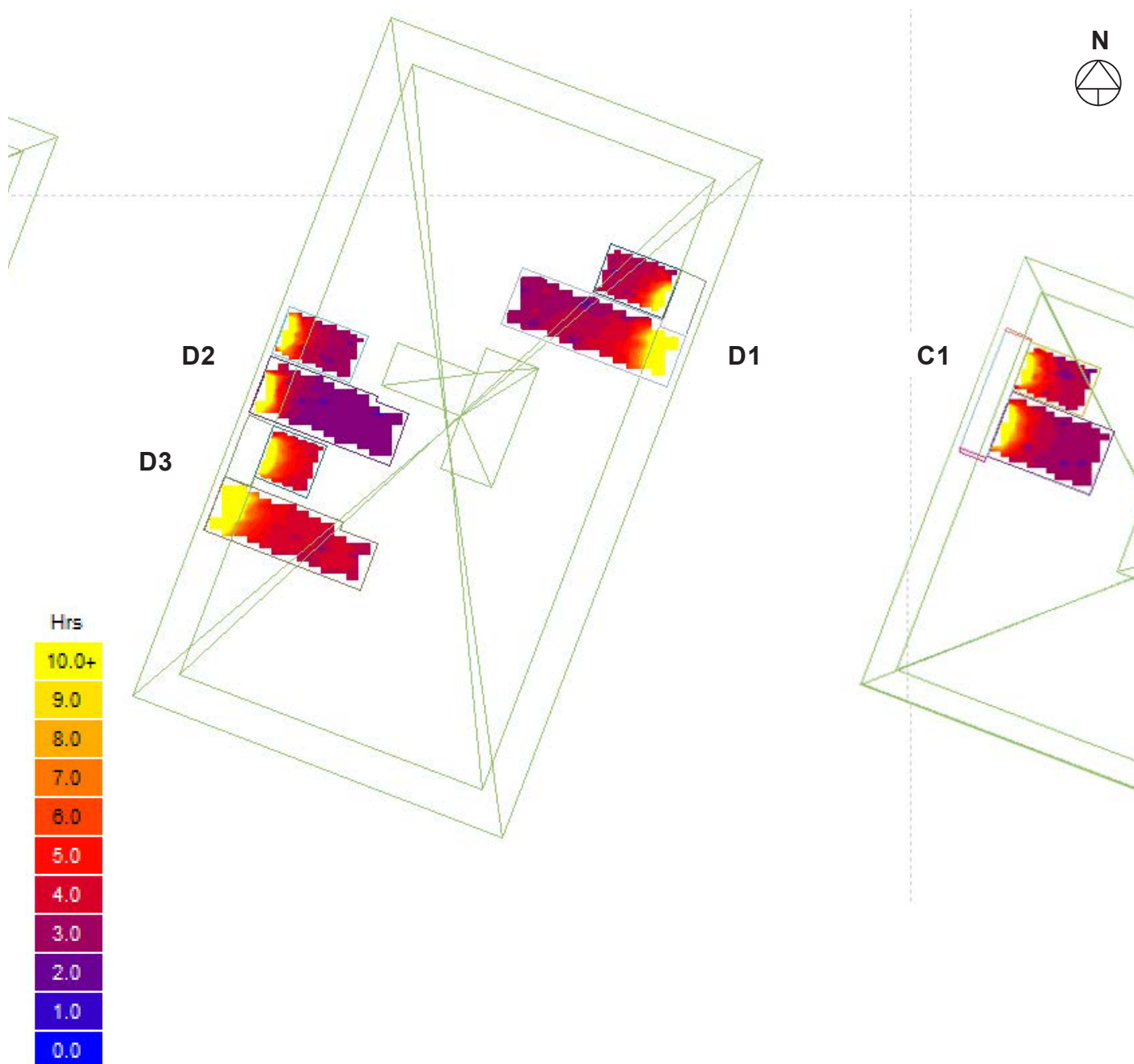


Fig 8. Partial Site Plan of generated analysis, indicating rooms assessed for Daylight, in Blocks C & D. The scale represents 0-10 hours of daylight.

5. Sunlight to gardens and open spaces

The BRE document indicates that for an amenity area to have good quality sunlight throughout the year, 50% should receive in excess of 2 hours sunlight on the 21st March. It also states that front gardens need not be assessed for sunlight.

Sunlight to adjacent gardens and open spaces

There are three private amenity spaces adjacent to this proposal, which have been assessed with a calculation of Sun on the Ground. The rear gardens to 4a & 5a Rose View and at 15 Kennelsfort Road Lower to the North of the proposed development are tested for existing and proposed conditions as these are the most likely to be impacted. The houses to the South, on the opposite side of the Chapelizod Bypass, will not be affected. The results are shown in Table 3 and radiation maps of generated analysis are shown in Figure 6 below.

Sunlight on the ground - Adjacent Dwellings				
		Existing	Proposed	Ratio % of existing value
L1	Rose view No.4a	88.55	91.28	1.03
L2	Rose view No.5	89.36	90.43	1.01
L3	15 Kennelsfort Rd. Upr.	56.86	68.63	1.21

Table 3: Area of amenity space to the that receives 2 or more hours of sunlight on the 21st March.

Conclusion

The three houses selected for testing currently experience good sunlight and these levels would be improved further should the proposed development proceed due to the demolition of the structures close to the boundary leaving more access to the sky. The proposed development meets the recommendations set out in the BRE guidelines.

