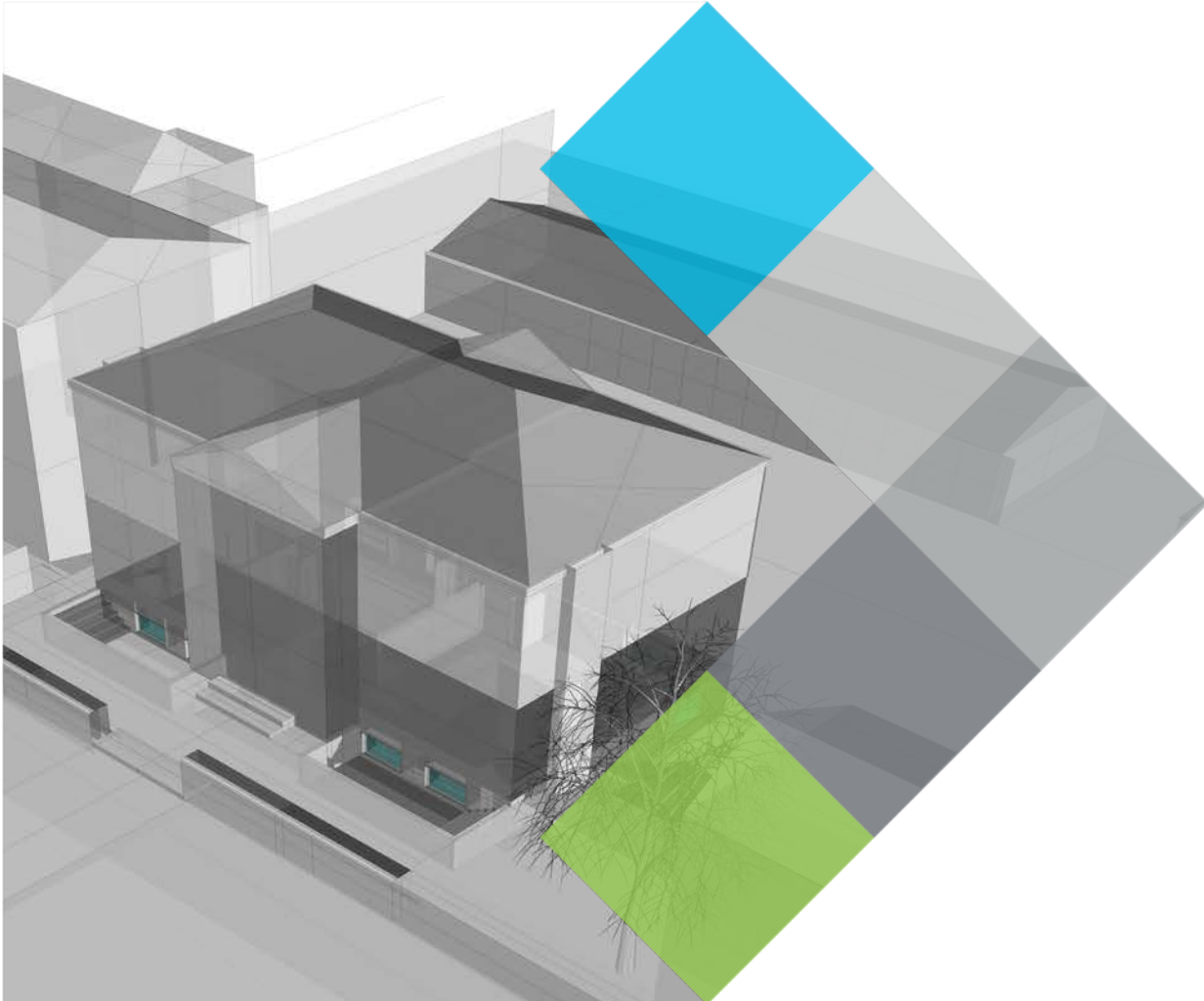




HODKINSON



**Internal Daylight
Assessment**

Aura Homes

Seafield Court

Final

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Our team of technical specialists offer advanced levels of expertise and experience to our clients. We have a wide experience of the construction and development industry and tailor teams to suit each individual project.

We are able to advise at all stages of projects from planning applications to handover.

Our emphasis is to provide innovative and cost effective solutions that respond to increasing demands for quality and construction efficiency.

This report has been prepared by Hodkinson Consultancy using all reasonable skill, care and diligence and using evidence supplied by the design team, client and where relevant through desktop research.

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Executive Summary

Hodkinson Consultancy has been instructed to assess the internal daylight levels of two units as part of the basement conversion of the Seafeld Court residence in Reading.

This report fully considers the methodology of the publication of the second edition of the BRE Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' (2011) and has also been prepared in line with British Standards 8206. The BRE guidance stated that it is intended for designers and their clients, consultants and planning officials. The guidance is not mandatory and states that it should not be seen as an instrument of planning policy.

