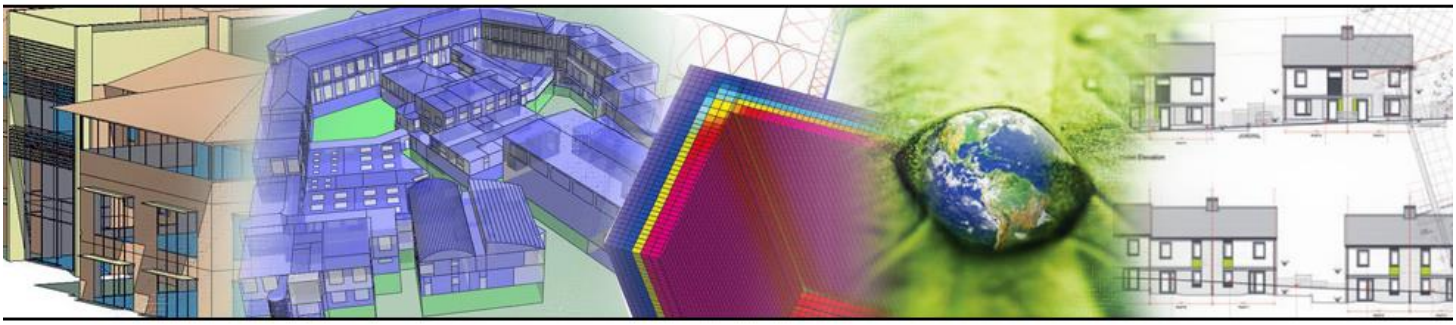
STROMA®
BUILT ENVIRONMENT



Daylight Assessment Report

Salamander Quay, Uxbridge

Stroma Reference: 08-21-88768 DLSL6
Date: 18/08/2022
Prepared for: Progress Group

1. Executive Summary

1.1. This daylight assessment report relates to the proposed development at Salamander Quay, Uxbridge

1.2. A detailed assessment has been undertaken on the proposed development to determine the expected levels of daylight and sunlight.

1.3. Works described within this report have been undertaken in accordance with BRE good practice guidance document BR209 Site Layout Planning for Daylight and Sunlight. This document includes recommendations for daylight and sunlight access and respective calculation methods.

1.4. Sunlight Availability Indicator: **London (51.5°N)**

1.5. The design team has followed guidance of both BR 209 as well as the London Housing SPG. Maximising daylight & sunlight in relevant areas and including The design team has followed guidance of both BR 209 as well as the London Housing SPG. Maximising daylight & sunlight in relevant areas and including dual aspect glazing where possible as per 2.3.37 of standard 29 of London housing SPG.

1.6. The BRE daylight criteria is met in all units. All the living/kitchen/dining rooms achieve the target ADF% values. All bedrooms also achieve the ADF% target for the room type.

1.7. The majority of the windows serving rooms with a sunlight requirement (according to BR 209) achieve the recommended APSH (annual probable sunlight hours). 19 (86.36%) of the proposed units achieve good sunlight throughout the year.

1.8. The exceptions are windows serving six living/kitchen/dining spaces, reasonable sunlight levels are shown to be received by these rooms however this below the BR 209 recommended level. In line with paragraph 2.3.46 of the London Housing SPG which states '*where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the daylight standards proposed within a scheme and individual units will achieve good amenity for residents'*. It is shown through this assessment that all units maintain good natural daylighting levels all year round this would mean the overall amenity within the dwellings would be of a high quality.

1.9. It should be noted that balconies have been provided to the first floor dwellings where sunlight can be enjoyed dual aspect glazing where possible as per 2.3.37 of standard 29 of London housing SPG.

1.10. The majority of the windows serving rooms with a sunlight requirement (according to BR 209) achieve the recommended APSH (annual probable sunlight hours). 19 (86.36%) of the proposed unit achieve good sunlight throughout the year.

1.11. The exceptions are windows serving six living/kitchen/dining spaces, reasonable sunlight levels are shown to be received by these rooms however this below the BR 209 recommended level. In line with paragraph 2.3.46 of the London Housing SPG which states '*where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the daylight standards proposed within a scheme and individual units will achieve good amenity for residents'*. It is shown through this assessment that all units maintain good natural daylighting levels all year round which would mean the overall amenity within the dwellings would be of a high quality.

1.12. The BRE daylight criteria is met in all units. All the living/kitchen/dining rooms achieve the target ADF% values. All bedrooms also achieve the ADF% target for the room type.

1.13. It should be noted that balconies have been provided to the first floor dwellings where sunlight can be enjoyed by the occupants. This will provide additional good amenity space for residents.

This assessment does not consider Right-to-Light. Should there be concerns that a Right-to-Light exists, it is recommended that a suitably qualified specialist be consulted.

Contents

2. Quality Management

Prepared by	Checked by
	
Jonathan Teale BSc (hons)	Malik Thomas BSc (hons) MSc
Sustainability Consultant	Sustainability Consultant
Date: 18/08/2022	**Date:** 18/08/2022
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Version	Status	Date	Change Summary
DLSL1	First issue	21/02/2022	-
DLSL2	First issue	25/03/2022	Block A assessment only
DLSL3	First issue	10/05/2022	Block A Layout revision
DLSL4	First issue	13/05/2022	Block A Layout revision
DLSL5	First issue	17/05/2022	Block A Layout revision
DLSL6	First issue	02/08/2022	Sunlight analysis included
DLSL&	First Issue	18/08/2022	Conclusion amendment

3. Development Overview

3.1. The development site consists of an existing office building. The proposal is a conversion of the office spaces to residential spaces.