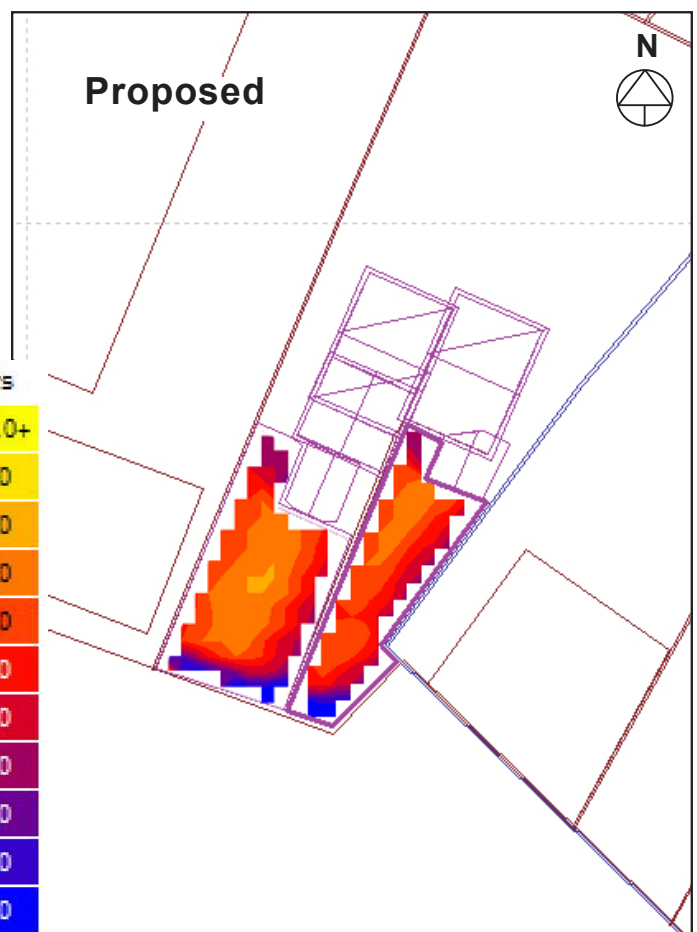
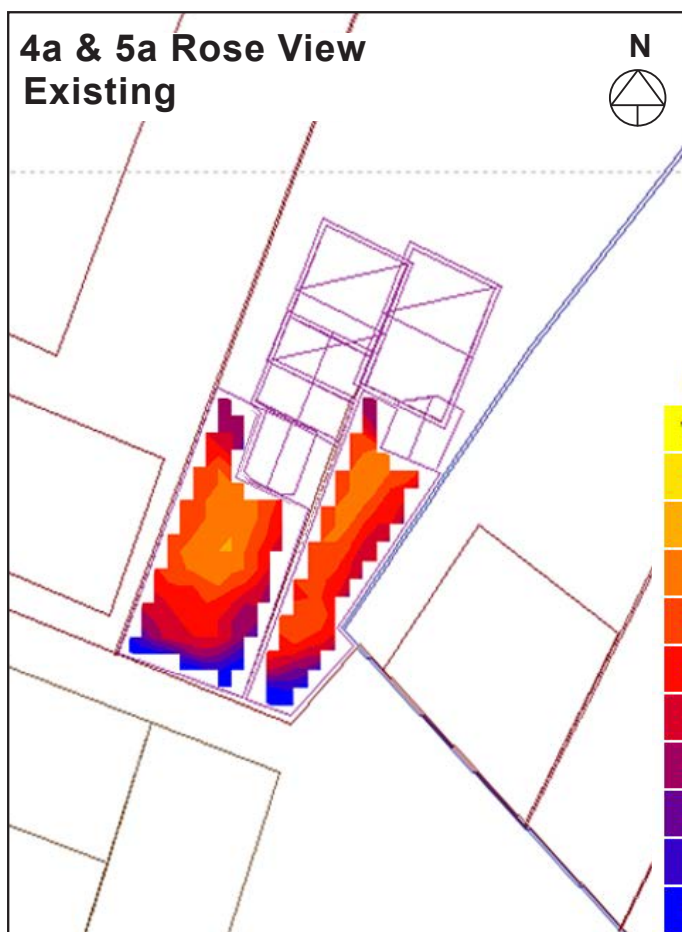
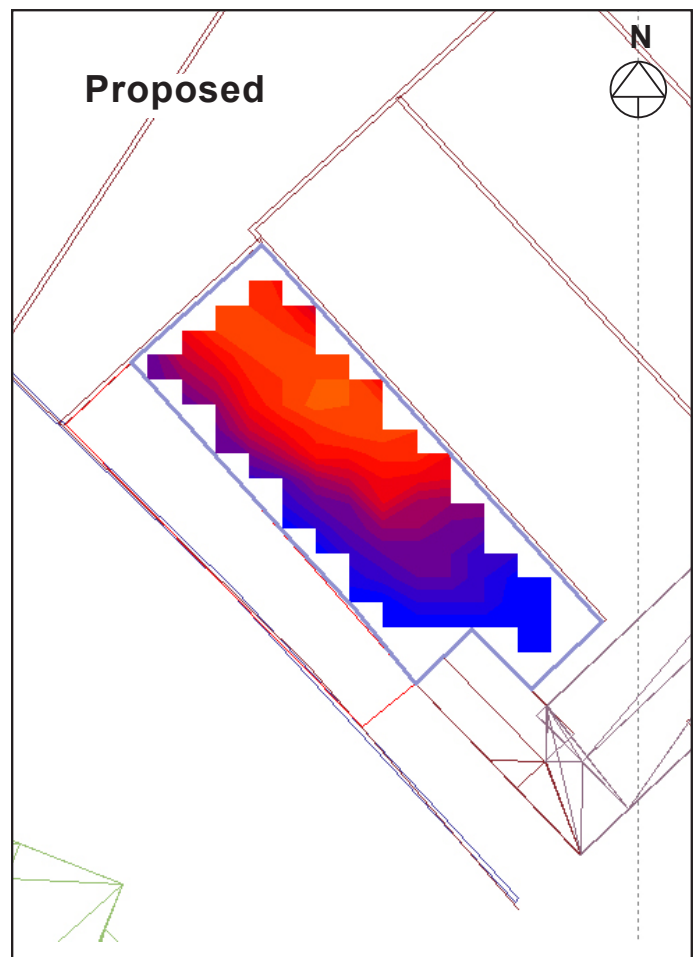
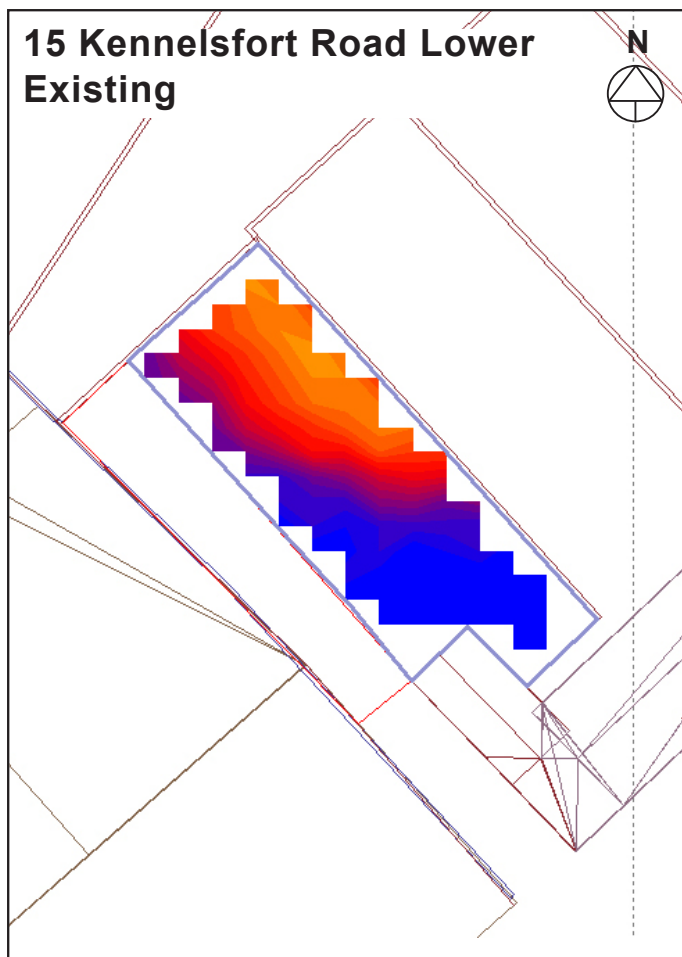


Fig 9. Existing & Proposed Radiation Map showing Average Sunlight on the Ground. The scale represents the percentage of Sunlight received from 0-10 hours.

Sunlight to Amenity within the Proposed Development



Fig 10. Proposed Landscape Plan



Fig 11. Radiation map generated through the calculation of sun on the ground, on the 21st March as per BRE guidelines. Scale indicates 0-10 hours of sunlight.

Sunlight to Amenity Spaces within the Proposed Development

A variety of amenity spaces have been designed into this scheme, including a roof terrace on Block A. All exceed the BRE recommendation that 50% of the area receive more than 2 hours of sunlight on the 21st March. For location plan and generated analysis see Figures 10 & 11 above and results in Table 4 below.

Sunlight on the Ground - Proposed Development		
	Description	Proposed
S1	Area at Blocks D & E	70%
S2	Area at Blocks B, C & D	82.5%
S3	Area at Blocks A & B	94.5%
S4	Roof terrace Block A	100%

Table 4: Area of amenity space to the that receives 2 or more hours of sunlight on the 21st March.

Conclusion

The proposed development meets the recommendations of the BRE guidelines and will receive in excess of 2 hours sunlight over 50% of the open space.

6. Shadow Diagrams

The BRE guidelines recommend using the 21st March for plotting shadow diagrams. June 21st and December 21st are provided for information but it should be noted that the summer solstice is the best case scenario with shadows at their shortest. In Winter even low buildings will cast long shadows and it is common for large areas of the ground to be in shadow.