Internal surface reflectance values used are 0.70 for walls, 0.90 for ceilings and 0.30 for floors, meaning that walls and ceilings should be light-coloured. The light transmittance value of the glazing has been introduced as 75% as a standard value for low-E double glazing and as 45% for the obscured glazing of the entrance door. The simulation light transmittance value accounts for all the relevant maintenance factors and a frame factor of 0.80, in line with the recommendations set out in the British Standard BS8206-2:2008 document.

An internal daylight assessment has been undertaken for all 5 habitable rooms of the proposed basement. Alterations in the basement layout were opted necessary to improve the daylighting levels of the assessed rooms and are summarized in the results section. Provided that the recommended alterations are incorporated in the design, all assessed habitable rooms achieve an acceptable level or exceed the recommended ADF targets, presenting a good internal daylight performance for the proposed basement conversion.

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1. INTRODUCTION

- 1.1** This document has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development to review the internal daylight levels of two units as part of the basement conversion of the Seafield Court residence in Reading.
- 1.2** The report uses the Average Daylight Factor (ADF) standards defined by the BRE (2011) guidance.

Site Location and Units Layout

- 1.3** The property is located at Seafield Court in Reading and accessed via Russel Street. A narrow path separates it from the adjacent residential building on the north and a wider path used as amenity space and car parking from the adjacent two-storey surgery on the south. On the east of Seafield court there is a large yard serving as car parking area and accessed via Baker Street. The residence is mainly surrounded by a mainly residential properties of one to three-storeys height. (Figures 1 and 2)
- 1.4** The proposed units are accessed from the rear of the plot at a lower ground level (car park level). Both units have their main living areas (living room, kitchen, dining) facing the rear of the plot and on the same level as the entrance (car park level). The bedrooms are facing Russel Street, sitting in a lower level than the street level and lit through lightwells (Figure 3).



Figure 1: View from Russel Street – Residence no 35 on the left and surgery on the right

(Source: Imagery ©2017 Google, Map data ©2017 Google)



2. GUIDANCE

- 2.1 The **Building Research Establishment** (BRE) has set out in their handbook '**Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2011)**' guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the **British Standard BS8206-2:2008**.
- 2.2 The document is intended as a guide with a stated aim to 'help rather than constrain the design'. Failure to achieve the stated target numerical factors does not necessarily mean that the development is unsuitable or that planning permission should be refused.

3. METHODOLOGY

- 3.1 An assessment of daylight into residential rooms within the proposed development has been carried out using advanced daylight simulation software. This is to ensure that future residents will benefit from the well-being of adequately lit rooms.
- 3.2 The BRE guidance states that daylight provision in new rooms may be checked using the average daylight factor (ADF). The ADF is a quantitative metric of the overall amount of daylight in a space.
- 3.3 The BRE guidance sets out detailed tests that assess the interior daylight conditions of rooms; this includes the calculation of the ADF. The ADF is derived from British Standards BS 8206-2:2008. The ADF takes into account the angle of visible sky reaching the window, and takes the following factors into account:
- > Window size;
 - > The number of windows available to the room;
 - > Room size;
 - > Use and layout;
- 3.4 BS 8206-2:2008 recommends a minimum ADF of 2% for kitchens, 1.5% for living and dining rooms and 1% for bedrooms.

4. SIMULATION INPUTS & ASSUMPTIONS

Sources of Data

- 4.1 Basement and site layout drawings, sections and elevations of the proposed conversion was provided by Aura Homes.
- 4.2 The surrounding buildings were modelled according to information provided by the client and data collected from Google Maps and Bing Maps.

Simulation Inputs

- 4.3 It is understood that light coloured materials are to be used in order to maximise the internal surface reflectance values. Common reflectance values were used for the surrounding buildings. The key inputs are presented in Tables 1 and 2.

Table 1: Surface Reflectance (Source: BS 8206-2:2008)

Material	Reflectance
Surrounding Ground (Earth dry/Paving)	0.2
Surrounding Neighbouring Buildings (Typical London brickwork)	0.3
External Walls (Typical Coloured Surfaces)	0.3
Internal Walls (white coloured)	0.7
Internal Ceiling (white coloured)	0.90
Internal Floor (light coloured timber flooring)	0.3

Table 2: Light Transmittance Calculation (Source: BS 8206-2:2008)

Glazing Description	Position	Frames modelled	LT normal	Maintenance Factors			Frames	LT total
				A.3	A.4	A.5	A.6	
Vertical glazing - Rooms	Vertical	No	0.75	8	1	1	0.8	0.69
Vertical Obscured glazing - Entrance Door	Vertical	No	0.74	8	1	1	0.8	0.45

