Daylight, Sunlight & Shading Report

94 Arlington Rd, London NW1 7HT

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Pro Sustainability Ltd
Stow House
Stowhill
Childrey
OX12 9XQ
www.prosustainability.co.uk

Executive summary

This report outlines the results of the analysis for the detailed planning application for the erection of a single storey building with green roof within the rear garden for the use of the site as commercial use, including erection of a new boundary wall at 94 Arlington Rd, London NW1 7HT. This report primarily assesses the daylight, sunlight and overshadowing impact on the adjacent properties.

The methodology set out in this report is in accordance with BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2022) which is accepted as good practice by Planning Authorities.

The modelling part has been carried out using a dynamic modelling software: (IES-VE) version 2023. The RADIANCE lighting simulation package, developed by the Lawrence Berkeley Laboratory in California, in conjunction with IES modelling software interface has been used to perform the daylight simulations.

Daylight & Sunlight Impact Assessment

Based on the orientation and the site layout, windows facing the proposed single story building, within the adjacent properties; 94 Arlington Rd and 8 Delancey Passage were tested to assess the impact of the proposed development on them, in terms of daylight and sunlight.

Results indicate there will be no adverse impact on the neighboring residential units at 94 Arlington Road in terms of daylight and sunlight.

8 Delancey Passage is a commercial building consisting of two floors, the ground floor has two windows on the party wall parallel to the proposed dwelling, **with no rights on the title**. Nevertheless, those two windows were tested, results indicate a medium impact in terms of the VSC on the ground floor level, and negligible impact in terms of APSH and sky view. With no impact overall on the first floor.

Shading Assessment

The gardens of 96 Arlington Road and the proposed garden area of 94 Arlington road, were tested in terms of shading. Results indicate that the proposal has no impact on the gardens, and BRE recommendation are met.

Date	Prepared by	Signature	Version	Comments
July 2023	Halla Huws	Halla Huws.	V1	

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Section 1 Introduction

This report assesses the impact of daylight, sunlight & shading levels, due to the proposed one storey commercial unit at 94 Arlington Rd, London NW1 7HT, on the adjacent properties.

The approach is based on the BRE's "Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice" PJ Littlefair 2022, BRE Guide / BS 8206-2:2008 & EN 17037:2018. which is generally accepted as good practice by Town and Country Planning authorities.

It should be noted that although the numerical values stated in the BRE provide useful guidance to designers, consultants and planning officials, these are purely advisory and may vary depending on context.

Site Location

The proposal site is at the rear of 94 Arlington Road, with access onto Delancey Passage.

The proposal is for the erection of a single storey building with green roof within the rear garden for the use of the site as commercial use, including erection of a new boundary wall.

Based on the orientation and sun cast analysis, the analysis was mainly carried out for the following: commercial unit at 8 Delancey Passage and Exisitng 94 Arlington Road residential units.

Additionally, the shading analysis of 96 and 94 Arlington gardens has been carried out due to the proximity to the site.

Figure 1 Site Location

Documents Considered

Table 1: List of Drawings

Description	Drawing Reference
Existing Site Plan	SLP SUBMITTED SBP REV B SUBMITTED
Proposed Plans	0-EXTERNAL USE OFFICE Dwg no: S.SLLP
Proposed Elevations	0-EXTERNAL USE OFFICE Dwg no: S.SLLP

Calculation Data

Weather file: London Heathrow

Software: IES-VE 2023

Sky Model: CIE Standard Overcast Sky

Sunlight and Daylight for Existing Buildings Methodology

The following methodology was used to carry out the daylight, sunlight and overshadowing assessments. The methodology is based on the guidelines set out in the BRE "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (2022).

Vertical Sky Component

The BRE document definition of the (VSC) is: Ratio of the part of illuminance, at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

The VSC is usually expressed as a percentage and the maximum value for a completely unobstructed window is slightly less than 40%. The recommendations set down in the BRE report,' Site layout for daylight and sunlight, a guide to good practice', would indicate, for residential properties, that a VSC value of greater than 27% is acceptable.

The BRE guide explains that diffuse daylight may be adversely affected if, after a development, the VSC is both less than 27% and less than 0.8 times its former value. If a room has two or more windows of equal size, the mean of their VSCs may be taken.

It should be noted that the Guide itself, within the introduction, states that the advice given was not mandatory and the Guide should not be seen as an instrument of planning policy, its aim being to help, rather than constrain, the designer. Although it gives numerical guidelines, these should be interpreted flexibly.

Table 2: Magnitude of change for Vertical Sky Component (VSC) Results

VSC Values	Ratio of Impact	Magnitude of change
VSC ≥27%	≥0.8	Negligible
VSC ≥ 27%	< 0.8	Negligible
VSC < 27%	> 0.8	Negligible
VSC < 27%	0.7 – 0.8	Low
VSC < 27%	0.6 – 0.7	Medium
VSC < 27%	< 0.6	High

Sky View (No Sky Line)

The No Sky Line is the outline on the working plane of the area from which no sky can be seen. This is to determine the light distribution in a room. The IES-ve calculation method is to define the sky view factor, which is the factor from the surface to the sky, this is the ratio of the diffuse sky radiation received by the surface to that which would be received by the same surface if it were completely exposed to the sky (The theory assumes that the diffuse sky radiation is isotropic).