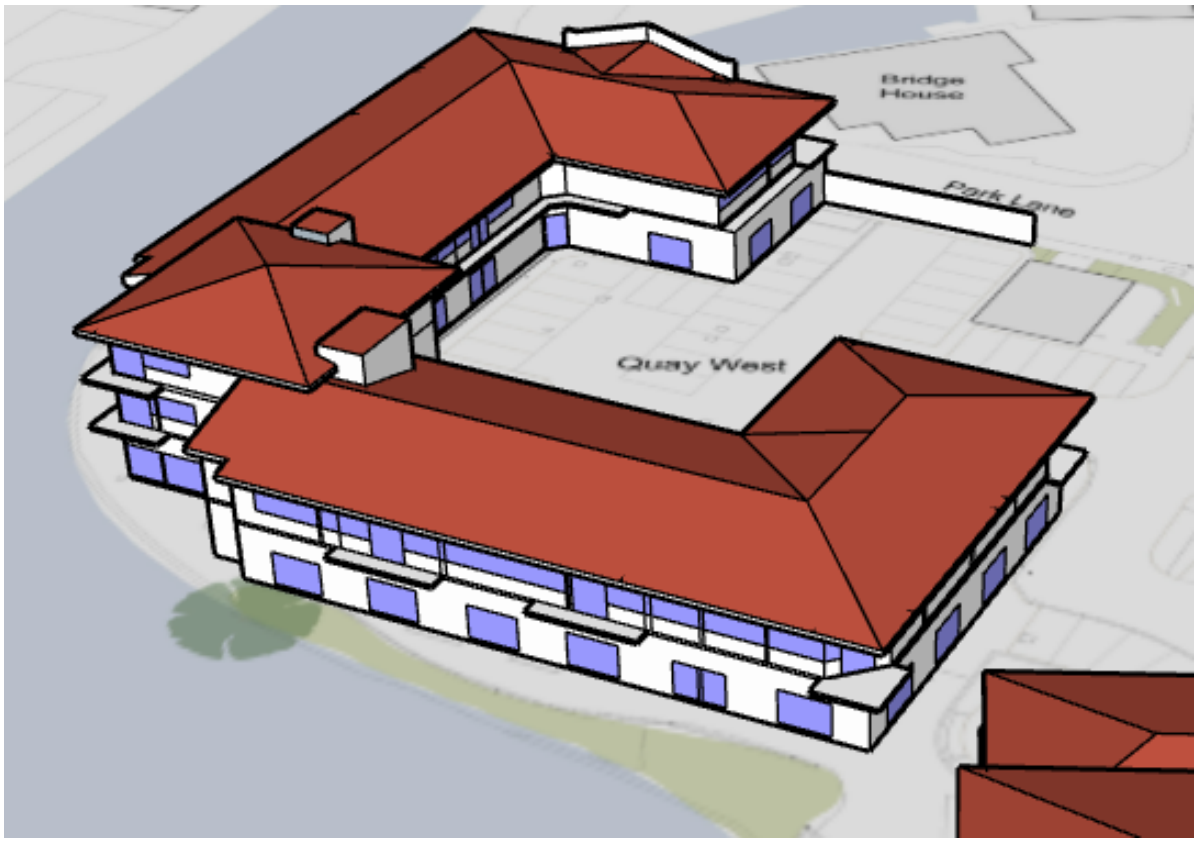

Figure 1. **Proposed development (Building A)**

4. Approach and Recommendations

4.1. Daylight

4.1.1. New Developments

4.1. Where windows are obstructed by large objects, the level of daylight received will be adversely affected. Large obstructions are defined by both their relative height and distance away from the window concerned.

4.2. In the case of wide obstructions, i.e. those not allowing daylight access from either side, the amount of daylight entering a room is proportional to the visible sky angle (Φ) – measured from the centre of the window pane. The Average Daylight Factor (ADF) commonly used to quantify daylight levels, is proportional to the visible sky angle.

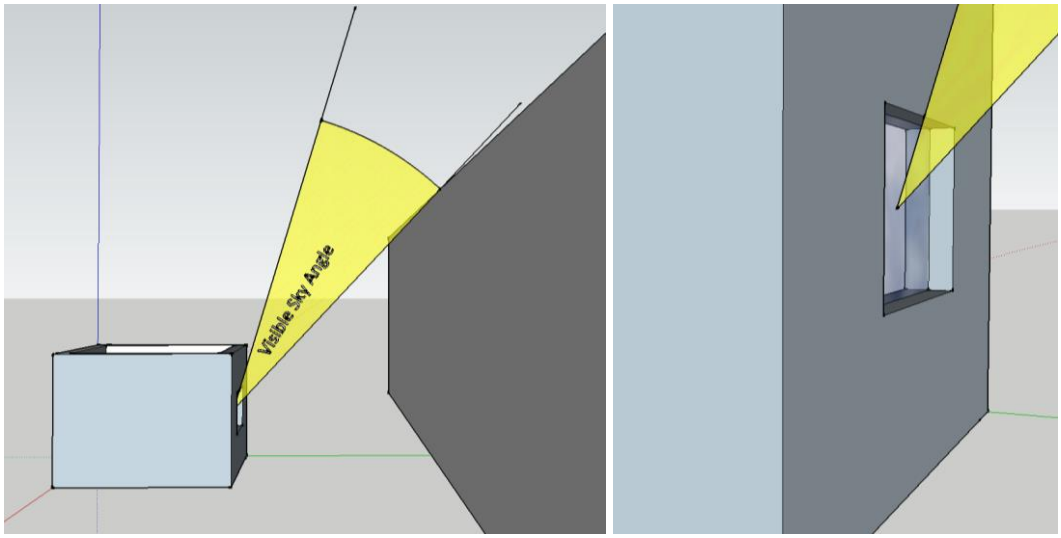

Figure 2. **Visible sky angle**

4.4. As obstructions are not always continuous, the angle of visible sky can be difficult to estimate. In such situations, the amount of skylight falling on a vertical wall or window can be quantified as the Vertical Sky Component (VSC). The VSC is the ratio of skylight received at a reference point against that of an unobstructed horizontal plane. Measurement of the VSC is usually determined at the centre point of a window and has a maximum value of approximately 40%. BRE guidance states the following daylight performance to correspond with VSC;

Summary

2.1.21 Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the angle of visible sky θ, angle of obstruction or vertical sky component (VSC) at the centre of the lowest window where daylight is required. If VSC is:

- At least 27% (θ is greater than 65°, obstruction angle less than 25°) conventional window design will usually give reasonable results.
- Between 15% and 27% (θ is between 45° than 65°, obstruction angle is between 25° and 45°) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- between 5% and 15% (θ is between 25° than 45°, obstruction angle is between 45° and 65°) it is very difficult to provide adequate daylight unless very large windows are used.
- Less than 5% (θ is less than 25°, obstruction more than 65°) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

Figure 3. **BR209 Summary - impact of VSC on anticipated daylight performance**[1]

4.5. Daylight factors can be calculated using derived VSC values to assess whether natural light levels are likely to be adequate. BS 8206-2 Code of Practice for Daylighting provides the following recommendations for dwelling room types.

Room Type	Target Daylight Factor
Kitchens	≥ 2%
Living rooms	≥ 1.5%
Bedrooms	≥ 1%

Table 1. **Recommended average daylight factors**

[1] Site Layout Planning for Daylight and Sunlight, P.J.Littlefair (2011) p.6

4.1.2. Existing Buildings

4.6. BRE guidance emphasises the importance of safeguarding daylight to nearby surroundings. Performance guidelines relate to dwelling rooms where daylight access is considered to be important. These areas include; living rooms, kitchens and bedrooms. The following procedure should be followed to assess whether proposed development is likely to have a detrimental effect upon existing surroundings.