5. AVERAGE DAYLIGHT FACTOR RESULTS

- 5.1** An assessment of the daylight received by rooms within the proposed development has been carried out using the Average Daylight Factor (ADF).
- 5.2** All habitable rooms (the Living/Dining/Kitchen and Bedroom) were assessed against the recommended ADF targets.
- 5.3** The room layouts have been modelled along with the position and size of relevant windows which service habitable rooms, based on the elevation and section drawings provided. Modelling of surrounding dwellings has also been incorporated to account for any surrounding buildings which may impede daylight amenity.
- 5.4** Alterations on the proposed basement layout were opted necessary to meet the BRE standards. The consecutive steps/strategies followed to achieve acceptable daylighting levels are described below. Detailed inputs and results can be found in the Appendices A & B.
- > Strategy 1: High Reflective Materials as described in section 4.4;
 - > Strategy 2: High Reflective Materials + Bedroom Window Enlargement;
 - > Strategy 3: High Reflective Materials + Bedroom Window Enlargement + Skylight Enlargement;
 - > Strategy 4: High Reflective Materials + Further Bedroom Window Enlargement + Skylight Enlargement + Additional Windows to LDK rooms of both units.
- 5.5** Acceptable levels of daylighting as per the British Standards and BRE guidance are achieved under the implementation of alterations (Strategy 4) described below and illustrated in figure 4;
- > Enlargement of lightwells to a total width of 2000mm;
 - > Increase of bedroom window width: minimum width of 1345mm for the single bedroom and of 1220mm or for the rest of the bedrooms;
 - > Shift of the partition wall of the single bedroom by 100mm towards south to provide a wider window;
 - > Addition of a new window with minimum dimensions of 1225mm by 1050mm (below window of 1st floor) on the dinning room of the 1-BED unit;
 - > Addition of a new window with minimum dimensions of 1225mm by 1050mm on the south façade of the 2-BED unit.

