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OVERHEATING REPORT

For: Bugler Developments Limited

Project: **Falling Lane**
1263-BGD-ZZ-ZZ-RP-MEP-0001

12th June 2025 | Revision P02

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PROJECT REVISION SHEET

FALLING LANE OVERHEATING

Overheating Report

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Prepared by: ..... BAILEYGOMM

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1.0 EXECUTIVE SUMMARY

This report assesses the overheating risk for the occupied spaces within the Falling Lane development in accordance with Approved Document O - 2021 Overheating using the methodology from CIBSE TM59.

Using the of the latest architectural design, all units have been modelled and assessed using the London LHR Design Summer Year (DSY) 1 2020s, high emissions, 50% percentile scenario. Although not a mandatory requirement the modelled areas were also assessed using the corresponding DSY2 and DSY3 weather files, to demonstrate future scenarios of extreme summer conditions.

Due to the window opening restrictions in place on all façades, all 50 assessed units required the use of Peak Lopping (Cooling modules) to the unit to pass the assessment.

When assessed using DSY2 a total of 44 of the 50 apartments are able to pass the overheating assessment through the use of peak lopping cooling modules. This pass rate reduces further when using weather file DSY3 with a total of 38 out of 50 passing.

2.0 INTRODUCTION

2.1 BACKGROUND TO THE SCHEME

The project comprises the development of the site for the construction of 1 No. apartment block containing 50 units. The block consists of 1 bed, 2 bed and 3 bed apartments and 7 duplex units.

2.2 ACOUSTICS

A Noise Impact Assessment completed by Bloc Consulting in June 2023 was provided detailing the window opening restrictions required due to noise levels. The report found that on all façades, opening windows was not suitable for the mitigation of overheating. Therefore, any windows and balcony doors would need to be modelled as closed at all times.

3.0 METHODOLOGY

Overheating has been assessed using IES VE software and its dynamic simulation module in conjunction with Approved Part O, which is used for the bedrooms, kitchen and living rooms within the apartments. CIBSE TM59 is the methodology behind Part O that is used when assessing the likelihood of overheating for residential spaces.

The assessment has been carried out using the London LHR Design Summer Year (DSY) 1 2020s, high emissions, 50% percentile scenario. The weather file used within the model accurately represents a suburban area, representing the location of the Falling Lane development location.

DSY2 and DSY3 weather files have also been used to show the effects of a more persistently warm summer and a two-week extreme heat wave respectively. The results for these weather files can be found in Appendices 8.1 and 8.2. Note compliance with DSY2 and DSY3 is not mandatory.

Fo the purpose of this assessment we have modelled and assessed all apartments within the block due to the varying orientations and layouts of the different unit types i.e. duplexes, 1-2 and 3 bed apartments.

The limitations on the window openings will affect the pass-fail rate of the rooms when assessed using natural ventilation and therefore it is likely they will require peak lopping via a cooling module.

3.1 CIBSE TM59 METHODOLOGY

For rooms that are predominately naturally ventilated, CIBSE TM59, sets out the following criterion:

Criterion (a):

'The operative temperature in all occupied rooms should not exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by more than 1K for more than 3% of occupied hours between May to September inclusive.'

Criterion (b):

'The operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail)

Operative temperature calculations should also set the air speed in each space at 0.1 m/s where the software provides this option unless there is a ceiling fan or other means of reliably generating air movement.

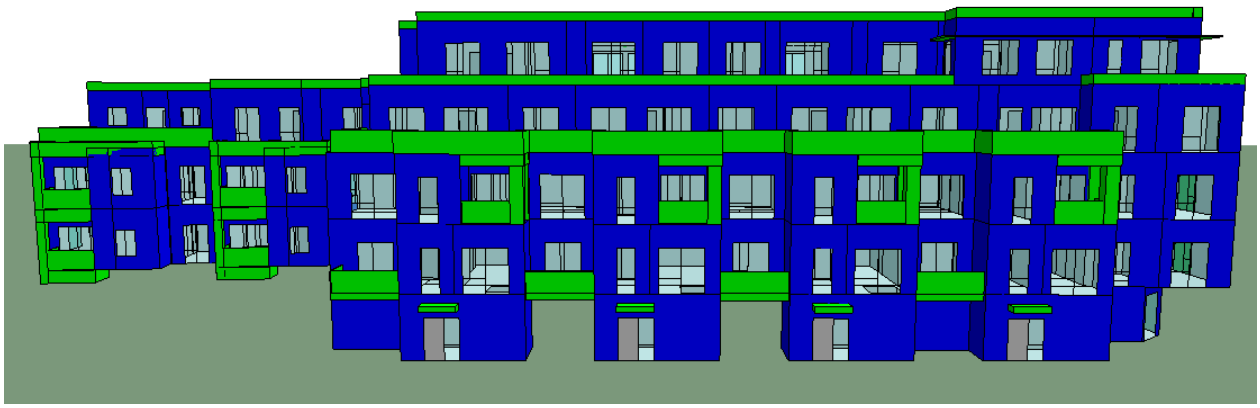
CIBSE TM59 sets out the following criteria for homes that are mechanically ventilated:
'For homes with restricted window opening, the CIBSE fixed temperature test must be followed, i.e., all occupied rooms should not exceed an operative temperature of 26°C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).'