A significant loss is when the area of a working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value.

Annual Probable Sunlight Hours (APSH)

APSH is the total number of hours in the year that the sun is expected to shine on the center of each window, allowing for average levels of cloudiness for the location in question. This test is usually used to test façades within 90 degrees of due south.

The BRE Handbook notes that: "*…a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day*".

The BRE Handbook suggests that: "*all main living rooms of dwellings… should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun*".

If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken. If a room has two windows on opposite walls, the APSH due to each can be added together.

The BRE guide explains that sunlight availability may be adversely affected if the center of the window:

- Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21st of September and 21st March and;
- Receives less than 0.8 times its former sunlight hours during either period and;
- Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours

Table 3: Magnitude of change for APSH Results

APSH Values	Ratio of Impact	Absolute reduction in APSH	Magnitude of change
APSH ≥25%	> 0.8	≤ 4%	Negligible
APSH ≥25%	> 0.8	> 4%	Negligible
APSH ≥25%	< 0.8	> 4%	Negligible
APSH <25%	> 0.8	≤ 4%	Negligible
APSH <25%	> 0.7	> 4%	Low
APSH <25%	0.6-0.7	> 4%	Medium
APSH <25%	< 0.6	> 4%	High

Section 2 Results of Daylight and Sunlight Assessments on Existing Buildings

A daylight and sunlight assessment was carried out for the commercial unit at 8 Delancey Passage and Existing 94 Arlington Road residential units.

Sky view levels, Daylight Distribution (DD), Table 5, showed that the impact on both properties is negligible.

The Vertical Sky Component Levels (VSC) were tested. The results in Table 4 indicate that the reduction due to the proposal is negligible for all of 94 Arlington windows. W6, 8 Delancey Passage, has high impact, nevertheless as the ground floor has multiple windows, the mean VSC of windows 6 & 7 is calculated, resulting in an overall medium impact.

The Average Probable Sunlight Hours (APSH) is used to test façades within 90 degrees of due south, windows 7 and 8 were tested, indicating that the impact is negligible.