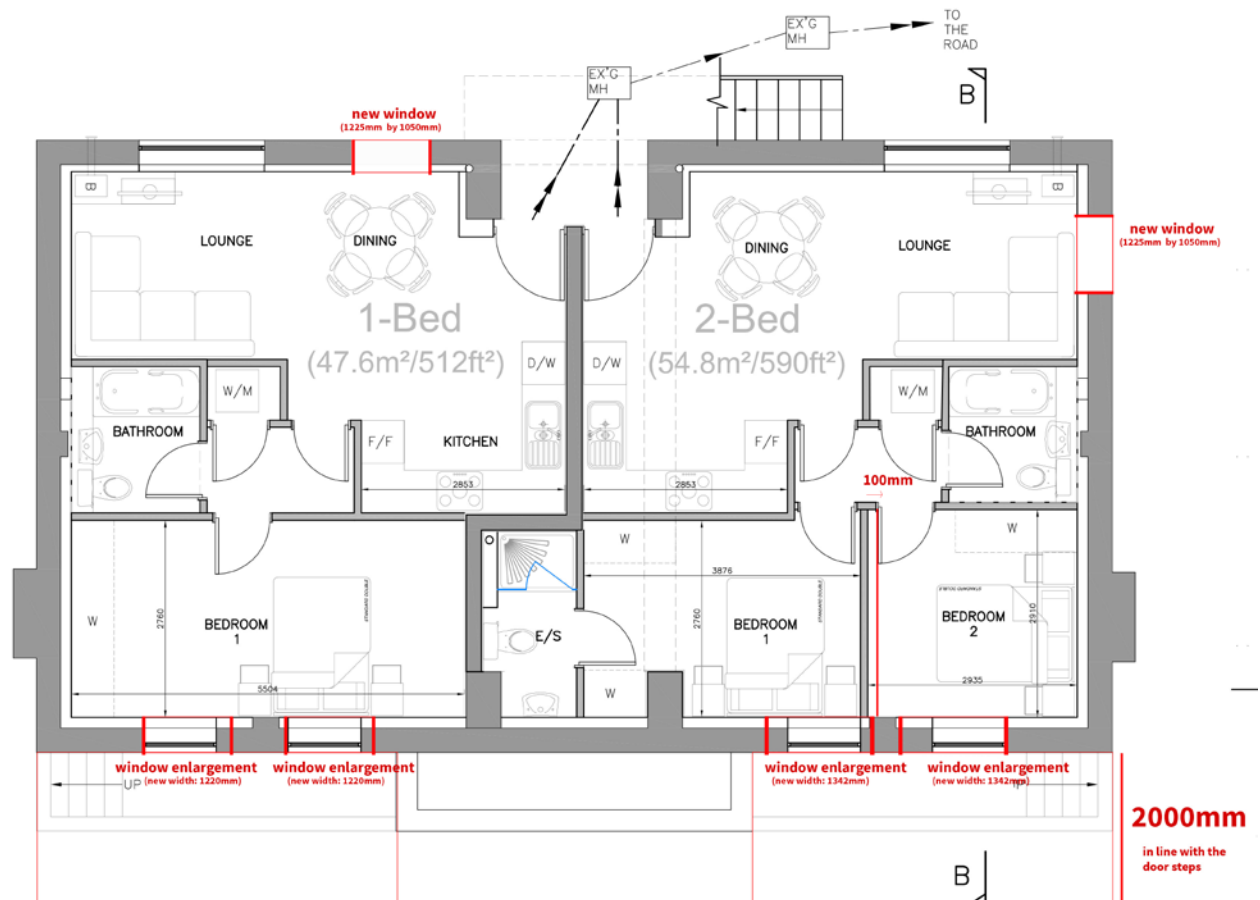


Figure 4: Summary of recommended alterations on the basement layout to meet the BRE standards.

- 5.6 The results of the ADF tests for the two units are displayed within Table 3. The table shows that the Average Daylight Factor of each room along with the recommended levels falls within the British Standards and the BRE guidance.
- 5.7 Taking into account that the BRE guidance recommends a higher daylight factor for kitchens (2%) than for living and dining rooms (1.5%), a reconfiguration of the proposed LDK layout is suggested. The benefits of flipping the kitchen with living room can be seen in the ADF final results plotted on the basement floor plan (Figure 5).

Table 3: Average Daylight Factor Results (Source: Radiance)
Dwellings - Assessed

		Actual ADF %	BS 8206-2:2008 Target	Assessment Result
Unit 1	L/D/K	1.5	2.0	Acceptable
	Bedroom 1	1.1	1.0	Above Target
Unit 2	L/D/K	1.8	2.0	Acceptable
	Bedroom 1	1.0	1.0	Above Target
	Bedroom 2	1.3	1.0	Above Target

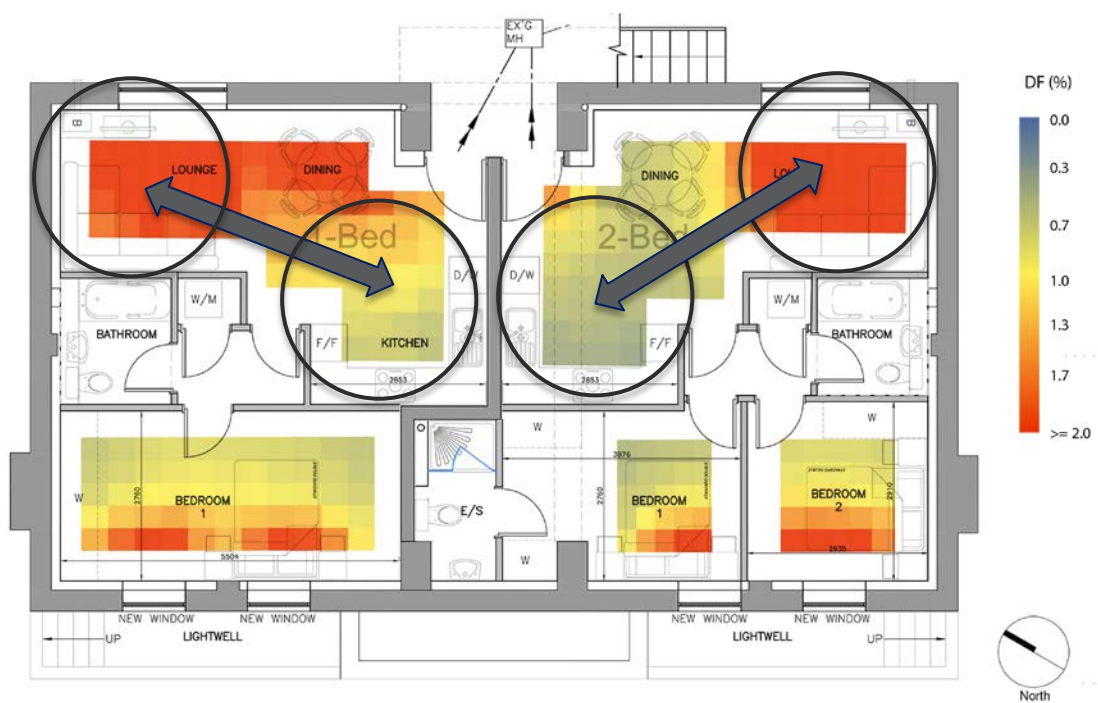


Figure 5. ADF results (strategy 4) plotted on the basement floor plan; proposed relocation of the kitchen and living room.