Communal corridors are also assessed using a fixed temperature test where if an operative temperature of 28°C is exceeded for more than 3% of the total annual hours then they should be identified as a significant risk. It is not however a requirement for the communal corridors to pass the overheating assessment.

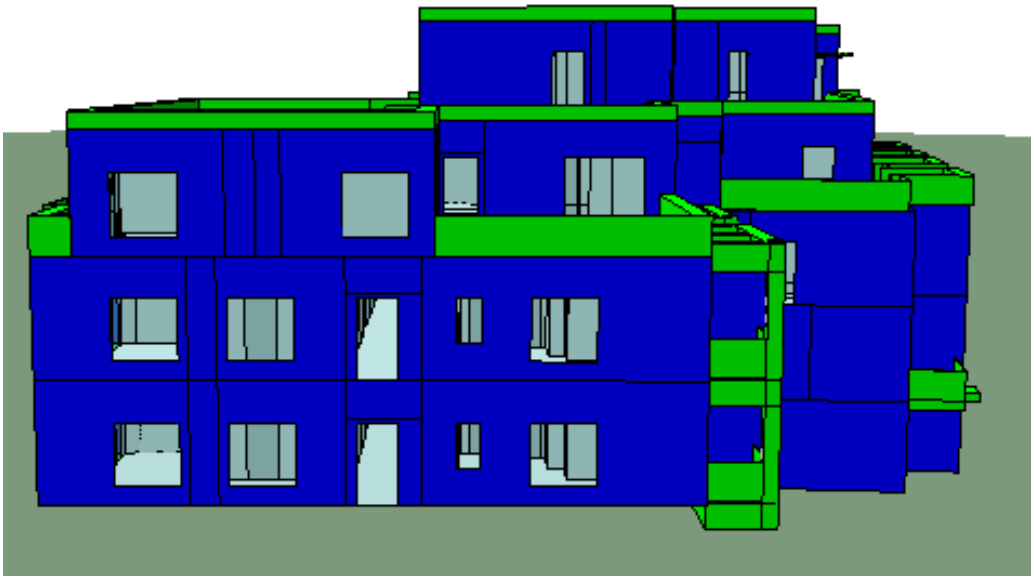
4.0 THERMAL MODEL

4.1 GEOMETRY

The geometry has been created using the latest revision of the layouts provided by Hunters dated March 2025. The rooms modelled are shown in blue and the shading shown in green. All balconies, overhangs, and parapets were modelled to provide shading to adjacent spaces as well as shutters on the south and west façades.