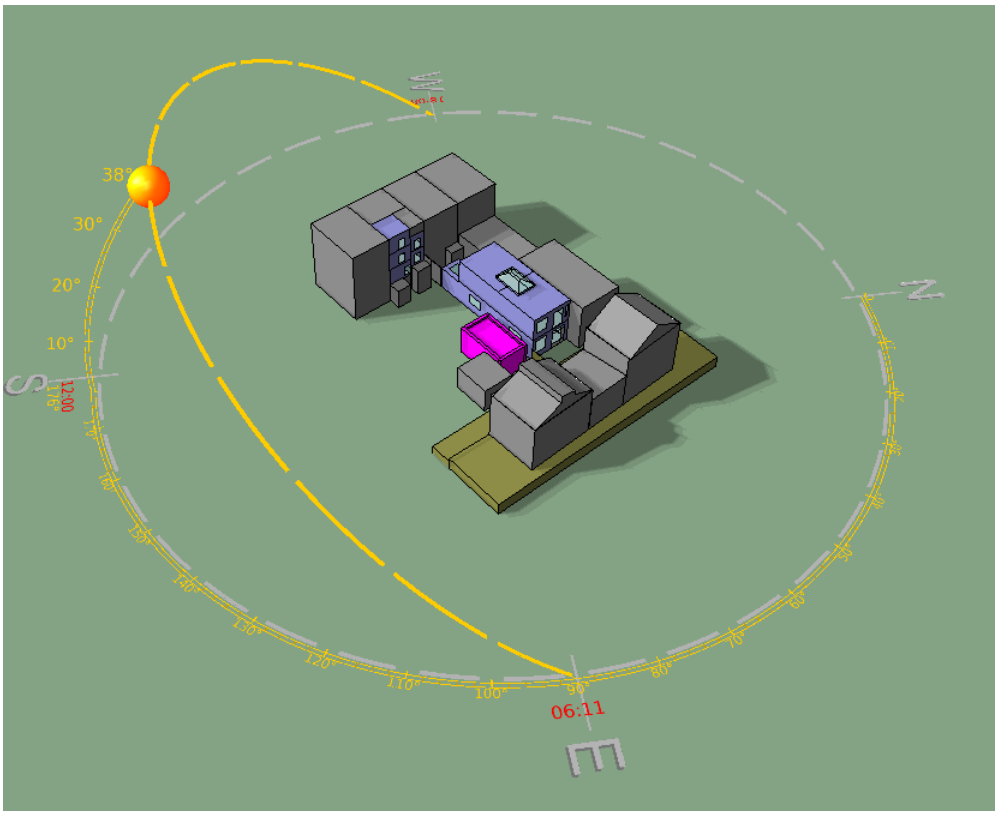


Figure 2 Sun Path on the 21st of March

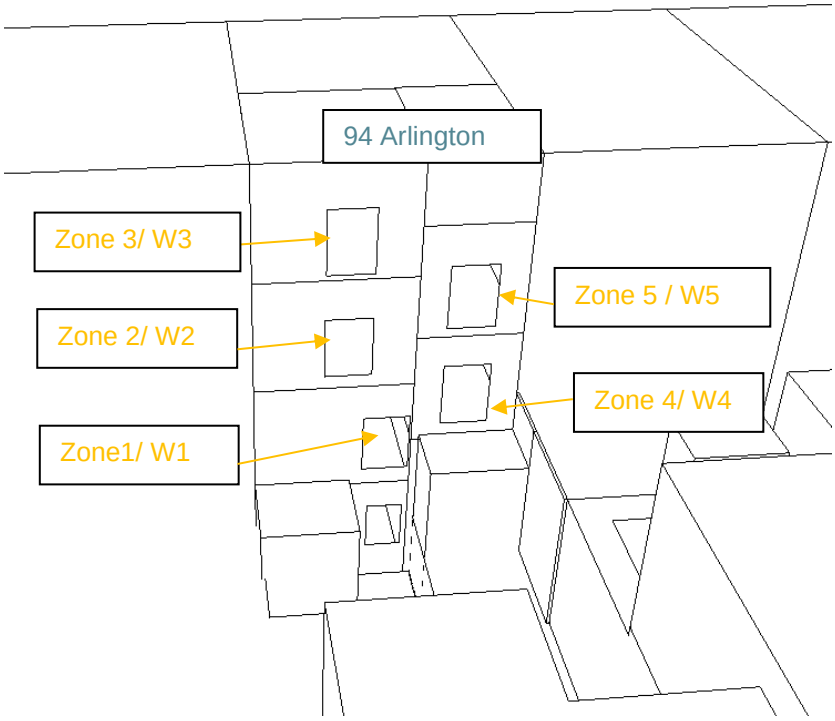


Figure 3 94 Arlington Test Zones &Windows

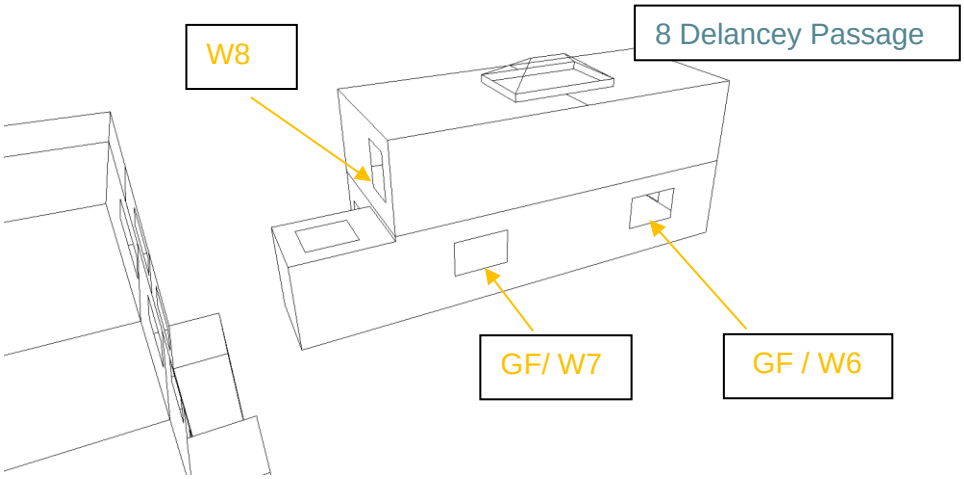


Figure 4 8 Delancey Passage Tested Zones & Windows

Table 4: Vertical Sky Component

Property	Opening Ref	Existing VSC (%)	Proposed VSC (%)	Reduction	Impact
94 Arlington	W1	31.65	31.52	0.00	Negligible
	W2	36.58	36.58	0.00	None
	W3	38.85	38.85	0.00	None
	W4	33.64	33.64	0.00	None
	W5	37.48	37.48	0.00	None
8 Delancey Passage	W6	33.40	9.23	0.72	High
	W7	35.03	33.69	0.04	Negligible
	W8	27.37	27.37	0.00	None

Table 5: Sky View Results

Building	Zone	Existing Sky view	Proposed Sky view	Reduction	Impact
94 Arlington	Zone 1	100%	100%	0	None
	Zone 2	100%	100%	0	None
	Zone 3	100%	100%	0	None
	Zone 4	75%	75%	0	Negligible
	Zone 5	100%	100%	0	None
8 Delancey Passage	Offices First Floor	100%	100%	0	None
	Offices ground Floor	99%	99%	0	None

Table 6 Average Probable Sunlight Hours

Building	Opening Ref	Scenario	Total Average (%)	Winter Average (%)	Summer Average (%)	Impact
8 Delancey Passage	7	Existing	56.97	21.88	35.09	Negligible
		Proposed	53.87	20.90	32.97	
	8	Existing	40.99	13.66	27.33	None
		Proposed	40.99	13.66	27.33	

Section 3 Shading Assessment

A shading analysis for the neighboring garden of 94 & 96 Arlington Road has been carried out.