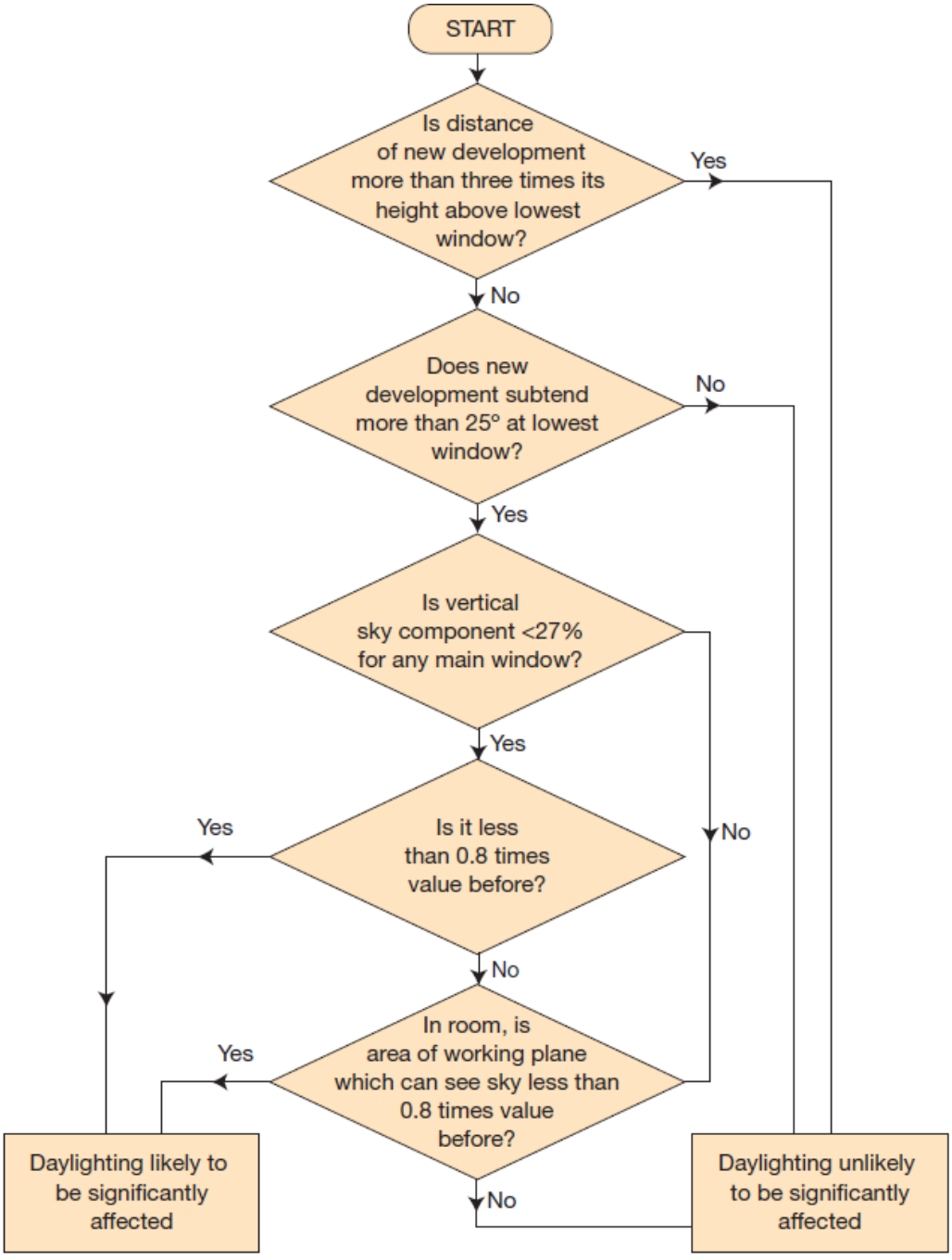

Figure 4. **BR209 'Decision chart: diffuse daylight in existing buildings'**[2]

[2] Site Layout Planning for Daylight and Sunlight, P.J.Littlefair (2011) p.10

4.2. Sunlight

4.2.1. New Developments

4.7. Ensuring access to sunlight is an important part of residential building design. The presence of direct sunlight is shown to have a positive impact upon occupant wellbeing. BRE guidance states that sunlight provision to living rooms and conservatories is of greatest importance compared with that to bedrooms and kitchens.

4.8. With developments in passive building design and a more frequent installation of solar collection technology, e.g. photovoltaics, the magnitude of sunlight and orientation of access is increasingly becoming a concern.

Summary – (new buildings)

3.1.15 In general a dwelling, or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided:

- At least one main window wall faces within 90° of due south and
- the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21September and 21 March.

3.1.16 Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations.

Figure 5. **BR209 Summary – Sunlight recommendations for new build**[3]

4.9. Unobstructed south-facing windows will receive significantly more sunlight than those facing north. East –facing aspects will receive direct sunlight during the morning and west-facing aspects in the afternoon/evening. The sunpath should be considered in setting out a development.

4.10. Where a dwelling has no window-wall within 90° of South, it is likely to be considered insufficiently sunlit. This is usually only a concern within apartment blocks where the number of aspects is limited. However, careful layout can help to ensure that the majority of apartments include window walls within 90° of south.

4.11. Guidance recommends that critical internal areas, i.e. rooms where sunlight is expected, should receive at least 25% of the annual probable sunlight hours (APSH). Furthermore, at least 5% should be received during the winter months; 21st September and 21st March. Measurements should be taken at the inside surface of the window wall. If window locations are unknown, values can be determined on a grid where they are likely to be situated.

[3] Site Layout Planning for Daylight and Sunlight, P.J.Littlefair (2011) p.16

4.2.2. Existing Buildings

4.12. Similar to daylight, access to sunlight should be safeguarded to critical areas of existing buildings.

4.13. BRE guidance provides the following guidance;

Summary

3.2.11 If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- Receives less than 25% of the annual probable sunlight hours, or less than 5% of the annual probable sunlight hours between 21st 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 the annual probable sunlight hours.

Figure 6. **BR209 Summary –securing sunlight levels of existing developments**[4]

[4] Site Layout Planning for Daylight and Sunlight, P.J.Littlefair (2011) p.17

5. Assessment

5.1. Objectives

5.1. Determine the levels of daylight and sunlight to all habitable rooms on the proposed development.

5.2. Determine the APSH of the proposed development.

5.2. Approach

5.2.1. Proposed

5.3. The proposed building ADF% (average daylight factors) and APSH have been assessed for all the relevant spaces using a calculation plugin for Sketchup.

6. Results

6.1. Proposed

6.1.1. Daylight – Building A

6.1. All the open plan living/kitchen/dining rooms achieve the target ADF% (average daylight factor) of 2% for the room type (refer to Appendix A for results).

6.2. All bedrooms on Building A achieve the target ADF% for the room type (refer to Appendix A for results).

6.1.1. Sunlight – Building A

6.3. Many of the windows serving rooms with a sunlight requirement (according to BRE 209) achieve the recommended APSH (annual probable sunlight hours), refer to Appendix B for results.

6.4. The exceptions to this are some windows situated on northern elevations. Generally, if a window faces significantly north, sunlight levels are unlikely to be met.

6.5. A large number of these windows serve rooms which benefit from additional windows (dual aspect) which do meet the recommendations, meaning sunlight levels are likely to be adequate. Others serve bedrooms where, according to BRE 209 sunlight is not as important.