CONCLUSION

- 5.8** Hodkinson Consultancy has been instructed to assess the internal daylight levels of two units as part of the basement conversion of the Seafield Court residence in Reading.
- 5.9** This report fully considers the methodology of the publication of the second edition of the BRE Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' (2011) and has also been prepared in line with British Standards 8206. The BRE guidance stated that it is intended for designers and their clients, consultants and planning officials. The guidance is not mandatory and states that it should not be seen as an instrument of planning policy.
- 5.10** Internal surface reflectance values used are 0.70 for walls, 0.90 for ceilings and 0.30 for floors, meaning that walls and ceilings should be light-coloured. The light transmittance value of the glazing has been introduced as 75% as a standard value for low-E double glazing and as 45% for the obscured glazing of the entrance door. The simulation light transmittance value accounts for all the relevant maintenance factors and a frame factor of 0.80, in line with the recommendations set out in the British Standard BS8206-2:2008 document.
- 5.11** An internal daylight assessment has been undertaken for all 5 habitable rooms of the proposed basement. Alterations in the basement layout were opted necessary to improve the daylighting levels of the assessed rooms and are summarized in the results section. Provided that the recommended alterations are incorporated in the design, all assessed habitable rooms achieve an acceptable level or exceed the recommended ADF targets, presenting a good internal daylight performance for the proposed basement conversion.

APPENDICES

Appendix A

ADF Numerical Results

Appendix B

ADF Graphical Results

APPENDIX B

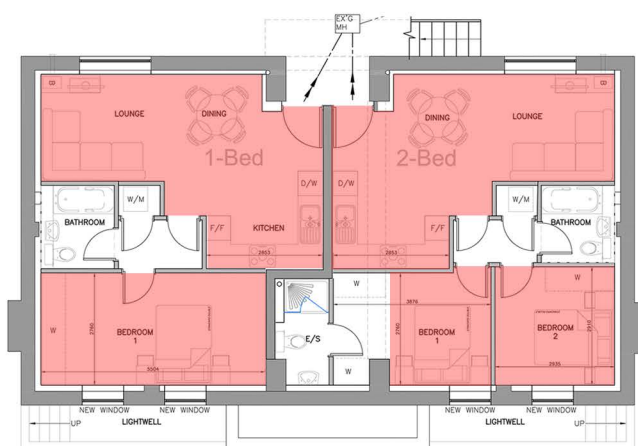
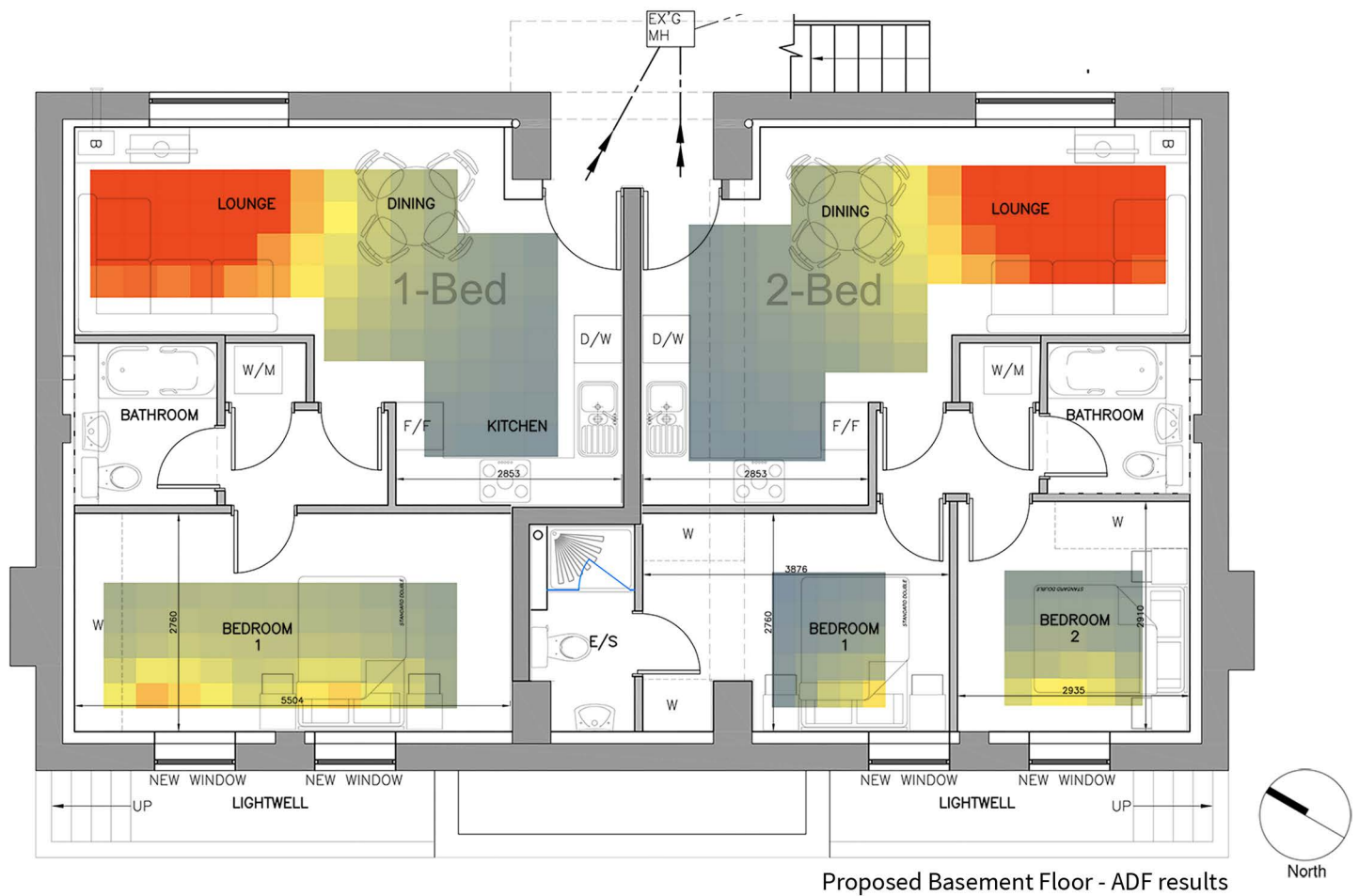
ADF NUMERICAL RESULTS