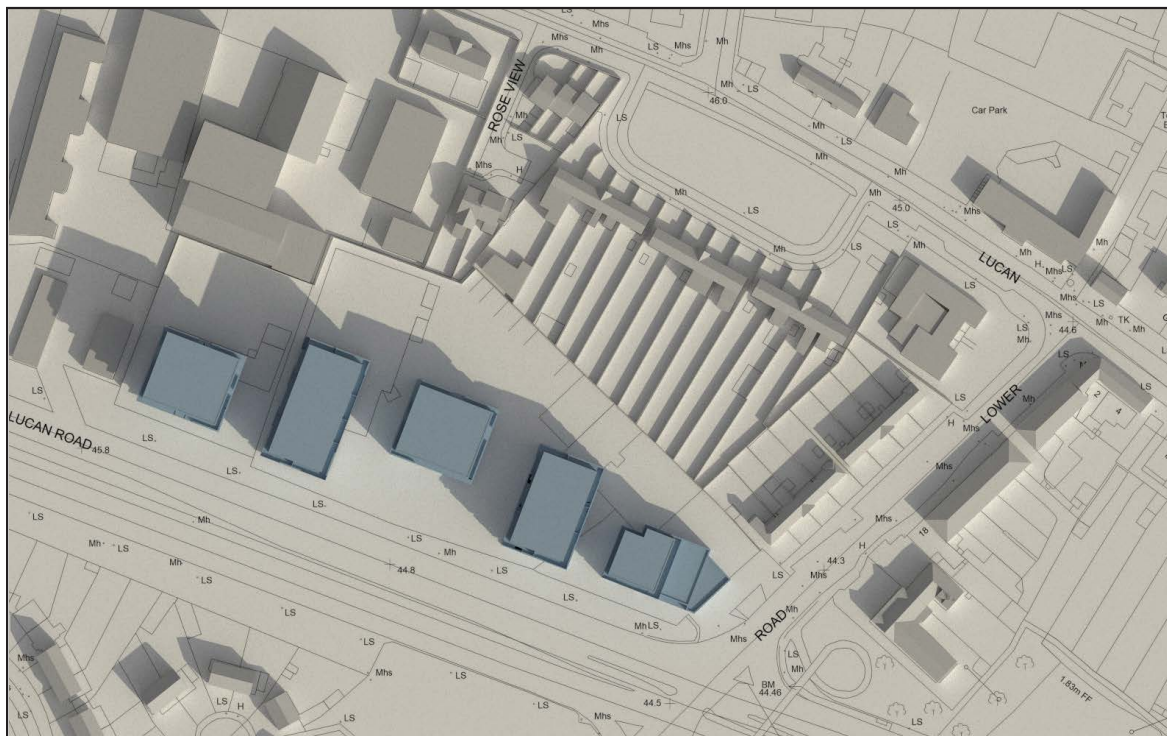
Figures 12- 15 show the existing and proposed shadow diagrams for the Equinox on the 21st March at intervals during the day.