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

Based on the BRE recommendations the solar exposure for the gardens was tested for the 21st of March, Vernal equinox. On that day the day and night have an equal length.

The results indicate that both gardens, would not be impacted in terms of shading, as they will maintain the same level of exposure.

The garden of number 96, in the existing condition, has no access to solar exposure that exceeds the 2 hours on the 21st of March. Whilst, the garden of the 94 Arlington, based on the proposed area, benefits from a southern orientation and will not be impacted, as the tested area of the garden receives 2 hours of sunlight or more on the 21st of March, and this is still maintained with the proposed commercial unit. Appendix B details the shading analysis carried out, highlight the low impact of overshadowing from the proposed commercial unit.

Table 7: Shading results

Zones	Percentage of existing with more than 2 hours of sun-21 March	Percentage of proposed with more than 2 hours of sun-21 March	Impact
Garden of 96 Arlington	100%	100%	None
Garden of 94 Arlington	0%	0%	None

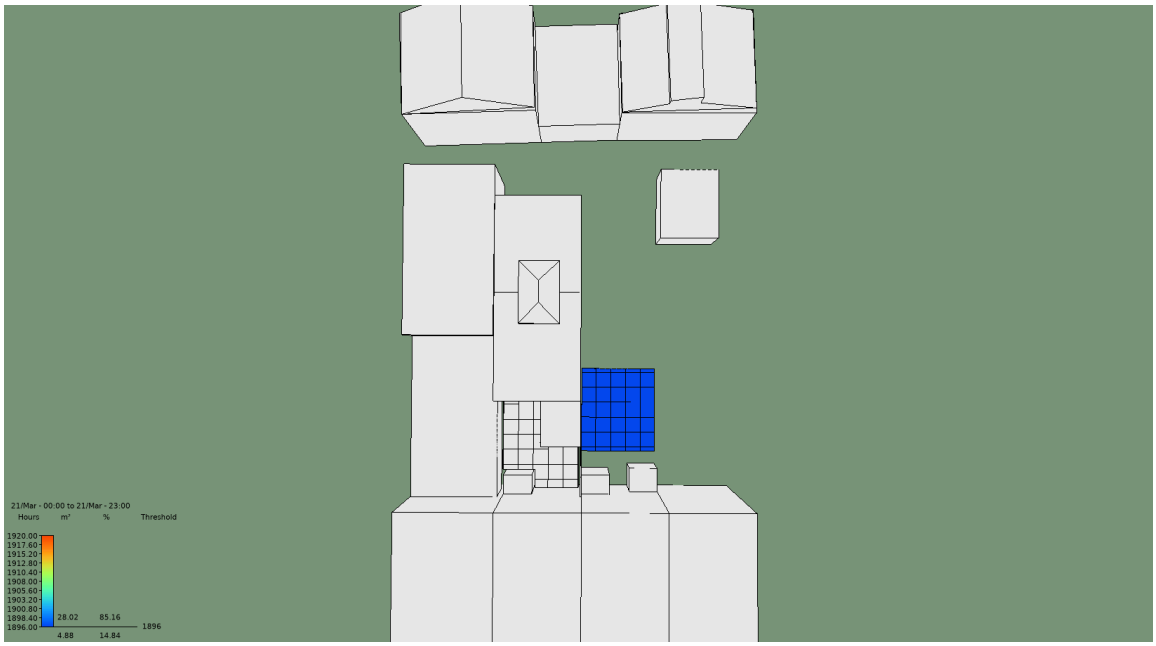


Figure 5: Solar Exposure- 21st of March- Existing

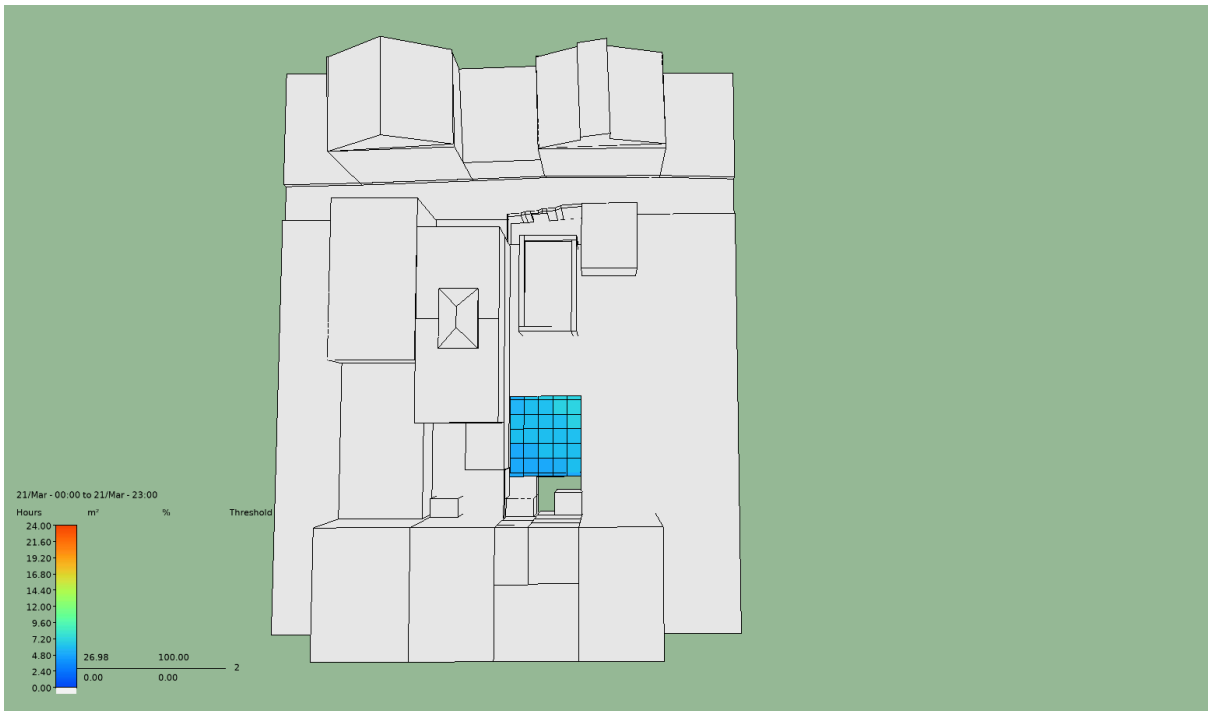


Figure 6 Solar Exposure- 21st of March- Proposed

Conclusion

Daylight, sunlight and shading assessments were carried out to assess the impact of the proposed one storey commercial unit, 94 Arlington Road, on the neighboring properties and open spaces that might impacted in terms of sunlight or daylight.

All windows and zones that might be at risk of losing sunlight or daylight due to the proposed new development were tested, those belonged to the following building; Existing residential units at 94 Arlington Road, and 8 Delancey Passage commercial unit.

Daylight and sunlight analysis were carried out for both the existing and proposed scenarios to investigate the possible impact of the proposal on those properties.