Table 4: Average Daylight Factor Results (Source: Radiance)

Strategies		Dwellings - Assessed			
			Actual ADF %	BS 8206-2:2008 Target	Assessment Result
Strategy 1	Unit 1	L/D/K	1.1	2.0	Below Target
		Bedroom 1	0.7	1.0	Below Target
	Unit 2	L/D/K	1.1	2.0	Below Target
		Bedroom 1	0.4	1.0	Below Target
		Bedroom 1	0.5	1.0	Below Target
Strategy 2	Unit 1	L/D/K	1.1	2.0	Below Target
		Bedroom 1	0.9	1.0	Acceptable
	Unit 2	L/D/K	1.2	2.0	Below Target
		Bedroom 1	0.5	1.0	Below Target
		Bedroom 1	0.7	1.0	Below Target
Strategy 3	Unit 1	L/D/K	1.2	2.0	Below Target
		Bedroom 1	1.1	1.0	Above Target
	Unit 2	L/D/K	1.2	2.0	Below Target
		Bedroom 1	0.8	1.0	Acceptable
		Bedroom 1	1.0	1.0	Above Target
Strategy 4	Unit 1	L/D/K	1.5	2.0	Acceptable
		Bedroom 1	1.1	1.0	Above Target
	Unit 2	L/D/K	1.8	2.0	Acceptable
		Bedroom 1	1.0	1.0	Above Target
		Bedroom 1	1.3	1.0	Above Target

APPENDIX B

ADF GRAPHICAL RESULTS



- Pass $\geq 2.0\%$ (L/D/Ks) or 1.0% (Bedrooms)
- Acceptable $\geq 1.5\%$ (L/D/Ks)
- Fail $< 1.5\%$ (L/D/Ks)