Appendix A

Shadow Casting diagrams March Equinox



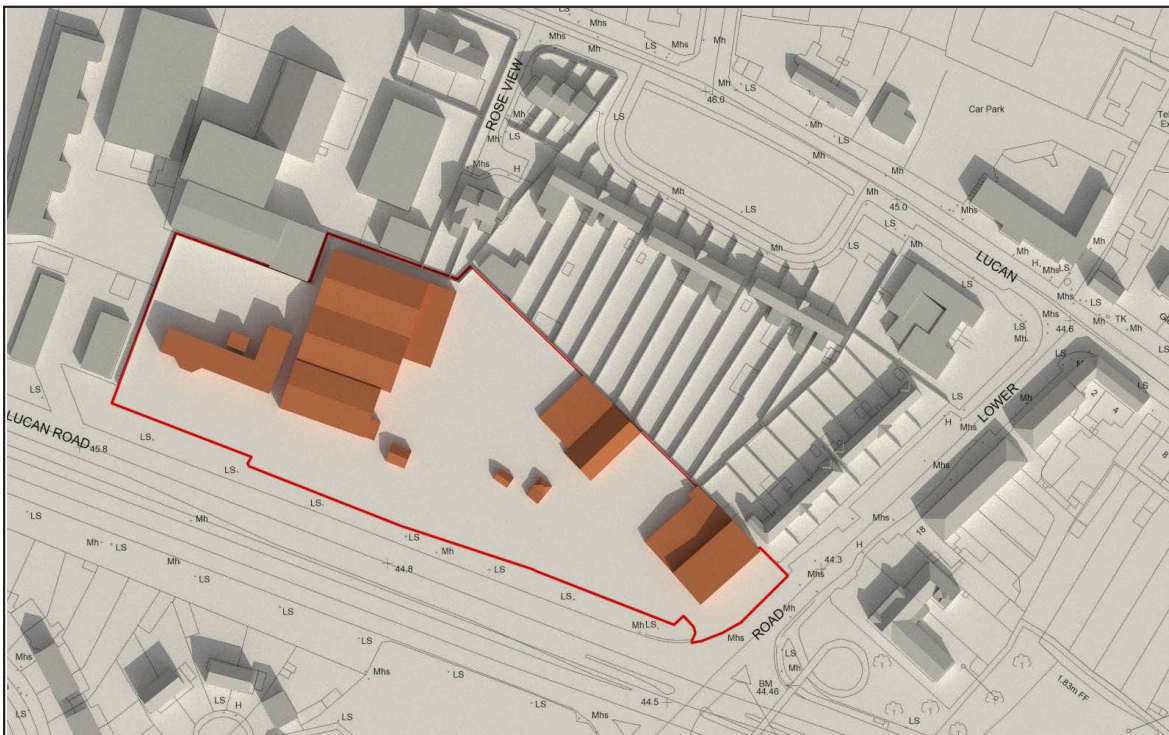
Existing



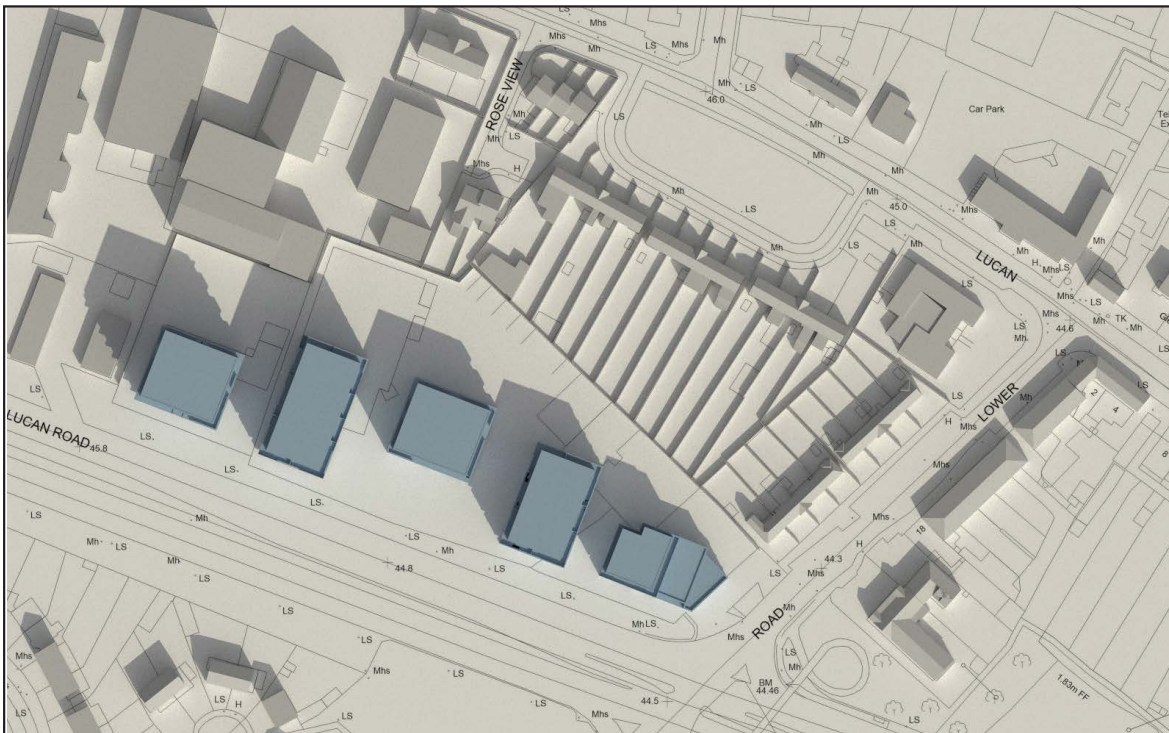
Proposed

Fig 12. Existing & Proposed Shadow diagram 21 March 10:00 GMT

Shadow Casting diagrams March Equinox



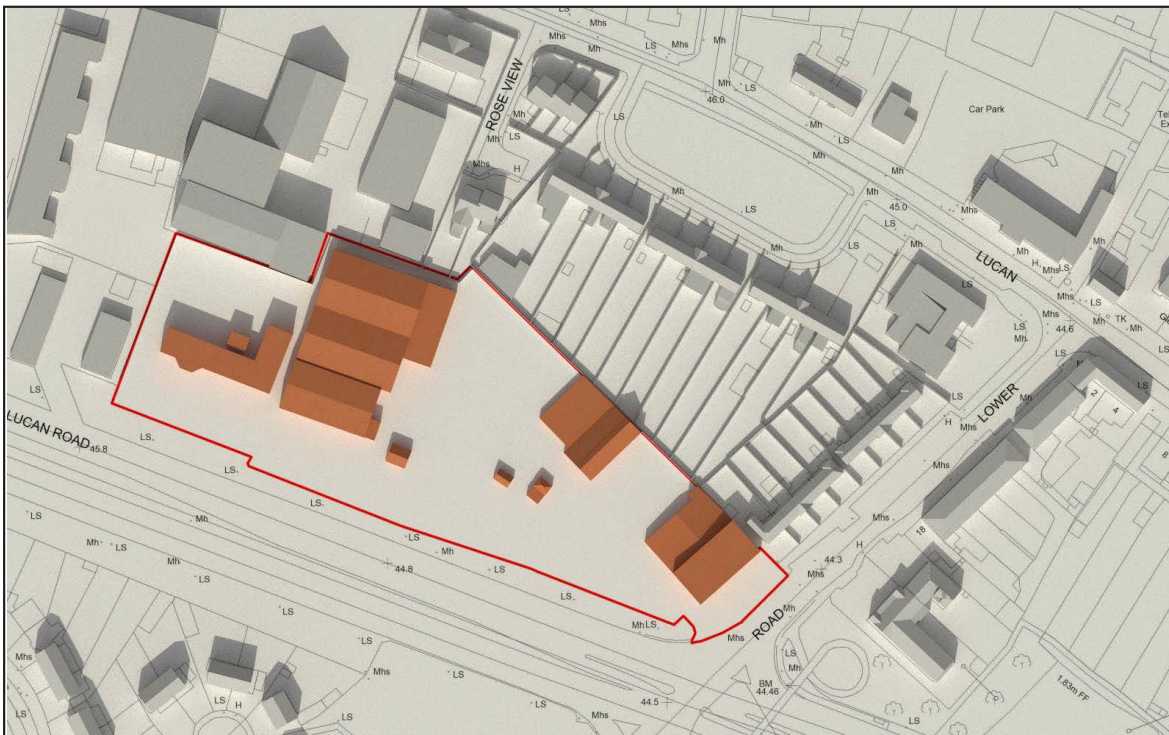
Existing



Proposed

Fig 13. Existing & Proposed Shadow diagram 21 March 11:00 GMT

Shadow Casting diagrams March Equinox



Existing



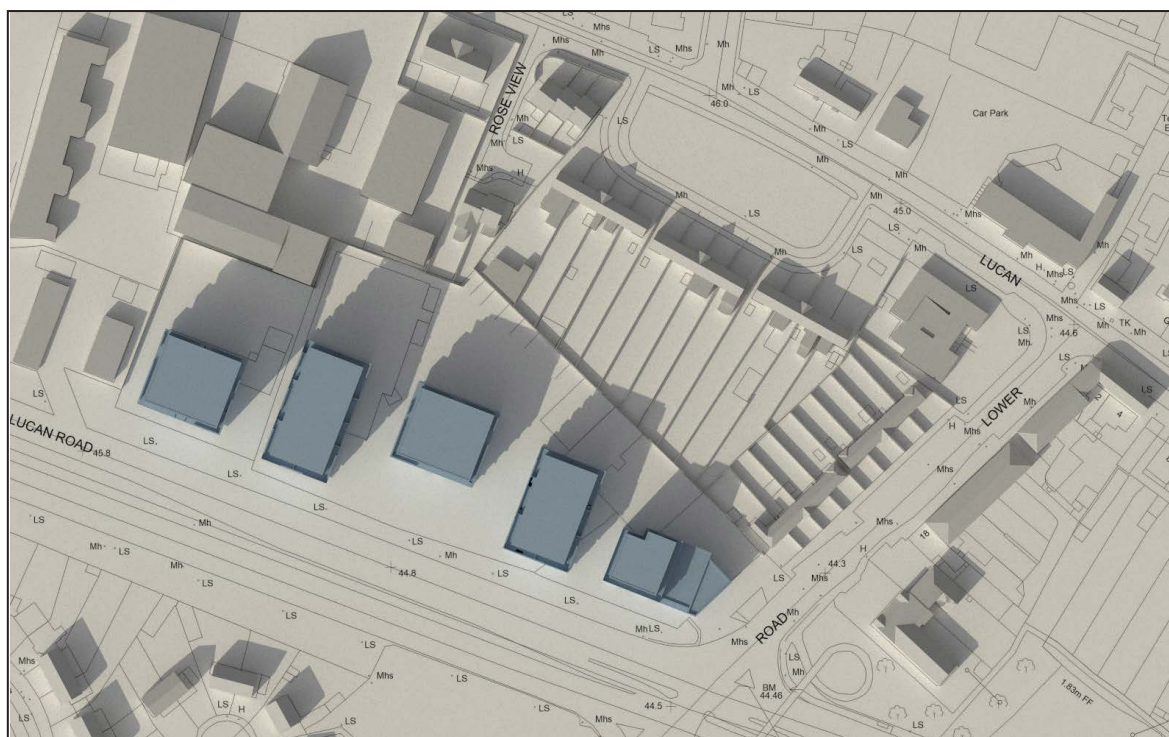