The VSC, APSH and Sky View results, all highlighted that the impact is none to negligible, for 94 Arlington, highlighting that it will retain access to daylight and sunlight.

8 Delancey Passage is a commercial building consisting of two floors, the ground floor has two windows on the party wall parallel to the proposed commercial unit, **with no rights on the title**. Nevertheless, those two windows were tested, results indicate a medium impact in terms of the VSC on the ground floor level, and negligible impact in terms of APSH and sky view. With no impact overall on the first floor.

A shading assessment has been carried out, to determine the impact of the new proposal on the gardens of 94 & 96 Arlington Road, the calculations indicated that there will be no impact, and the gardens will retain the current solar exposure.

Appendix A: Sky View

Room 94000010 (94 Arlington Z5 Existing)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=4.682m² Margin=0.50 m	Daylight factor	0.6 %	2.2 %	7.5 %	0.26	0.08
	Daylight illuminance	71.76 lux	274.45 lux	918.83 lux	0.26	0.08
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 94000011 (94 Arlington Z4 Existing)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=4.682m² Margin=0.50 m	Daylight factor	0.5 %	1.7 %	7.8 %	0.31	0.07
	Daylight illuminance	62.99 lux	202.24 lux	954.54 lux	0.31	0.07
	Sky view	0.00	0.75	1.00	0.00	0.00

Room 94000013 (94 Arlington Z2 Existing)

Analysis calculation for room -

Summary results for working planes and floor

Room 94000014 (94 Arlington Z1 Existing)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=2.352m² Margin=0.50 m	Daylight factor	0.6 %	2.3 %	7.0 %	0.25	0.08
	Daylight illuminance	70.08 lux	284.73 lux	860.17 lux	0.25	0.08
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 8D000002 (8 DP GF Existing)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=52.681m² Margin=0.50 m	Daylight factor	0.3 %	2.7 %	11.1 %	0.11	0.03
	Daylight illuminance	35.42 lux	324.12 lux	1357.52 lux	0.11	0.03
	Sky view	0.00	0.99	1.00	0.00	0.00