Project Title:
Seafeld Court

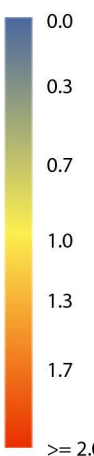
Client:
Aurahomes

Average Daylight Factor Contours

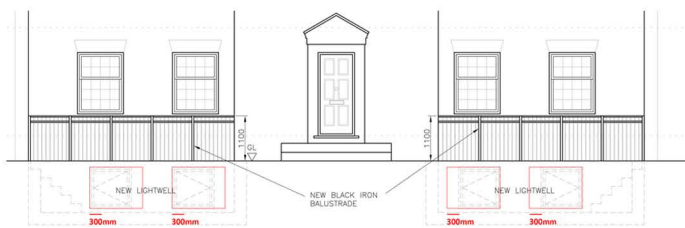
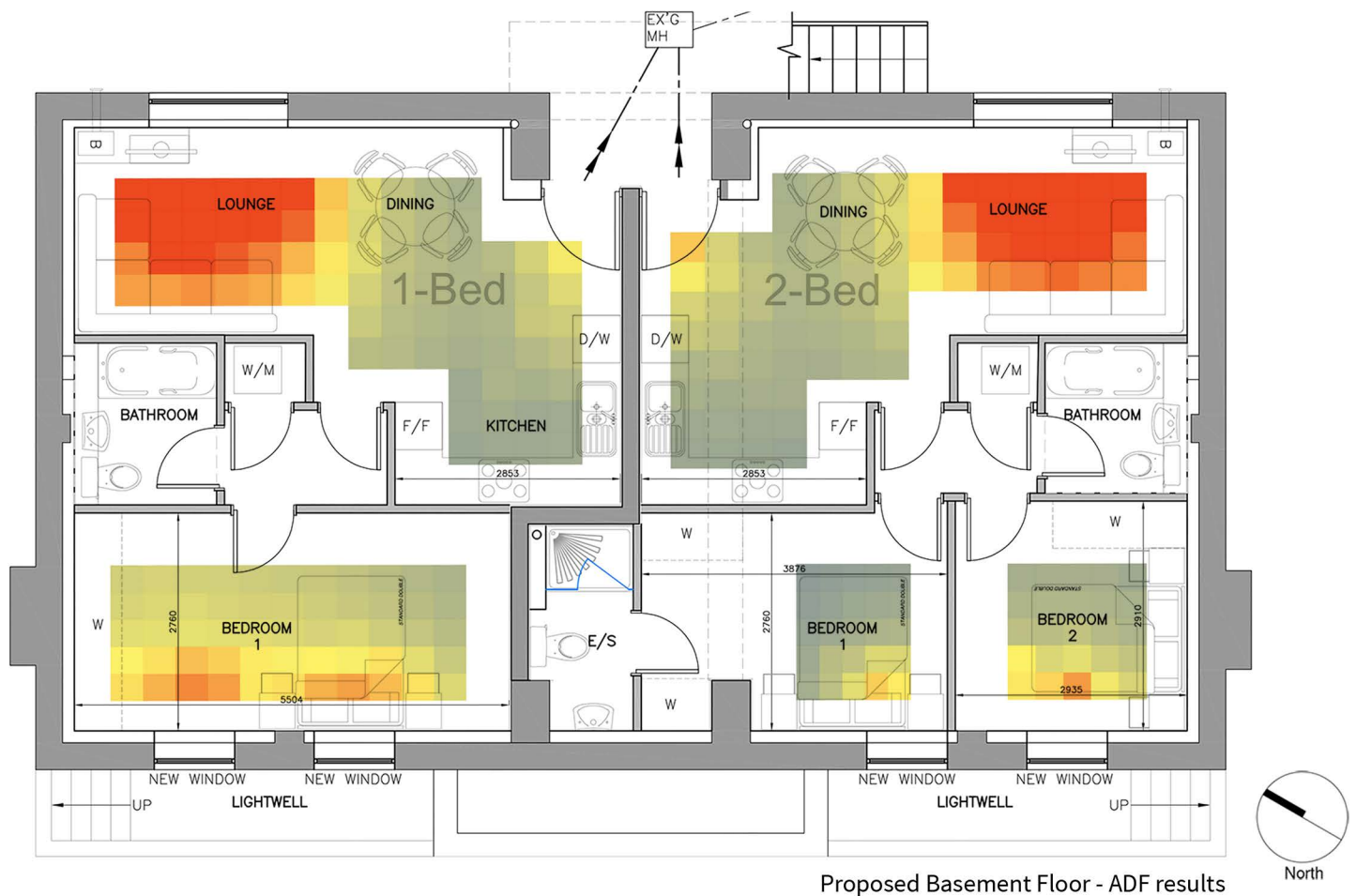
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Prepared by: AA
Checked by: EP
Date: 02 October 2017

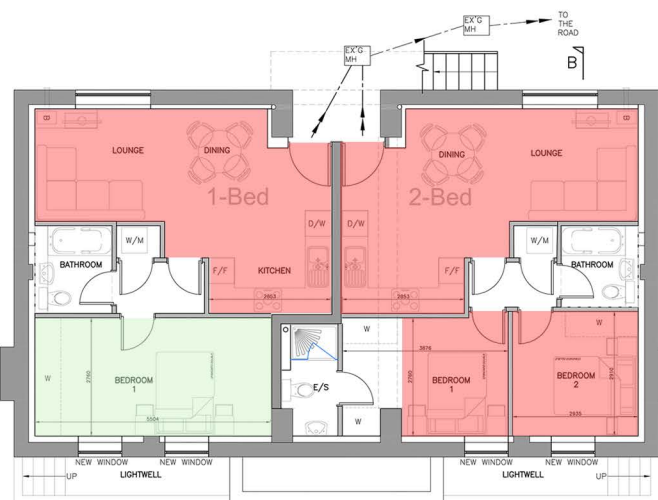
DF (%)



Source:
Radiance



Proposed Front West Elevation - Enlargement of Windows



- Pass $\geq 2.0\%$ (L/D/Ks) or 1.0% (Bedrooms)
- Acceptable $\geq 1.5\%$ (L/D/Ks)
- Fail $< 1.5\%$ (L/D/Ks)