Proposed

Fig 14. Existing & Proposed Shadow diagram 21 March 13:00 GMT

Shadow Casting diagrams March Equinox



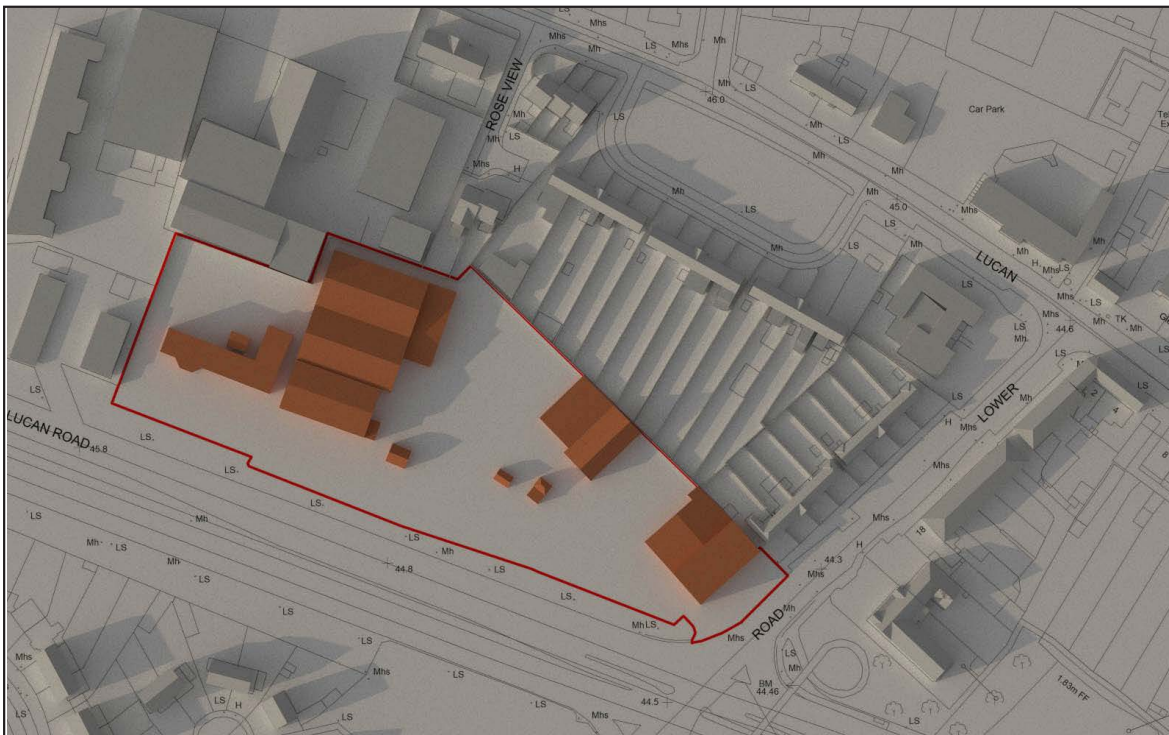
Existing



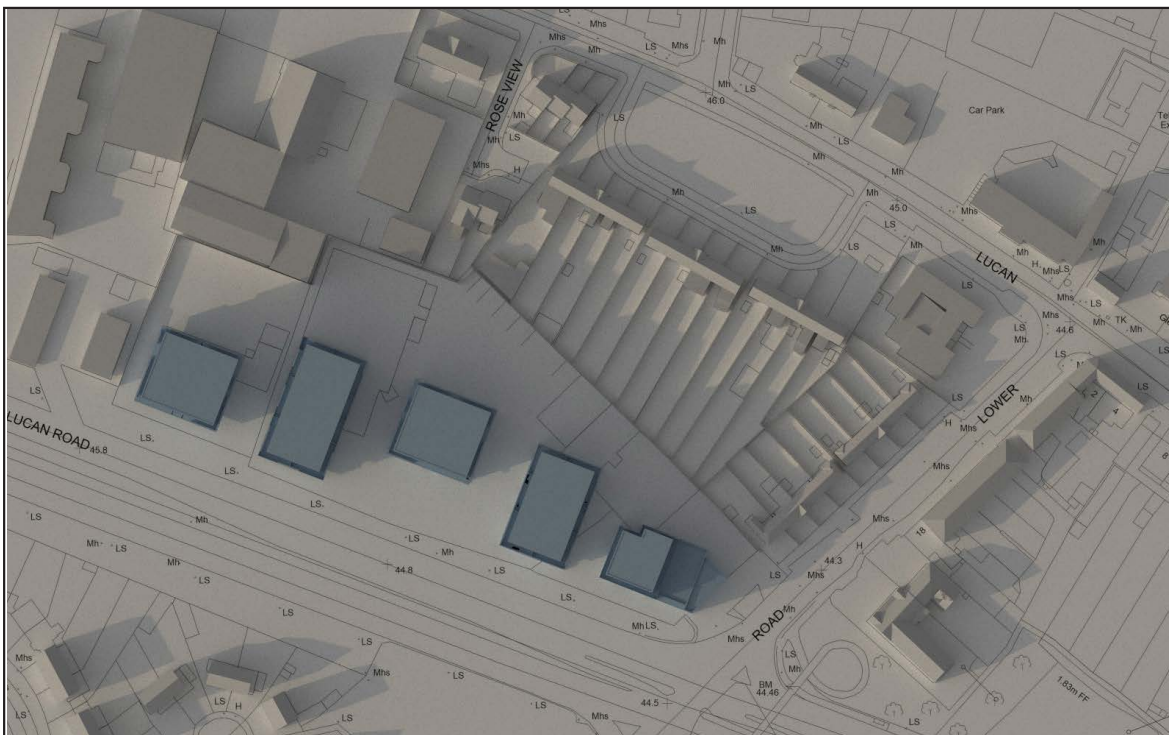
Proposed

Fig 15. Existing & Proposed Shadow diagram 21 March 15:00 GMT

Shadow Casting diagrams March Equinox



Existing



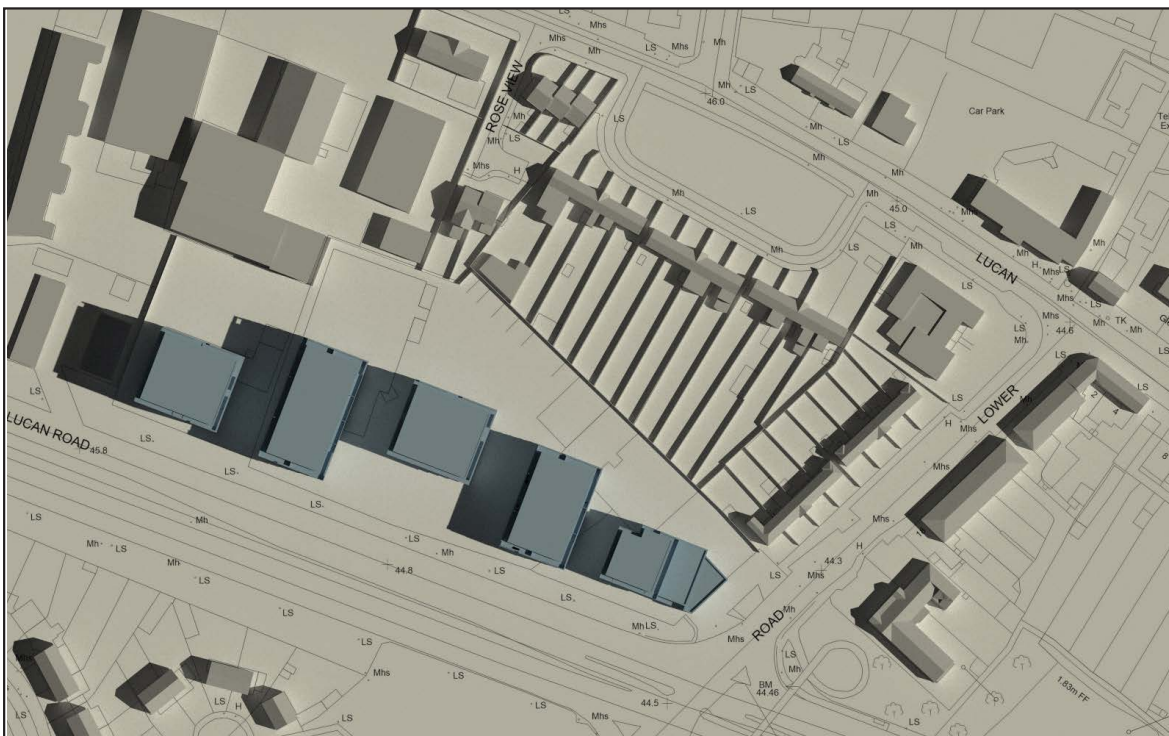
Proposed

Fig 16. Existing & Proposed Shadow diagram 21 March 17:00 GMT