Room 8D000000 (8 DP FF Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=47.963m² Margin=0.50 m	Daylight factor	0.9 %	9.4 %	24.6 %	0.10	0.04
	Daylight illuminance	113.34 lux	1153.98 lux	3000.26 lux	0.10	0.04
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 94000006 (94 Arlington Z3 Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=4.682m² Margin=0.50 m	Daylight factor	0.7 %	2.1 %	6.8 %	0.35	0.11
	Daylight illuminance	90.84 lux	261.65 lux	832.86 lux	0.35	0.11
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 94000007 (94 Arlington Z2 Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=4.682m² Margin=0.50 m	Daylight factor	0.8 %	2.2 %	7.4 %	0.34	0.10
	Daylight illuminance	93.96 lux	272.75 lux	905.38 lux	0.34	0.10
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 94000008 (94 Arlington Z4 Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=4.682m² Margin=0.50 m	Daylight factor	0.7 %	1.6 %	7.5 %	0.41	0.09
	Daylight illuminance	80.74 lux	198.01 lux	913.43 lux	0.41	0.09
	Sky view	0.00	0.75	1.00	0.00	0.00

Room 9400000A (94 Arlington Z5 Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=2.352m² Margin=0.50 m	Daylight factor	0.7 %	2.2 %	6.0 %	0.33	0.12
	Daylight illuminance	87.57 lux	264.88 lux	731.61 lux	0.33	0.12
	Sky view	1.00	1.00	1.00	1.00	1.00

Room 9400000B (94 Arlington Z1 Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=2.352m² Margin=0.50 m	Daylight factor	0.8 %	2.4 %	7.1 %	0.32	0.11
	Daylight illuminance	94.97 lux	297.07 lux	869.94 lux	0.32	0.11
	Sky view	1.00	1.00	1.00	1.00	1.00

Room GF000000 (8 DP GF Proposed)

Analysis calculation for room -

Summary results for working planes and floor

Surface	Quantity	Values			Uniformity (Min./Ave.)	Diversity (Min./Max.)
		Min.	Ave.	Max.		
Working plane 1 Reflectance=0% Transmittance=100% Grid size=0.50 m Area=52.681m² Margin=0.50 m	Daylight factor	0.2 %	2.2 %	11.2 %	0.11	0.02
	Daylight illuminance	28.13 lux	265.16 lux	1366.88 lux	0.11	0.02
	Sky view	0.00	0.99	1.00	0.00	0.00

Appendix B: Shading Results

Table 7: Shading Analysis 21st of June

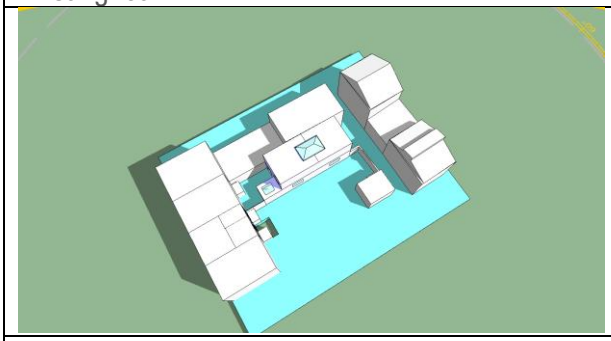
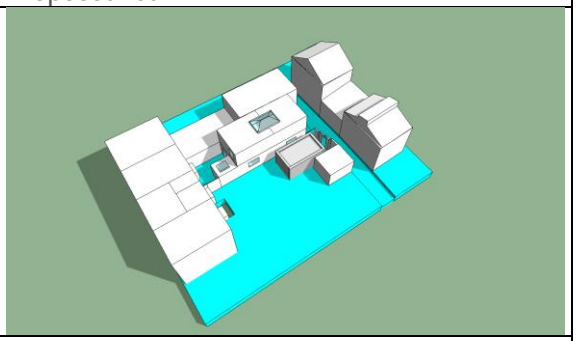
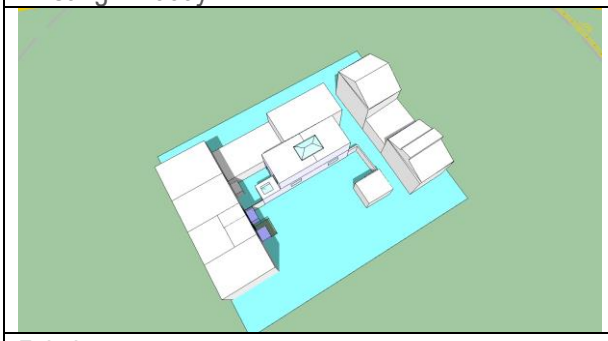
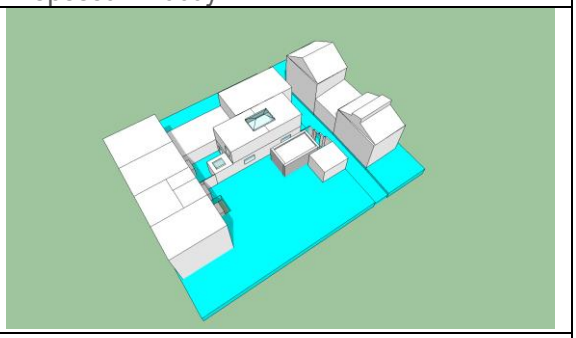
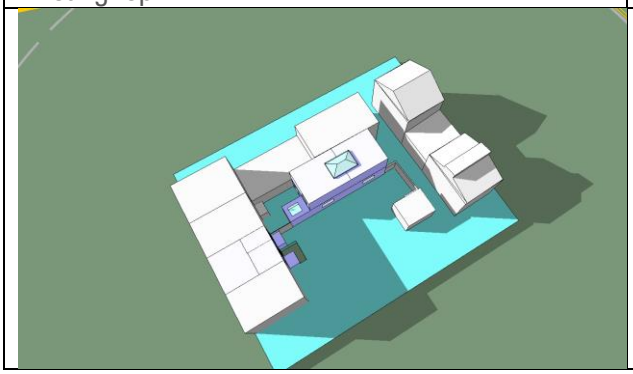
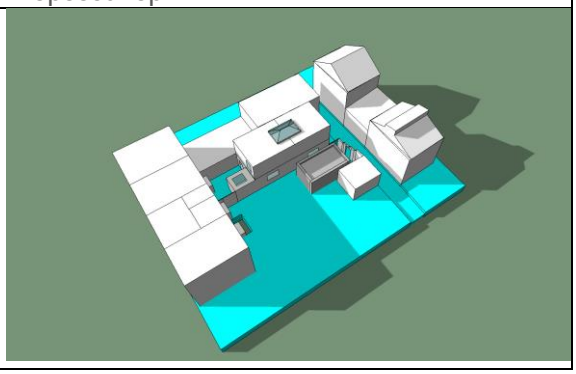
Existing: 9am	Proposed: 9am
	