6.6. The table below shows the APSH results for windows not meeting BRE 209 recommendations and serving living/kitchen/diners not benefitting from additional passing windows. The results show that most of the rooms achieve some level of sunlight however the levels are lower than the recommendations (although A-1F-05 and A-1F-07 are very close to achieving the annual recommendations and meet the winter recommendations).

Window Ref	Annual Probable Sunlight Hours (APSH)		
	Annual	Winter	
	Proposed %	Proposed %	
Pass Criterion	**25**	**5**	**Comment**
3	14	0	A-GF-01 LDK
4	12	0	A-GF-01 LDK
25	16	0	A-GF-09 LDK
194	16	0	A-GF-09 LDK
71	18	6	A-1F-05 LDK
72	18	6	A-1F-05 LDK
73	24	7	A-1F-05 LDK

74	18	6	A-1F-05 LDK
75	18	6	A-1F-07 LDK
76	18	6	A-1F-07 LDK
77	24	7	A-1F-07 LDK
78	18	6	A-1F-07 LDK
80	18	6	A-1F-08 LDK
81	14	2	A-1F-08 LDK
82	12	2	A-1F-08 LDK
83	6	1	A-1F-08 LDK
84	6	0	A-1F-08 LDK
85	1	0	A-1F-08 LDK
86	16	0	A-1F-09 LDK
87	16	0	A-1F-09 LDK

7. Conclusion

7.1. The design team has followed guidance of both BR 209 as well as the London Housing SPG. Maximising daylight & sunlight in relevant areas and including dual aspect glazing where possible as per 2.3.37 of standard 29 of London housing SPG.

7.2. The BRE daylight criteria is met in all units. All the living/kitchen/dining rooms achieve the target ADF% values. All bedrooms also achieve the ADF% target for the room type.

7.3. The majority of the windows serving rooms with a sunlight requirement (according to BR 209) achieve the recommended APSH (annual probable sunlight hours). 19 (86.36%) of the proposed units achieve good sunlight throughout the year.

7.4. The exceptions are windows serving six living/kitchen/dining spaces, reasonable sunlight levels are shown to be received by these rooms however this below the BR 209 recommended level. In line with paragraph 2.3.46 of the London Housing SPG which states '*where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the daylight standards proposed within a scheme and individual units will achieve good amenity for residents'*. It is shown through this assessment that all units maintain good natural daylighting levels all year round this would mean the overall amenity within the dwellings would be of a high quality.

7.5. It should be noted that balconies have been provided to the first floor dwellings where sunlight can be enjoyed by the occupants. This will provide additional good amenity space for residents.

Appendix A. ADF (Average Daylight Factor) Results (Building A)

Apartment	Building Name	Floor	Room Use	Window	ADF%
A-GF-01	Building A	Ground	LKD	W3-L	0.08
	Building A	Ground	LKD	W3-U	1.64
	Building A	Ground	LKD	W4-L	0.10
	Building A	Ground	LKD	W4-U	2.01
					3.84
A-GF-02	Building A	Ground	LKD	W5-L	0.11
	Building A	Ground	LKD	W5-U	2.12
	Building A	Ground	LKD	W6-L	0.11
	Building A	Ground	LKD	W6-U	2.16
					4.50
A-GF-02	Building A	Ground	Bedroom	W7-L	0.17
	Building A	Ground	Bedroom	W7-U	3.34
					3.51
A-GF-03	Building A	Ground	Studio	W8-L	0.11
	Building A	Ground	Studio	W8-U	2.14
					2.24
A-GF-04	Building A	Ground	LKD	W9-L	0.13
	Building A	Ground	LKD	W9-U	2.52
	Building A	Ground	LKD	W10-L	0.13
	Building A	Ground	LKD	W10-U	2.47
					5.25
A-GF-04	Building A	Ground	Bedroom	W11-L	0.06
	Building A	Ground	Bedroom	W11-U	1.12
					1.17
A-GF-04	Building A	Ground	Bedroom	W11-L	0.15
	Building A	Ground	Bedroom	W11-U	2.96
					3.11
A-GF-05	Building A	Ground	LKD	W16-L	0.07
	Building A	Ground	LKD	W16-U	1.25
	Building A	Ground	LKD	W16-L	0.06
	Building A	Ground	LKD	W16-U	1.05
	Building A	Ground	LKD	W17-L	0.08
	Building A	Ground	LKD	W17-U	1.36
					3.85
A-GF-05	Building A	Ground	Bedroom	W17-L	0.14
	Building A	Ground	Bedroom	W17-U	2.60
					2.74
A-GF-06	Building A	Ground	LKD	W18-L	0.15
	Building A	Ground	LKD	W18-U	2.90
					3.04
A-GF-06	Building A	Ground	Bedroom	W19-L	0.09
	Building A	Ground	Bedroom	W19-U	1.50

					1.59
A-GF-07	Building A	Ground	Bedroom	W20-L	0.16
	Building A	Ground	Bedroom	W20-U	3.09
					3.25
A-GF-07	Building A	Ground	Bedroom	W21-L	0.12
	Building A	Ground	Bedroom	W21-U	2.12
					2.24
A-GF-07	Building A	Ground	Bedroom	W21-L	0.07
	Building A	Ground	Bedroom	W21-U	1.26
					1.33
A-GF-08	Building A	Ground	Bedroom	W22-L	0.15
	Building A	Ground	Bedroom	W22-U	2.89
					3.04
A-GF-08	Building A	Ground	Bedroom	W22-L	0.08
	Building A	Ground	Bedroom	W22-U	1.63
					1.71
A-GF-08	Building A	Ground	LKD	W23-L	0.12
	Building A	Ground	LKD	W23-U	2.34
	Building A	Ground	LKD	W24	2.20
					4.67
A-GF-09	Building A	Ground	Studio	W25	0.78
	Building A	Ground	Studio	W194-L	0.09
	Building A	Ground	Studio	W194-U	1.27
					2.14
A-GF-10	Building A	Ground	Bedroom	W27	1.25
					1.25
A-GF-10	Building A	Ground	Bedroom	W28	1.22
					1.22
A-GF-10	Building A	Ground	LKD	W29	2.17
	Building A	Ground	LKD	W30-L	0.10
	Building A	Ground	LKD	W30-U	2.20
					4.48
A-GF-11	Building A	Ground	Bedroom	W31-L	0.07
	Building A	Ground	Bedroom	W31-U	1.51
					1.58
A-GF-11	Building A	Ground	LKD	W31-L	0.05
	Building A	Ground	LKD	W31-U	0.95
	Building A	Ground	LKD	W32-L	0.07
	Building A	Ground	LKD	W32-U	1.41
					2.48
A-GF-07	Building A	Ground	LKD	W34-L	0.06
	Building A	Ground	LKD	W34-U	1.20
	Building A	Ground	LKD	W194-L	0.05
	Building A	Ground	LKD	W194-U	1.02
					2.33
A-1F-01	Building A	first	LKD	W43	1.64