Shadow Casting diagrams June Solstice



Existing



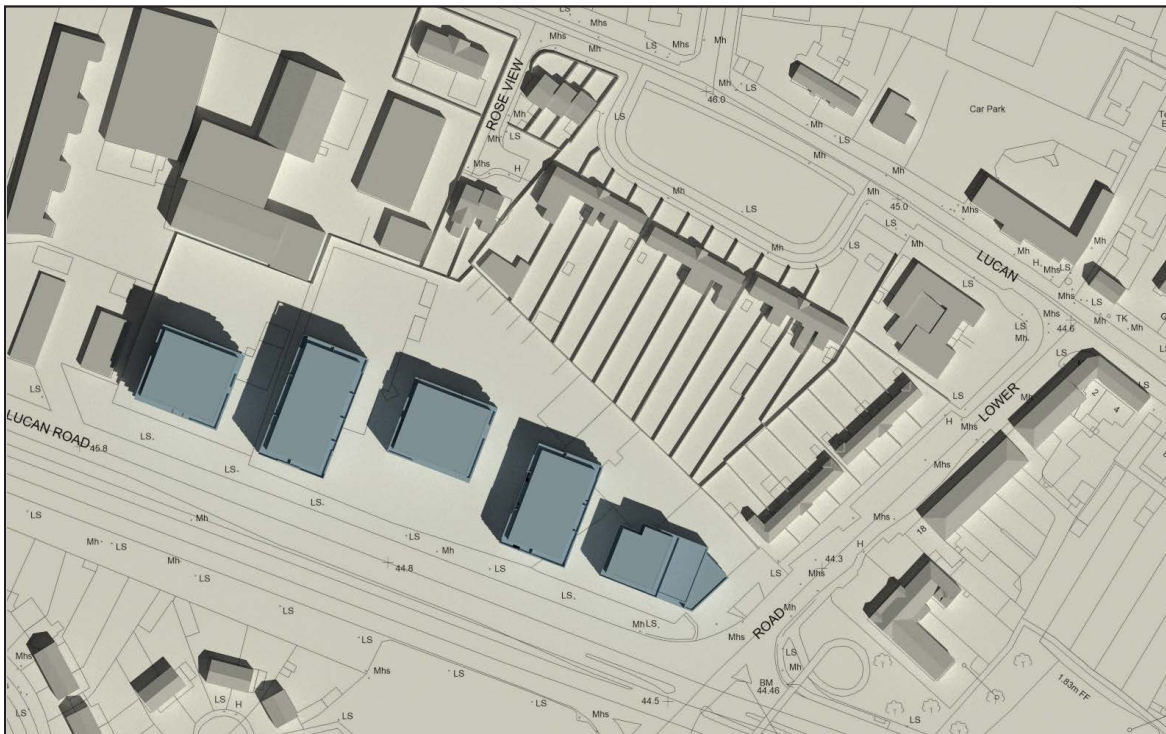
Proposed

Fig 17. Existing & Proposed Shadow diagram 21 June 10:00 GMT

Shadow Casting diagrams June Solstice



Existing



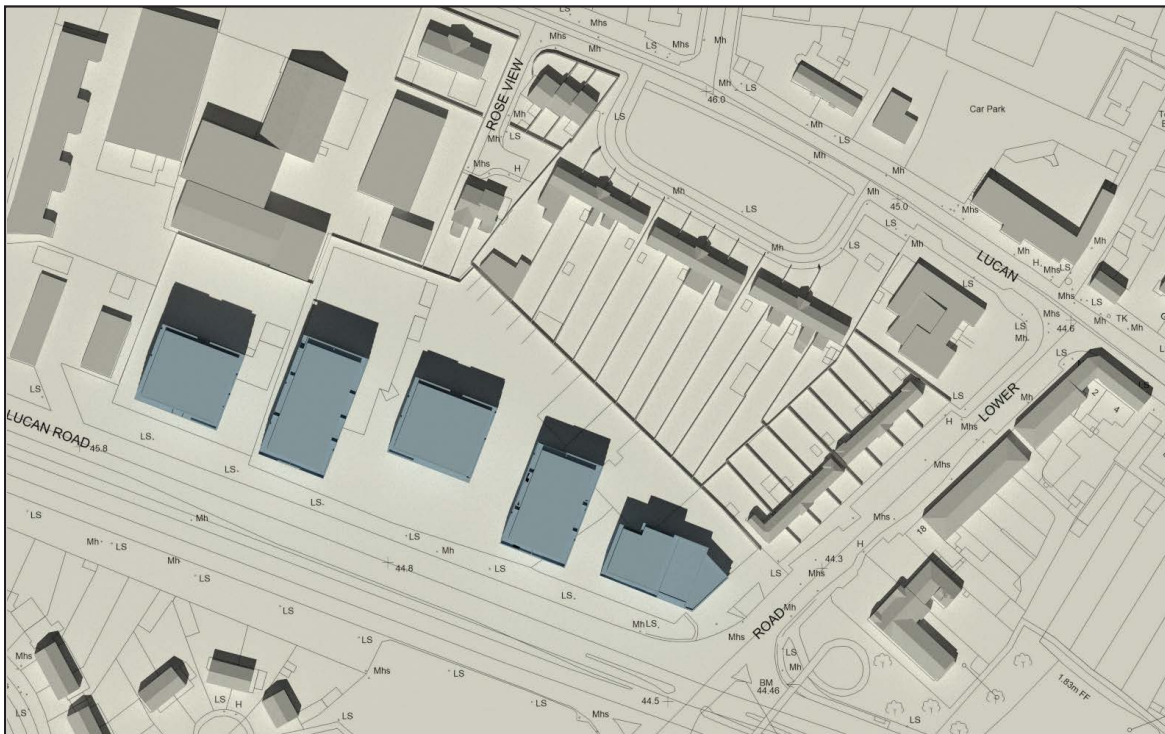
Proposed

Fig 18. Existing & Proposed Shadow diagram 21 June 12:00 GMT

Shadow Casting diagrams June Solstice



Existing



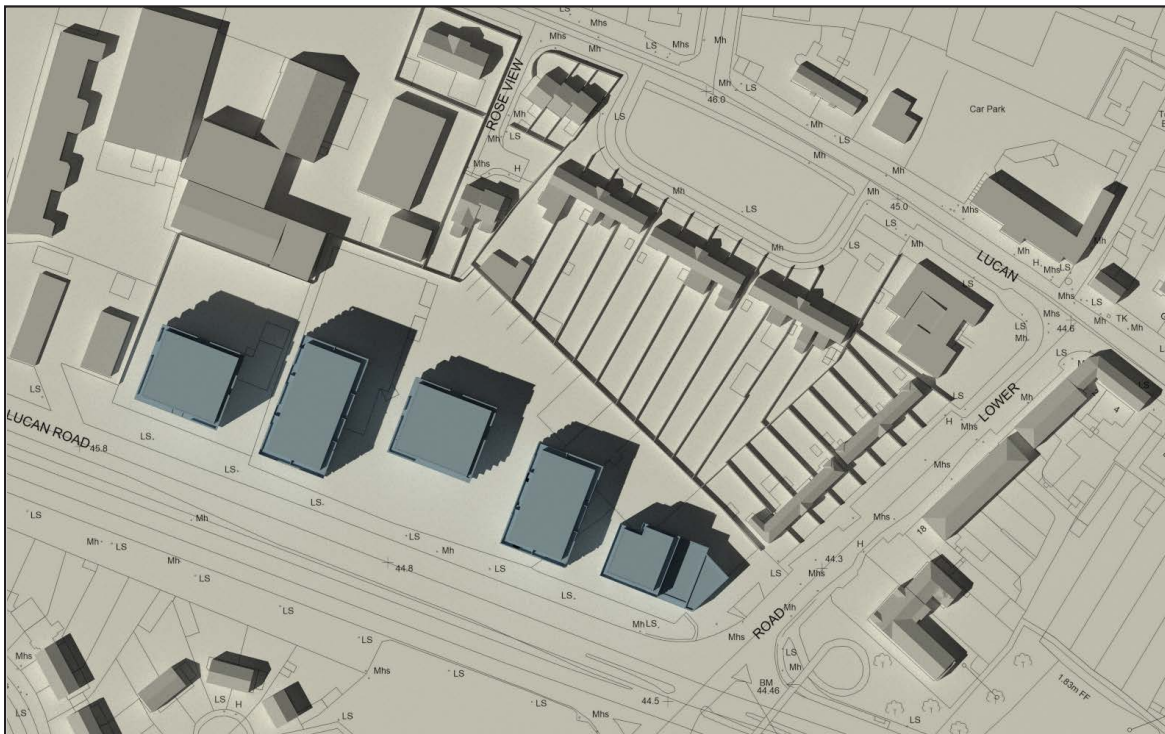
Proposed