Existing: Midday	Proposed: Midday
	
Existing: 5pm	Proposed: 5pm
	

Table 8: Shading Analysis 21st of March

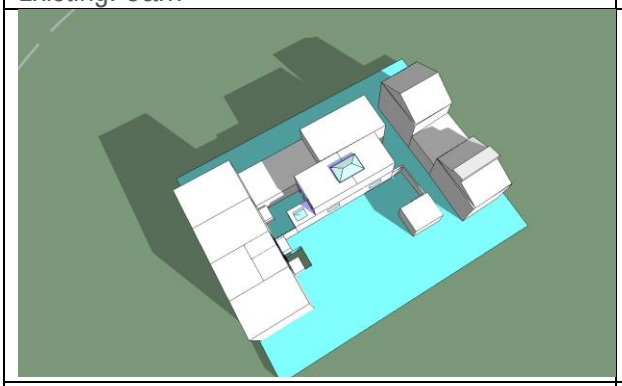
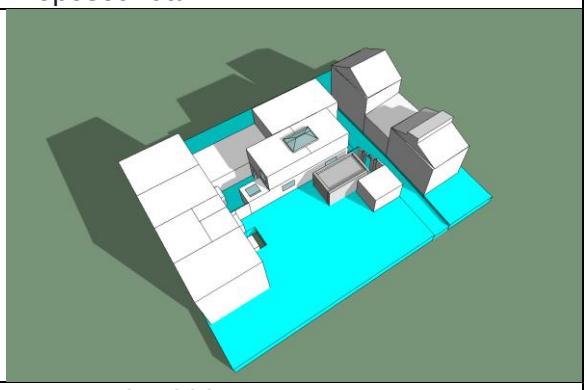
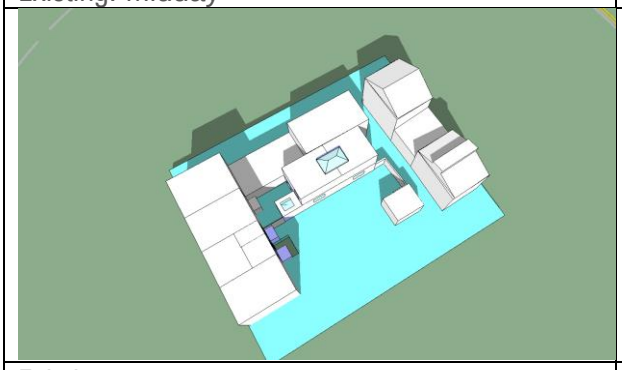
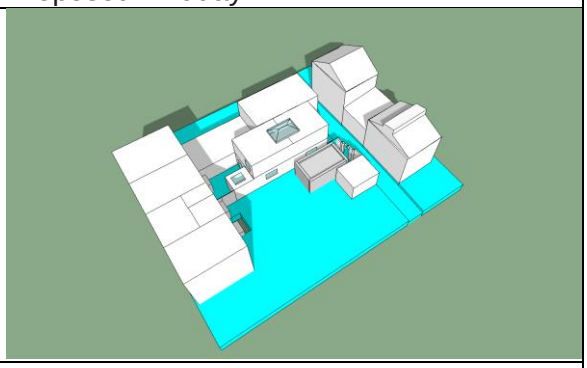
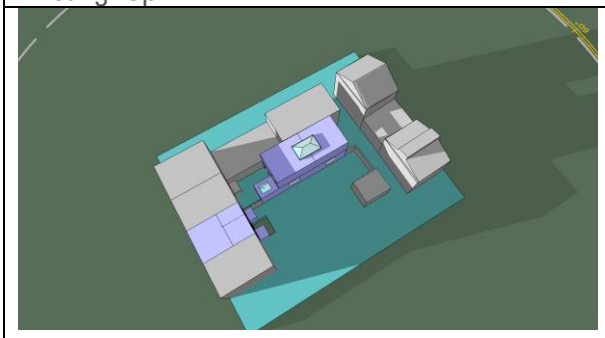
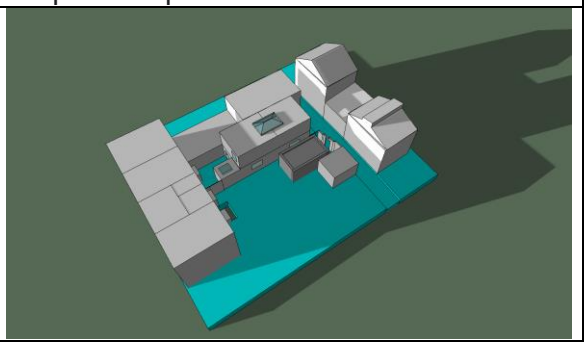
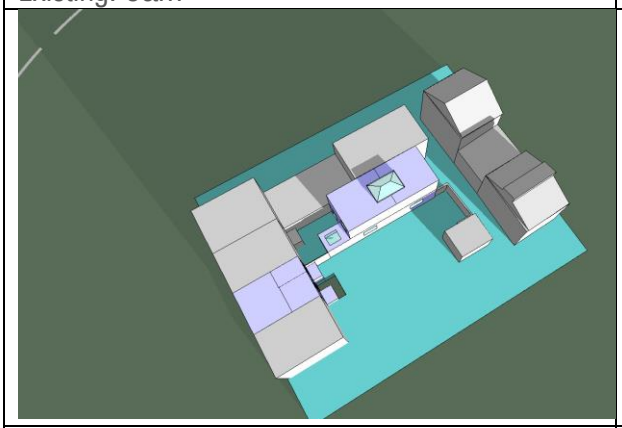