	Building A	first	LKD	W44	0.29
	Building A	first	LKD	W45-L	0.08
	Building A	first	LKD	W45-U	0.84
	Building A	first	LKD	W46	0.32
	Building A	first	LKD	W47	2.19
					5.35
A-1F-01	Building A	first	Studio	W48	4.07
					4.07
A-1F-02	Building A	first	LKD	W49	2.33
					2.33
A-1F-03	Building A	first	LKD	W50	1.92
	Building A	first	LKD	W51	0.35
	Building A	first	LKD	W52-L	0.08
	Building A	first	LKD	W52-U	0.81
	Building A	first	LKD	W53	0.37
	Building A	first	LKD	W54	1.26
					4.79
A-1F-03	Building A	first	Bedroom	W55	4.15
					4.15
A-1F-03	Building A	first	Bedroom	W56	3.95
					3.95
A-1F-04	Building A	first	LKD	W65	1.14
	Building A	first	LKD	W66	0.15
	Building A	first	LKD	W67-L	0.09
	Building A	first	LKD	W67-U	0.98
	Building A	first	LKD	W68-L	0.09
	Building A	first	LKD	W68-U	1.00
					3.45
A-1F-04	Building A	first	Bedroom	W69	2.82
					2.82
A-1F-05	Building A	first	Bedroom	W70	2.89
					2.89
A-1F-05	Building A	first	LKD	W70	0.58
	Building A	first	LKD	W72	0.67
	Building A	first	LKD	W73-L	0.07
	Building A	first	LKD	W73-U	0.82
	Building A	first	LKD	W74	0.59
					2.74
A-1F-07	Building A	first	LKD	W53	1.90
	Building A	first	LKD	W77-L	0.05
	Building A	first	LKD	W77-U	0.60
	Building A	first	LKD	W78	0.43
					2.99
A-1F-08	Building A	first	Bedroom	W79	2.71
					2.71
A-1F-08	Building A	first	Bedroom	W80	3.10

					3.10
A-1F-08	Building A	first	Bedroom	W80	1.41
	Building A	first	Bedroom	W81	0.41
	Building A	first	Bedroom	W82-L	0.07
	Building A	first	Bedroom	W82-U	0.81
	Building A	first	Bedroom	W83	0.30
	Building A	first	Bedroom	W84	1.67
					4.66
A-1F-09	Building A	first	Studio	W87-L	0.08
	Building A	first	Studio	W87-U	1.24
	Building A	first	Studio	W86	0.72
					2.04
A-1F-10	Building A	first	Bedroom	W88-L	0.14
	Building A	first	Bedroom	W88-U	2.08
					2.22
A-1F-10	Building A	first	Bedroom	W89	1.18
					1.18
A-1F-10	Building A	first	LKD	W90	1.78
	Building A	first	LKD	W91	0.36
	Building A	first	LKD	W92-L	0.08
	Building A	first	LKD	W92-U	0.90
	Building A	first	LKD	W93	0.42
	Building A	first	LKD	W94	1.78
					5.33
A-1F-11	Building A	first	Bedroom	W95	2.57
					2.57
A-1F-11	Building A	first	LKD	W95	1.14
A-1F-11	Building A	first	LKD	W54	3.70
					4.83
A-1F-07	Building A	first	Bedroom	W55	1.71
					1.71
A-1F-07	Building A	first	Bedroom	W96	2.55
					2.55
A-1F-07	Building A	first	Bedroom	W98-L	0.07
	Building A	first	Bedroom	W98-U	0.80
	Building A	first	Bedroom	W99	1.30
	Building A	first	Bedroom	W97-L	0.07
	Building A	first	Bedroom	W97-U	0.84
					3.08
A-1F-06	Building A	first	LKD	W100	0.82
	Building A	first	LKD	W101-L	0.06
	Building A	first	LKD	W101-U	1.01
	Building A	first	LKD	W102	0.68
					2.55
A-1F-05	Building A	first	Bedroom	W192	1.00
					1.00

Appendix B. APSH (Annual Probable Sunlight Hours) Results (Building A)

Window Ref	Annual Probable Sunlight Hours (APSH)	
	Annual	Winter
	Proposed %	Proposed %
Pass Criterion	**25**	**5**
3	14	0
4	12	0
5	11	0
6	59	20
7	60	21
8	59	20
9	52	19
10	69	30
11	78	29
12	73	29
13	76	29
14	73	28
15	76	28
16	67	23
17	26	8
18	36	9
19	28	8
20	30	7
21	27	7
22	30	7
23	31	7
24	5	0
25	16	0
27	16	0
28	16	0
29	6	0
30	61	20
31	63	21
32	66	24
33	39	19
34	46	15
35	40	9
37	6	0
38	1	0
39	0	0
42	6	0
43	5	0

45	28	9
46	33	9
47	41	15
48	41	15
49	41	15
50	42	16
51	40	17
52	51	28
53	36	26
54	54	29
55	53	28
56	52	27
57	52	27
58	64	28
59	52	27
60	52	27
61	64	28
62	52	27
63	52	27
64	54	27
65	61	22
66	49	25
67	62	26
68	26	9
69	16	4
71	18	6
72	18	6
73	24	7
74	18	6
75	18	6
76	18	6
77	24	7
78	18	6
79	18	6
80	18	6
81	14	2
82	12	2
83	6	1
84	6	0
85	1	0
86	16	0
87	16	0
88	16	0
89	16	0
90	5	0
91	8	3