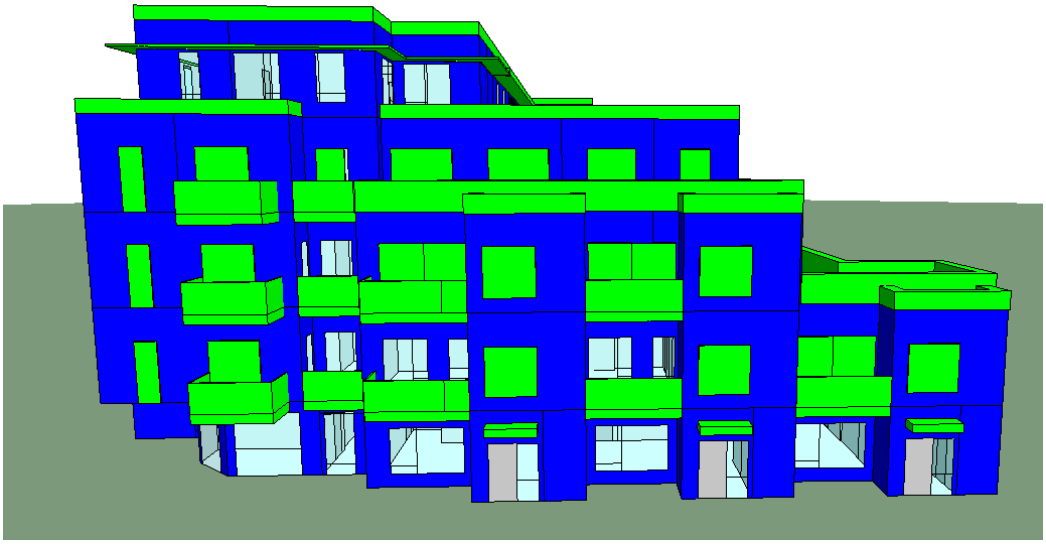


North Façade



East Façade

South Façade



West Façade

4.2 BUILDING ENVELOPE

The building fabric U-Values for the residential areas were specified by Bugler Developments and are listed in the table below.

Element	Proposed Building [W/m²K]
Walls	0.15
Roof	0.10
Ground Floor	0.10
Party Walls	0.15
Windows	0.9
g-value	0.4
	[m³/hr/m²]
Air permeability	3

Table 1 – Building Envelope Performance

4.3 VENTILATION STRATEGIES

When considering which ventilation strategy to use within a flat, there is a formal hierarchy that must be applied. Excess heat should be removed from a residential building by following the hierarchy below with the order of preference being the top option is the most desirable:

- Opening windows (if possible) where its effectiveness is improved by cross ventilation (natural ventilation).
- Additional purge ventilation of 50l/s (including additional boost flowrate from MVHR).
- A mechanical cooling system (cooling ventilation system).

4.3.1 NATURAL VENTILATION

A room is deemed to be naturally ventilated if it has openable windows and/or doors. It was determined from the noise assessment that opening windows for natural ventilation was not suitable for mitigating overheating. This means that no windows were modelled as openable on all façades of the block.

All internal rooms with natural ventilation have an infiltration rate of 0.25ACH and a background ventilation rate of 0.3l/s·m2 in accordance with Part F. This can be achieved with an MVHR system.

Internal Doors:

All internal residential doors – To be opened to 90° angle during the day and closed at night. Where a room has sliding / roller doors these have been modelled to allow for an opening of 90%.

Entrance Doors:

All entrance and communal doors – To be modelled as always closed.

Lobbies with AOVs:

All lobbies with AOVs were modelled with a ventilation rate of 2 air changes per hour when the internal temperature was above 25°C via an AOV.

4.3.3 PEAK LOPPING (COOLING) VENTILATION

Cooling via peak lopping will be supplied if a room fails the overheating assessment with the use of natural ventilation. As there are window restrictions in place on the rooms at all times, the rooms with peak lopping will be assessed as mechanically ventilated.

The cooling module will be activated when a wall mounted temperature sensor reaches 22°C (not adjustable) this will also increase the speed of the MVHR to 100l/s.

Bedrooms:

Dependent on the number of bedrooms within an apartment, the bedrooms will have varying flowrates of cooled air, typically:

- 1-Bedroom apartments will have 30l/s in the bedroom.
- 2-Bedroom apartments will have 25l/s in each bedroom.
- 3-Bedroom apartments will have 20l/s in each bedroom.

Living Room/Kitchen:

As with the bedrooms, the cooling module will provide differing quantities of cool air dependent to the number of bedrooms, typically:

- 1-Bedroom apartments will have 70l/s of cool air supplied to the kitchen & living room.
- 2-Bedroom apartments will have 50l/s of cool air supplied to the kitchen & living room.
- 3-Bedroom apartments will have 40l/s of cool air supplied to the kitchen & living room.

The number of bedrooms dictates the flowrate supplied to each room with the bedrooms having half the flowrate of the kitchen & living room. Where a unit has separate kitchen to living areas, the total flowrate previously mentioned is divided equally between both rooms.

The cooling module is not a dedicated air conditioning system but rather a peak lopping system where the supply air temperature is related to the external air temperature. The profile for the cooling ventilation system was created using information provided by NuAire 'MRXBOX Hybrid Cooling System' and this can be seen in Table 2 below.