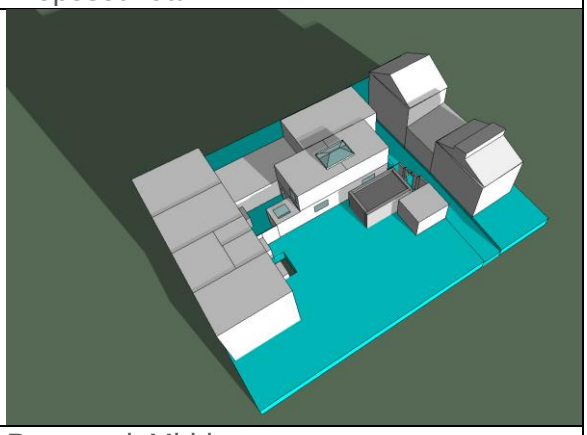
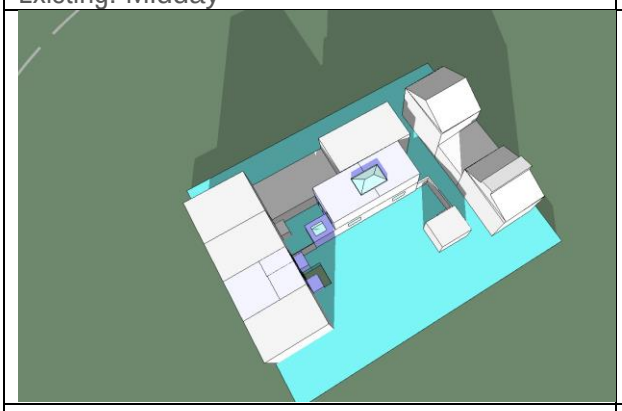
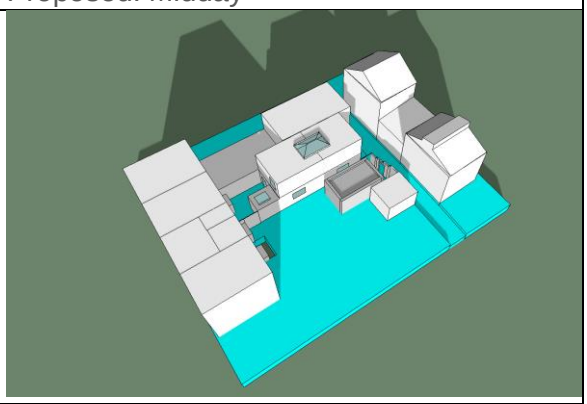
Existing: 9am	Proposed: 9am
	
Existing: Midday	Proposed: Midday
	
Existing: 5pm	Proposed: 5pm
	

Table 9: Shading Analysis 21st of December

Existing: 9am	Proposed: 9am
	
Existing: Midday	Proposed: Midday
	
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