92	21	7
93	25	8
94	36	13
95	36	13
96	36	13
97	43	15
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102	33	9
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110	5	0
111	1	0
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162	88	30
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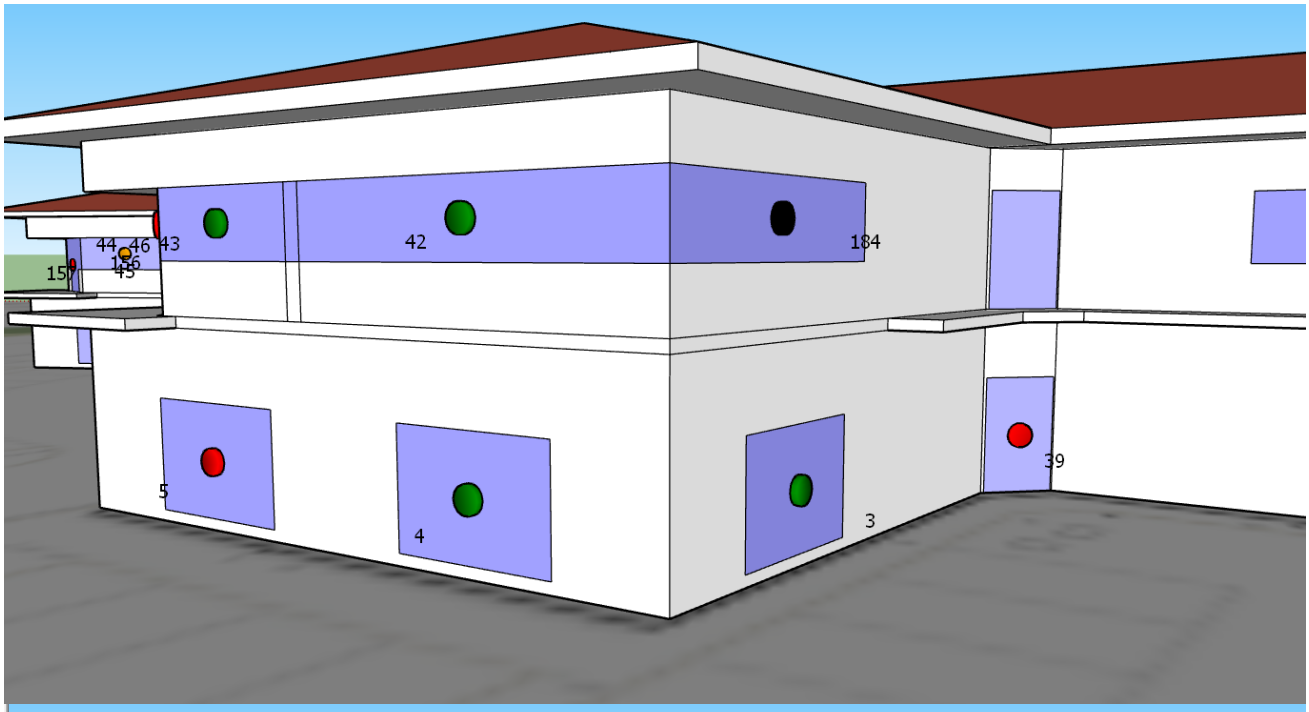
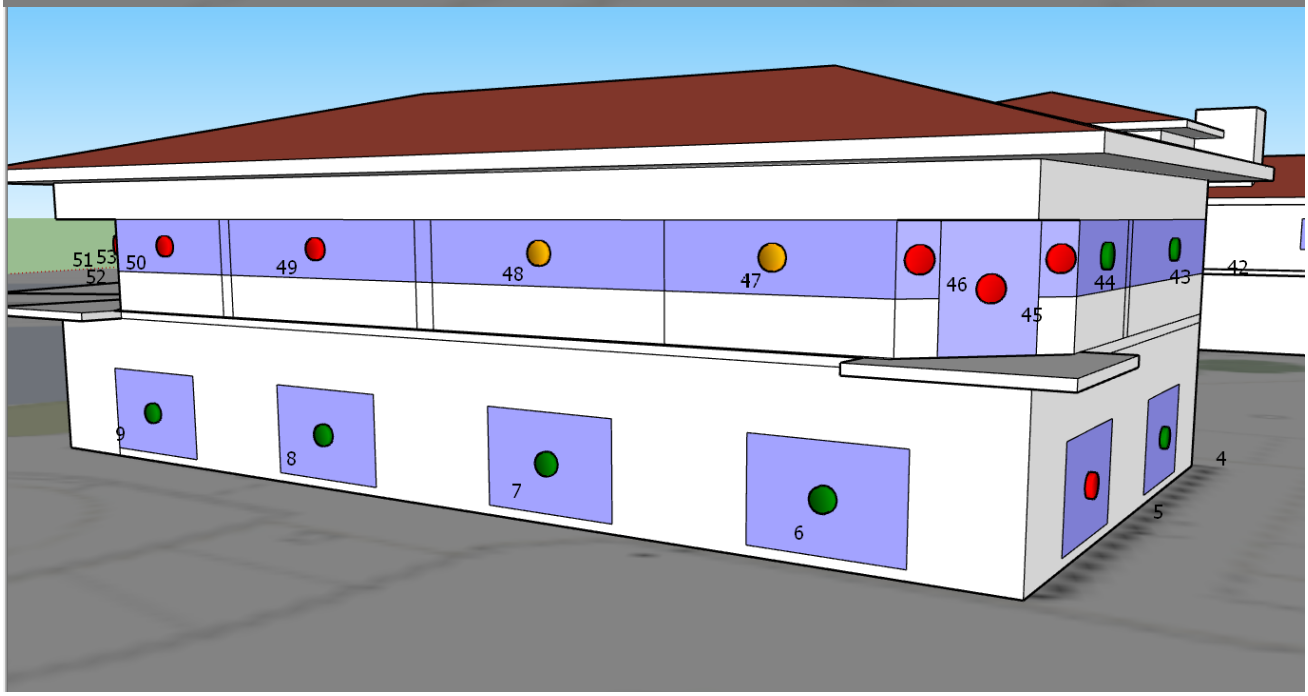
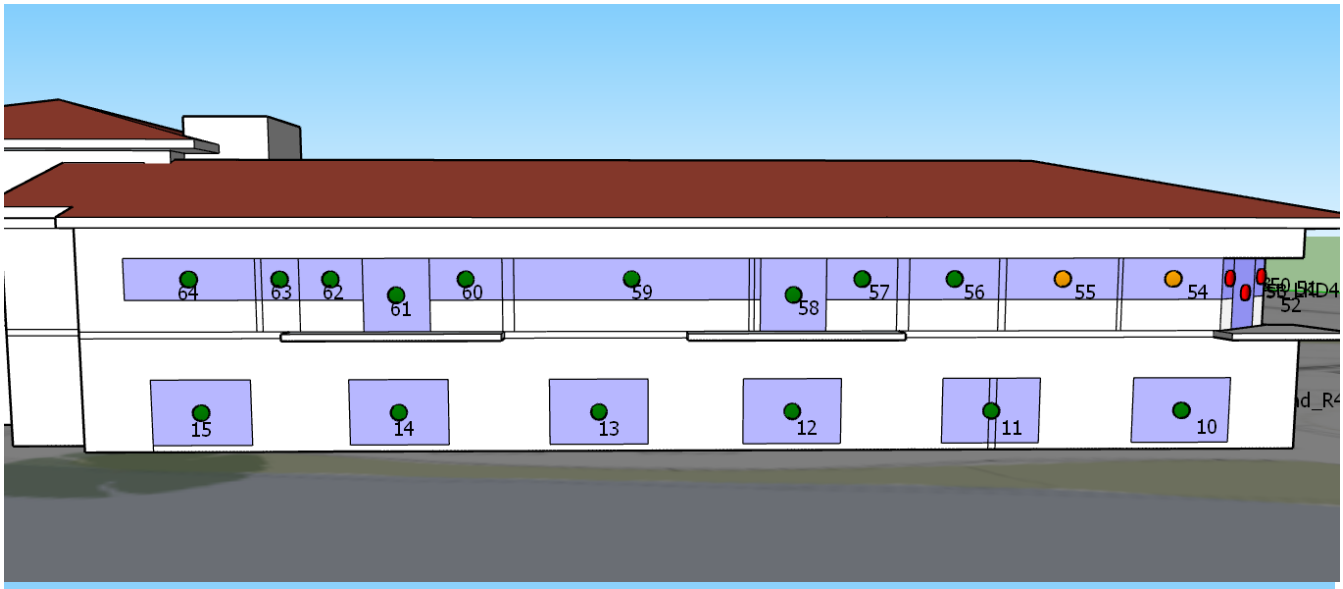
Appendix C. Window references Building A