External Conditions	Internal Conditions	Air Flow Rate		Supply Temperature
db (°C)	db (°C)	(l/s)	(m³/h)	(°C)
29	24	100	360	17.3
32	24	100	360	18.3
34	24	100	360	18.5

Table 2 – NuAire MRXBOX Hybrid Cooling System

5.0 RESULTS

The results below show the calculations which have been carried out with regards to the occupancy categories and weather data used. The numerical results for the various ventilation system results can be found in the Appendix 8.3.

5.1 PART O CALCULATIONS

Due to the acoustic restrictions in place meaning no windows could be modelled as openable during daytime or nighttime, all rooms were assessed as mechanically ventilated. This meant that no unit was able to use natural ventilation through openable windows and all units required mechanically ventilating via an MVHR with peak lopping.

5.2 SUMMARY

Within the tables below are the block, the corresponding assessed apartment number and its overall pass-fail result when using a mechanical ventilation system to pass the mandatory overheating assessment. Where a unit had modified flowrates to allow the rooms to pass, these have been detailed in Appendix 8.4.

DUPLEX UNITS:

Unit No.	Ventilation System
1	MVHR with Peak Lopping
2	MVHR with Peak Lopping
3	MVHR with Peak Lopping
4	MVHR with Peak Lopping
5	MVHR with Peak Lopping
6	MVHR with Peak Lopping
7	MVHR with Peak Lopping

APARTMENTS

Floor	Unit No.	Ventilation System	Unit No.	Ventilation System
GF	8	MVHR with Peak Lopping	9	MVHR with Peak Lopping
1st	10	MVHR with Peak Lopping	11	MVHR with Peak Lopping
	12	MVHR with Peak Lopping	13	MVHR with Peak Lopping
	14	MVHR with Peak Lopping	15	MVHR with Peak Lopping
	16	MVHR with Peak Lopping	17	MVHR with Peak Lopping
	18	MVHR with Peak Lopping		

2nd	19	MVHR with Peak Lopping	20	MVHR with Peak Lopping
	21	MVHR with Peak Lopping	22	MVHR with Peak Lopping
	23	MVHR with Peak Lopping	24	MVHR with Peak Lopping
	25	MVHR with Peak Lopping	26	MVHR with Peak Lopping
	27	MVHR with Peak Lopping	28	MVHR with Peak Lopping
	29	MVHR with Peak Lopping	30	MVHR with Peak Lopping
	31	MVHR with Peak Lopping	32	MVHR with Peak Lopping
	33	MVHR with Peak Lopping		
3rd	34	MVHR with Peak Lopping	35	MVHR with Peak Lopping
	36	MVHR with Peak Lopping	37	MVHR with Peak Lopping
	38	MVHR with Peak Lopping	39	MVHR with Peak Lopping
	40	MVHR with Peak Lopping	41	MVHR with Peak Lopping
	42	MVHR with Peak Lopping	43	MVHR with Peak Lopping
	44	MVHR with Peak Lopping	45	MVHR with Peak Lopping
4th	46	MVHR with Peak Lopping	47	MVHR with Peak Lopping
	48	MVHR with Peak Lopping	49	MVHR with Peak Lopping
	50	MVHR with Peak Lopping		

5.2.1 COMMUNAL CORRIDORS AND AREAS

Although it is not a requirement for communal corridors to pass, it must be made known if there is a risk of overheating. All corridors with AOVs have a ventilation rate of 2 air changes per hour when the internal temperature exceeds 25°C meaning only one area was identified as at risk of overheating: 4th Floor Right Corridor.

6.0 CONCLUSION

Due to the window restrictions in place all units required mechanically ventilating via an MVHR unit with Peak Lopping (cooling module).

When assessed using weather file DSY2, a total of 44 of the 50 assessed units were able to pass. This pass rate reduces when using weather file DSY3 with a total of 38 passing the assessment.

It is not a mandatory requirement for the apartments to pass using these weather files, but it serves to highlight the potential risk of overheating in the future. In the instance of extreme weather occurring similar to in DSY 2 and DSY 3, residents can use internal fans to increase the air velocity in the room to reduce the risk of overheating.