Fig 19. Existing & Proposed Shadow diagram 21 June 14:00 GMT

Shadow Casting diagrams June Solstice



Existing



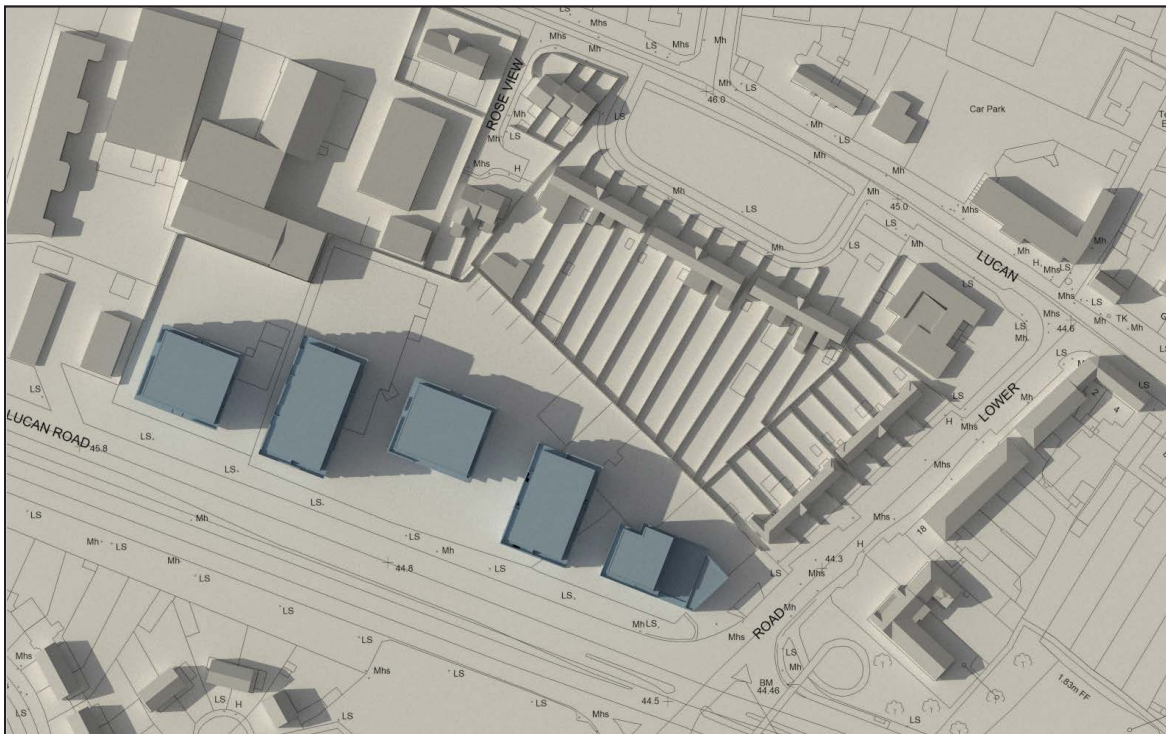
Proposed

Fig 20. Existing & Proposed Shadow diagram 21 June 16:00 GMT

Shadow Casting diagrams June Solstice



Existing



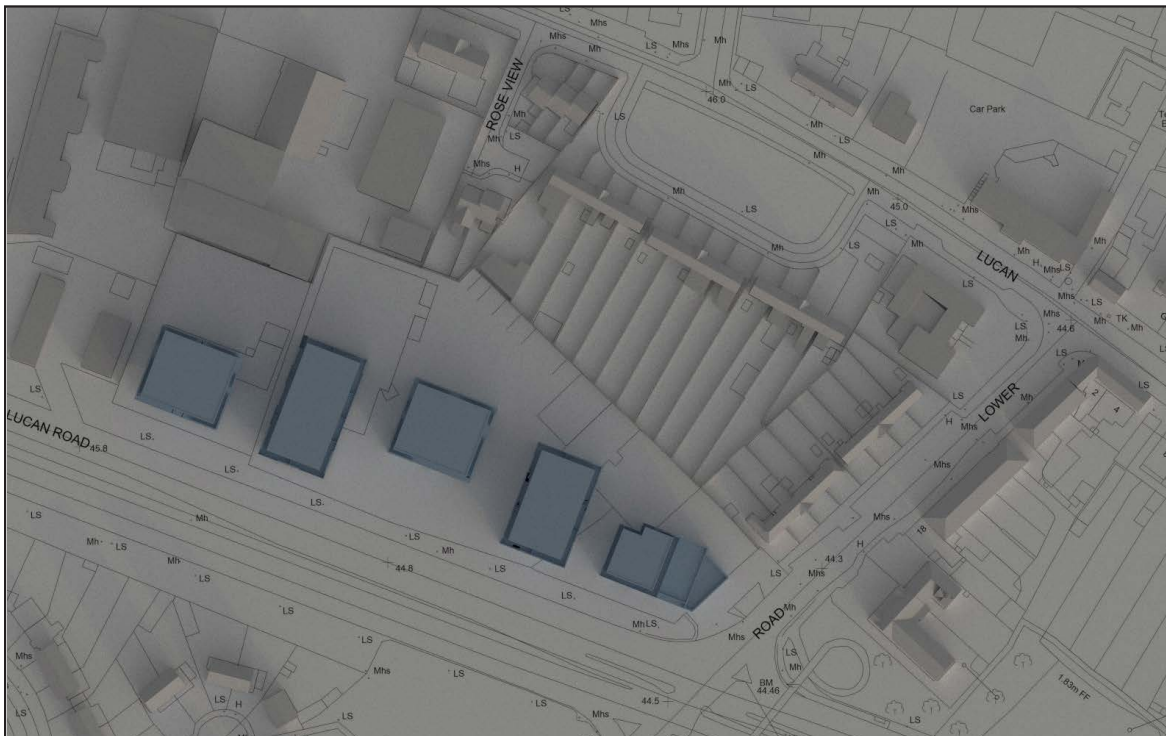
Proposed

Fig 21. Existing & Proposed Shadow diagram 21 June 18:00 GMT

Shadow Casting diagrams December Solstice



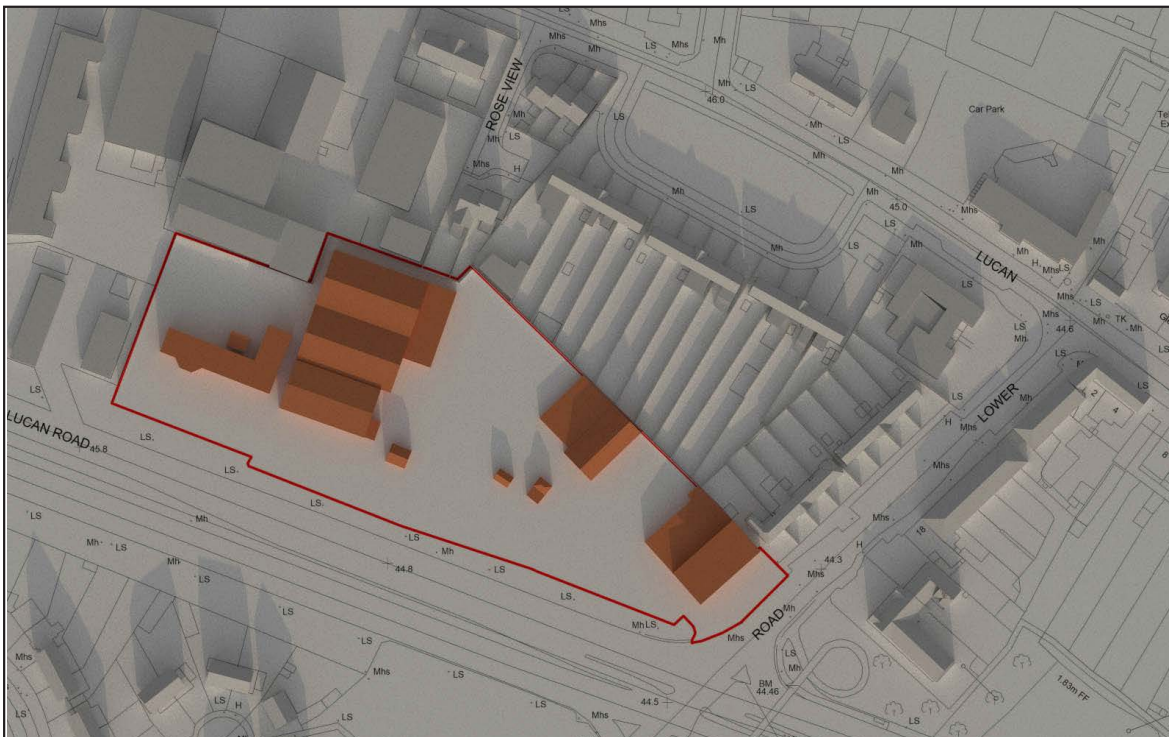
Existing