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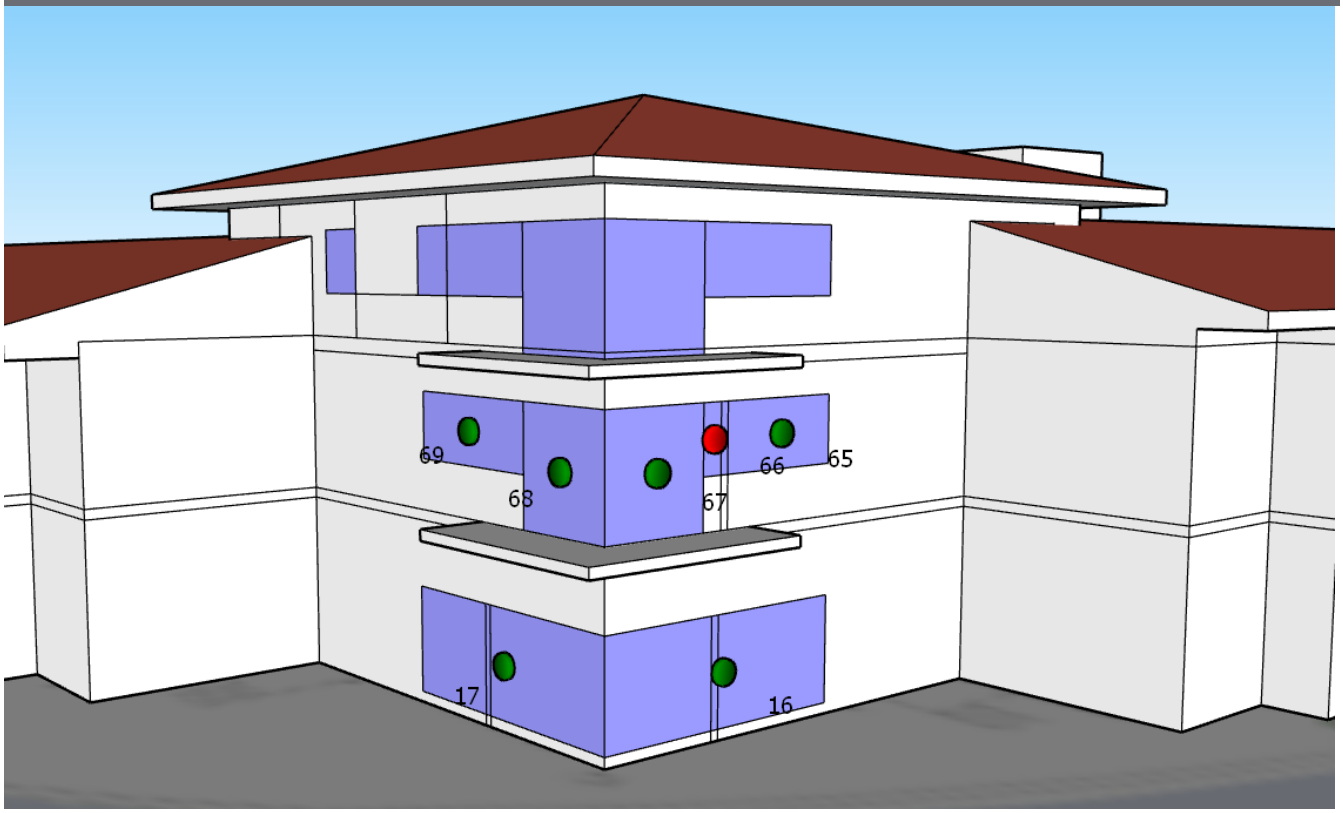
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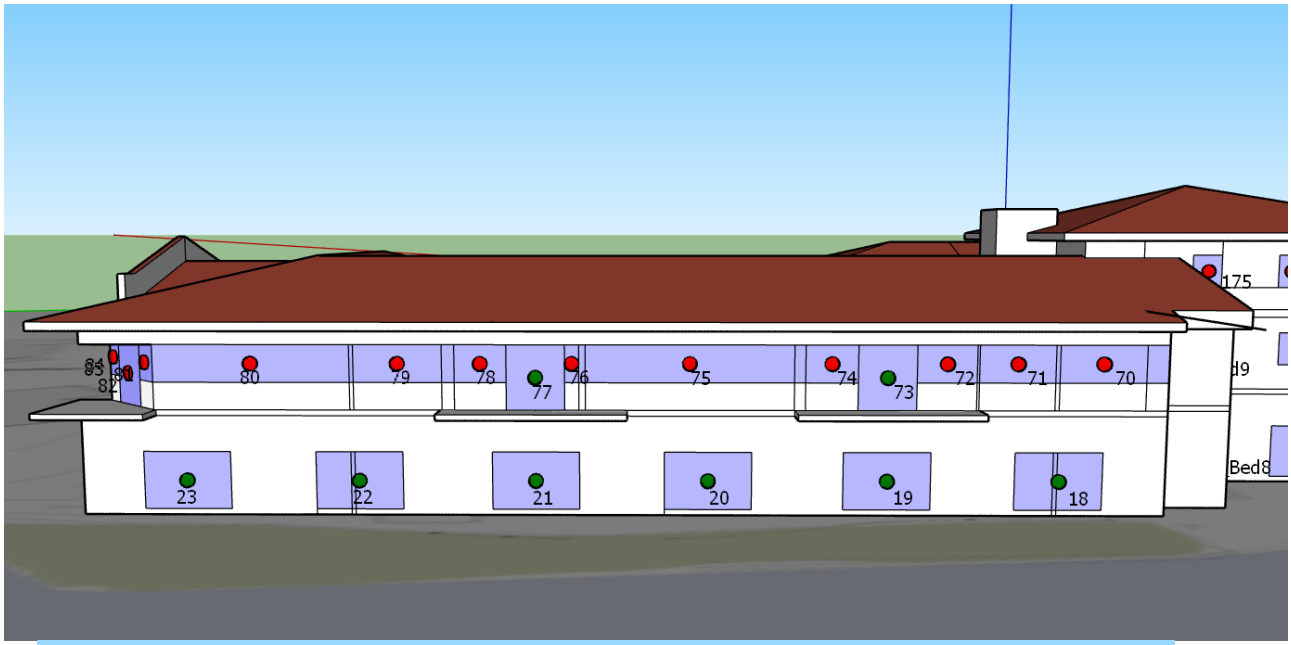
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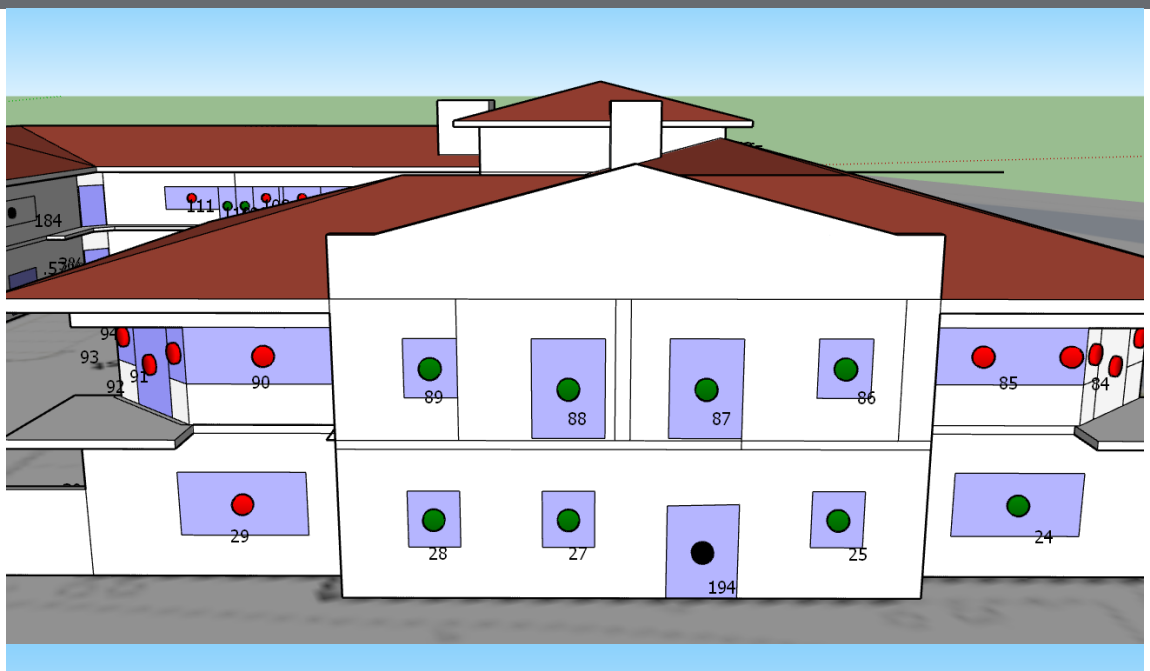