7.0 LIST OF ACRONYMS

ACH	Air Changes per Hour
BS	British Standard
CIBSE	Chartered Institute of Building Services Engineers
CIBSE TM59	Technical Memorandum 59 – Design Methodology for the Assessment of Overheating Risk in Homes
DSY	Design Summer Year – represents warmer than typical year and is used to evaluate overheating risk within buildings
IES VE	Integrated Environmental Solutions Virtual Environment (Modelling Software)
NCM	National Calculation Method (Standard Energy Modelling Software)
Part O	Approved Document Part O - Overheating

8.0 APPENDIX

8.1 DSY 2 WEATHER PROFILE RESULTS (NOT MANDATORY)

Duplex Units:

Duplex Unit No.	Ventilation System
1	MVHR with Peak Lopping
2	MVHR with Peak Lopping
3	MVHR with Peak Lopping
4	MVHR with Peak Lopping
5	MVHR with Peak Lopping
6	MVHR with Peak Lopping
7	MVHR with Peak Lopping

Apartments:

Floor	Unit No.	Ventilation System	Unit No.	Ventilation System
GF	8	MVHR with Peak Lopping	9	MVHR with Peak Lopping
1st	10	MVHR with Peak Lopping	11	MVHR with Peak Lopping
	12	MVHR with Peak Lopping	13	MVHR with Peak Lopping
	14	MVHR with Peak Lopping	15	MVHR with Peak Lopping
	16	MVHR with Peak Lopping	17	MVHR with Peak Lopping
	18	MVHR with Peak Lopping		
2nd	19	MVHR with Peak Lopping	20	MVHR with Peak Lopping
	21	MVHR with Peak Lopping	22	Fails with MVHR with Peak Lopping
	23	MVHR with Peak Lopping	24	MVHR with Peak Lopping
	25	MVHR with Peak Lopping	26	MVHR with Peak Lopping
	27	MVHR with Peak Lopping	28	MVHR with Peak Lopping
	29	MVHR with Peak Lopping	30	MVHR with Peak Lopping
	31	MVHR with Peak Lopping	32	MVHR with Peak Lopping
	33	MVHR with Peak Lopping		
3rd	34	Fails with MVHR with Peak Lopping	35	MVHR with Peak Lopping
	36	Fails with MVHR with Peak Lopping	37	MVHR with Peak Lopping
	38	MVHR with Peak Lopping	39	MVHR with Peak Lopping
	40	MVHR with Peak Lopping	41	MVHR with Peak Lopping

	42	MVHR with Peak Lopping	43	MVHR with Peak Lopping
	44	MVHR with Peak Lopping	45	MVHR with Peak Lopping
4th	46	MVHR with Peak Lopping	47	MVHR with Peak Lopping
	48	Fails with MVHR with Peak Lopping	49	Fails with MVHR with Peak Lopping
	50	Fails with MVHR with Peak Lopping		

8.2 DSY 3 WEATHER PROFILE RESULTS (NOT MANDATORY)

Duplex Units:

Duplex Unit No.	Ventilation System
1	Fails with MVHR with Peak Lopping
2	Fails with MVHR with Peak Lopping
3	Fails with MVHR with Peak Lopping
4	MVHR with Peak Lopping
5	MVHR with Peak Lopping
6	MVHR with Peak Lopping
7	MVHR with Peak Lopping

Apartments:

Floor	Unit No.	Ventilation System	Unit No.	Ventilation System
GF	8	MVHR with Peak Lopping	9	Fails with MVHR with Peak Lopping
1st	10	MVHR with Peak Lopping	11	MVHR with Peak Lopping
	12	MVHR with Peak Lopping	13	MVHR with Peak Lopping
	14	MVHR with Peak Lopping	15	MVHR with Peak Lopping
	16	MVHR with Peak Lopping	17	MVHR with Peak Lopping
	18	MVHR with Peak Lopping		
2nd	19	MVHR with Peak Lopping	20	MVHR with Peak Lopping
	21	MVHR with Peak Lopping	22	Fails with MVHR with Peak Lopping
	23	MVHR with Peak Lopping	24	MVHR with Peak Lopping
	25	MVHR with Peak Lopping	26	MVHR with Peak Lopping
	27	MVHR with Peak Lopping	28	MVHR with Peak Lopping
	29	MVHR with Peak Lopping	30	MVHR with Peak Lopping
	31	MVHR with Peak Lopping	32	MVHR with Peak Lopping
	33	MVHR with Peak Lopping		
3rd	34	Fails with MVHR with Peak Lopping	35	MVHR with Peak Lopping
	36	Fails with MVHR with Peak Lopping	37	MVHR with Peak Lopping
	38	MVHR with Peak Lopping	39	MVHR with Peak Lopping