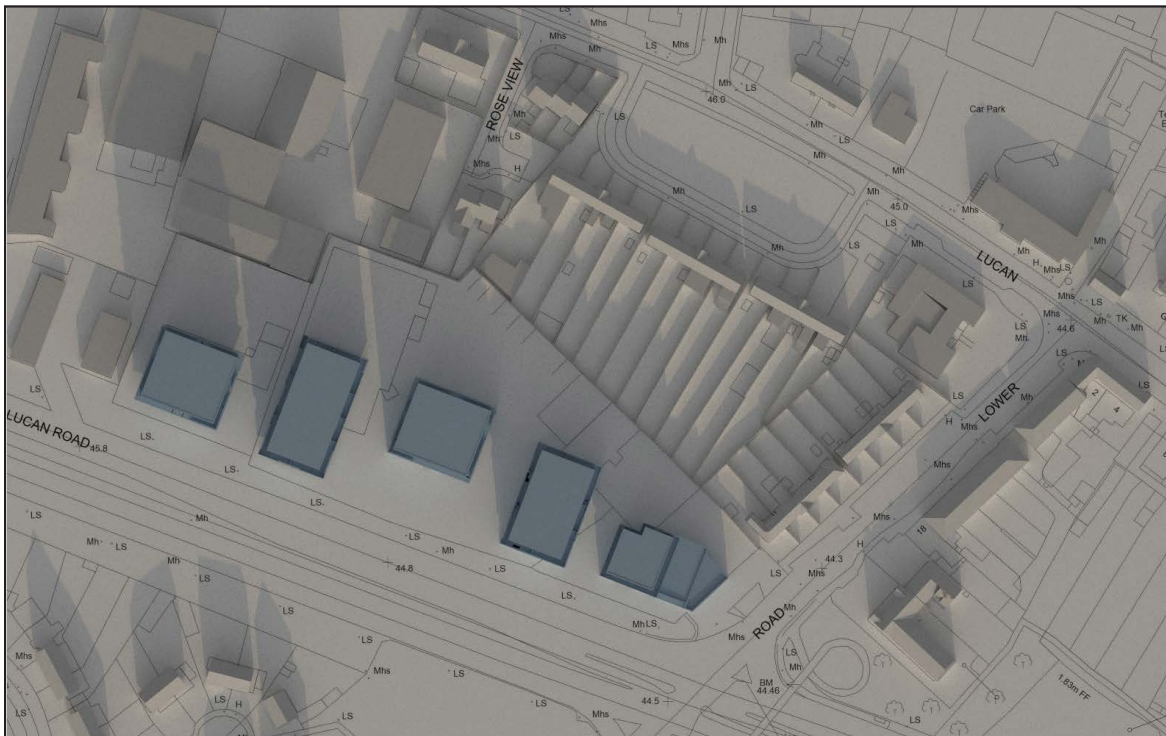
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Fig 22. Existing & Proposed Shadow diagram 21 December 10:00 GMT

Shadow Casting diagrams December Solstice



Existing



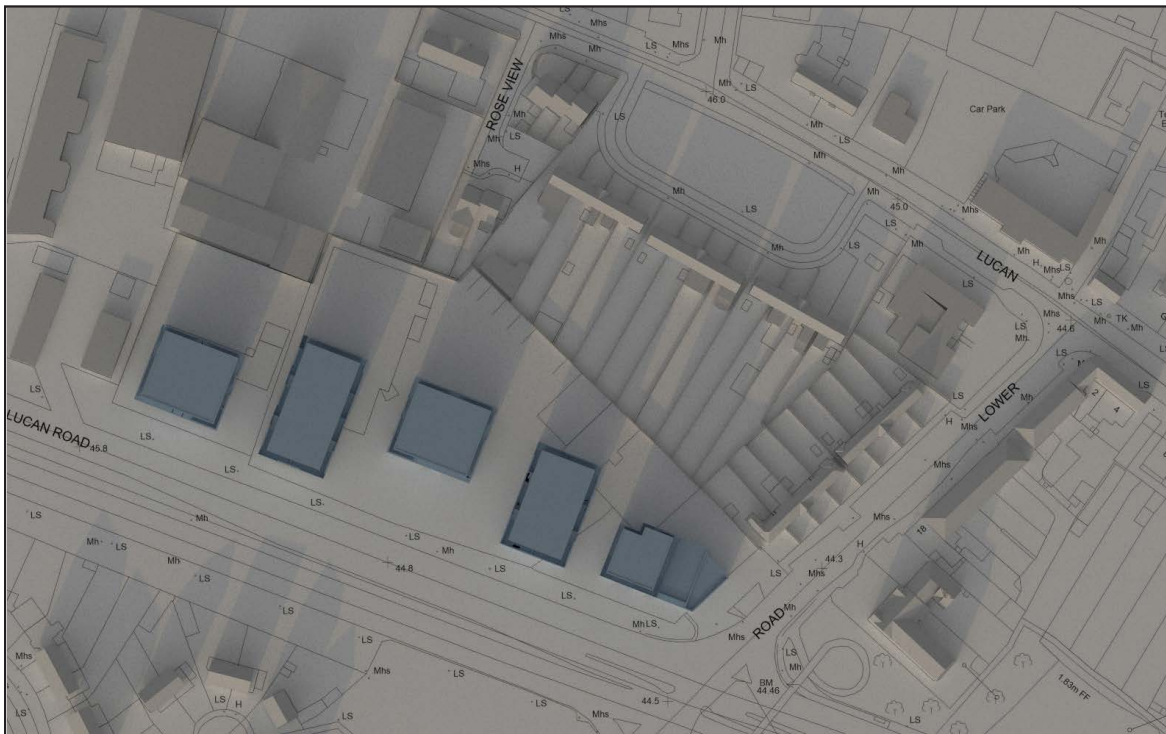
Proposed

Fig 23. Existing & Proposed Shadow diagram 21 December 12:00 GMT

Shadow Casting diagrams December Solstice



Existing



Proposed

Fig 24. Existing & Proposed Shadow diagram 21 December 14:00 GMT