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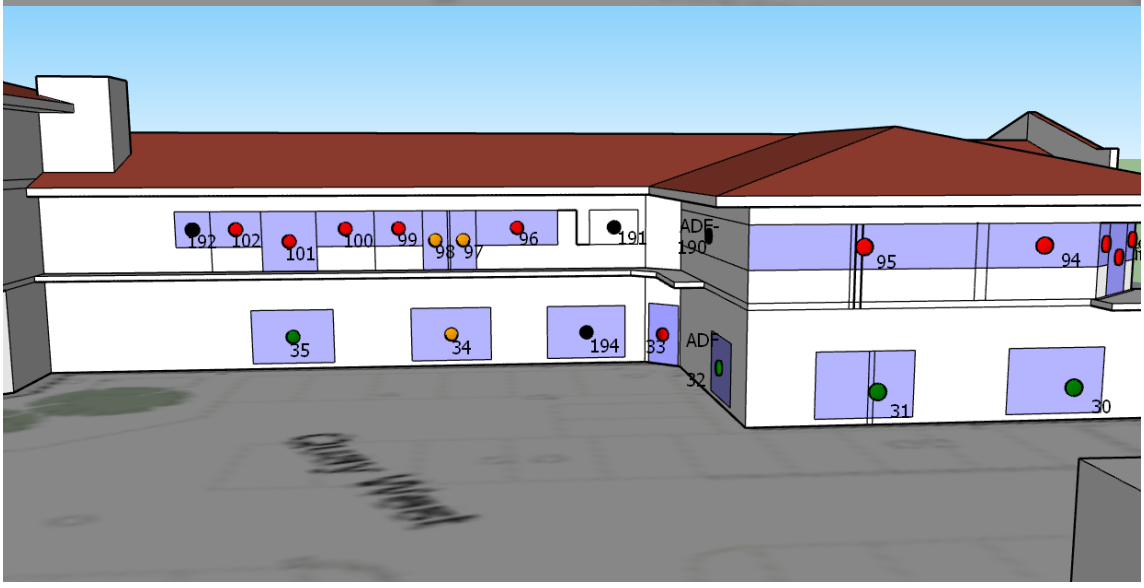
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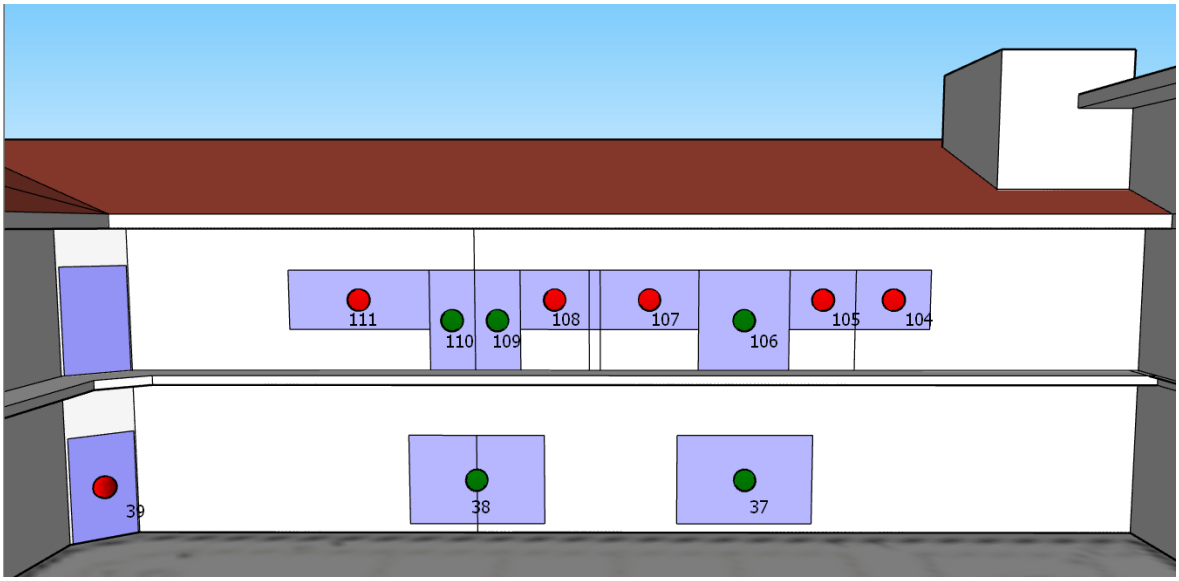
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