Project Title:
Seafeld Court

Client:
Aurahomes

Average Daylight Factor Contours

Drawing:
Strategy 2: Visualized Results

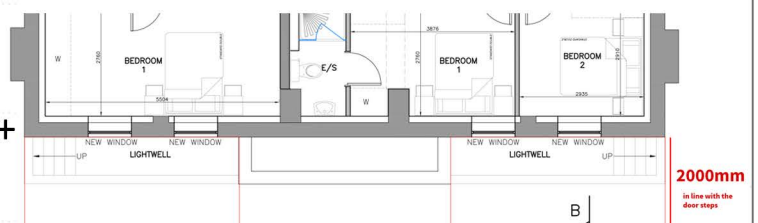
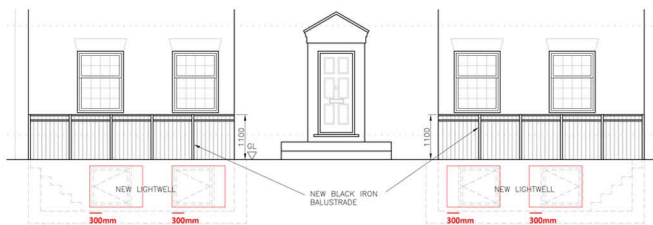
Prepared by: AA
Checked by: EP
Date: 02 October 2017

DF (%)



≥ 2.0

Source:
Radiance



Proposed Front West Elevation - Enlargement of Windows

Proposed Basement - Lightwells Enlargement



- Pass $\geq 2.0\%$ (L/D/Ks) or 1.0% (Bedrooms)
- Acceptable $\geq 1.5\%$ (L/D/Ks)
- Fail $< 1.5\%$ (L/D/Ks)



Project Title:
Seafeld Court

Client:
Aurahomes

Average Daylight Factor Contours

Drawing:
Strategy 3: Visualized Results

Prepared by:
AA

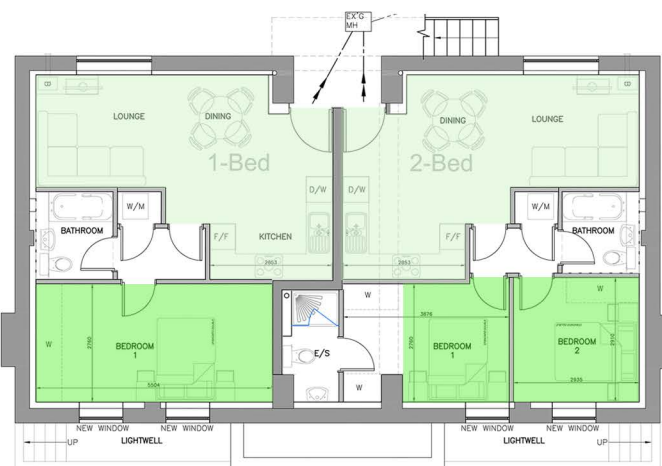
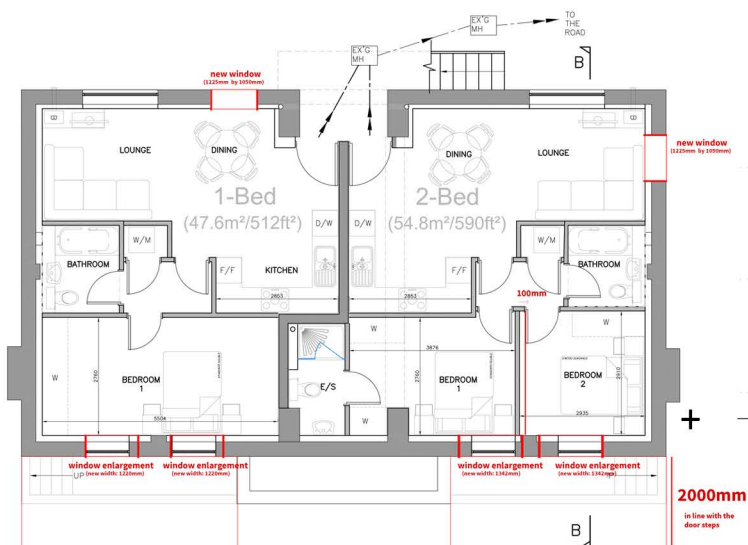
Checked by:
EP

Date:
02 October 2017

DF (%)



Source:
Radiance



- Pass $\geq 2.0\%$ (L/D/Ks) or 1.0% (Bedrooms)
- Acceptable $\geq 1.5\%$ (L/D/Ks)
- Fail $< 1.5\%$ (L/D/Ks)



Project Title:
Seafeld Court

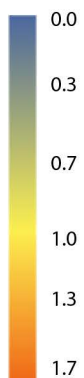
Client:
Aurahomes

Average Daylight Factor Contours

Drawing:
Strategy 4: Visualized Results

Prepared by: AA
Checked by: EP
Date: 02 October 2017

DF (%)



Source:
Radiance