	40	MVHR with Peak Lopping	41	MVHR with Peak Lopping
	42	Fails with MVHR with Peak Lopping	43	MVHR with Peak Lopping
	44	MVHR with Peak Lopping	45	MVHR with Peak Lopping
4th	46	Fails with MVHR with Peak Lopping	47	MVHR with Peak Lopping
	48	Fails with MVHR with Peak Lopping	49	Fails with MVHR with Peak Lopping
	50	Fails with MVHR with Peak Lopping		

8.3 DETAILED TM59 RESULTS

DUPLEX UNITS:

Mechanical Ventilation			
Duplex Unit	**Room name**	**No. hours >26°C**	**% Annual hours > 26°C**
1	Kitchen/Living/Dining	77	1.6
	Master Bedroom	84	1
	Single Bedroom 2	93	1.1
	Single Bedroom 3	68	0.8
2	Double Bedroom 2	13	0.1
	Kitchen/Living/Dining	118	2.5
	Master Bedroom	87	1
3	Double Bedroom 2	5	0.1
	Kitchen/Living/Dining	27	0.6
	Master Bedroom	223	2.5
4	Kitchen/Living/Dining	5	0.1
	Master Bedroom	4	0
	Single Bedroom 2	0	0
5	Kitchen/Living/Dining	3	0.1
	Master Bedroom	0	0
	Single Bedroom 2	0	0
6	Kitchen/Living/Dining	1	0
	Master Bedroom	0	0
	Single Bedroom 2	0	0
7	Kitchen/Living/Dining	1	0
	Master Bedroom	0	0
	Single Bedroom 2	1	0

APARTMENTS:

Mechanical Ventilation			
Unit	**Room name**	**No. hours >26°C**	**% Annual hours > 26°C**
8	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0

9	Kitchen/Living/Dining	67	1.4
	Master Bedroom	0	0
	Twin Bedroom 2	29	0.3
	Twin Bedroom 3	32	0.4
10	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
11	Kitchen/Living/Dining	3	0.1
	Master Bedroom	47	0.5
	Single Bedroom 2	0	0
12	Kitchen/Living/Dining	7	0.1
	Master Bedroom	0	0
	Single Bedroom 2	0	0
	Twin Bedroom 3	0	0
13	Kitchen/Living/Dining	0	0
	Master Bedroom	0	0
	Single Bedroom 2	0	0
14	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
15	Double Bedroom 2	0	0
	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
16	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
17	Double Bedroom 2	0	0
	Kitchen/Living/Dining/Entrance	1	0
	Master Bedroom	0	0
18	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
19	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
20	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
21	Kitchen/Living/Dining/Entrance	36	0.8
	Master Bedroom	25	0.3
	Single Bedroom 2	31	0.4
	Single Bedroom 3	43	0.5

22	Kitchen/Living/Dining	49	1
	Master Bedroom	224	2.6
	Single Bedroom 2	19	0.2
23	Kitchen/Living/Dining	5	0.1
	Master Bedroom	11	0.1
	Single Bedroom 2	0	0
24	Kitchen/Living/Dining	5	0.1
	Master Bedroom	12	0.1
	Single Bedroom 2	0	0
25	Kitchen/Living/Dining	38	0.8
	Master Bedroom	12	0.1
	Single Bedroom 2	11	0.1
	Twin Bedroom 3	0	0
26	Kitchen/Living/Dining	7	0.1
	Master Bedroom	11	0.1
	Single Bedroom 2	0	0
27	Kitchen/Living/Dining	0	0
	Master Bedroom	0	0
	Single Bedroom 2	0	0
28	Kitchen/Living/Dining	15	0.3
	Master Bedroom	12	0.1
	Single Bedroom 2	1	0
29	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
30	Double Bedroom 2	0	0
	Kitchen/Living/Dining/Entrance	2	0
	Master Bedroom	0	0
31	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
32	Double Bedroom 2	0	0
	Kitchen/Living/Dining/Entrance	9	0.2
	Master Bedroom	2	0
33	Kitchen/Living/Dining	0	0
	Master Bedroom	0	0

34	Kitchen/Living/Dining/Entrance	137	2.9
	Master Bedroom	208	2.4
	Single Bedroom 2	207	2.4
	Single Bedroom 3	236	2.7
35	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	0	0
36	Kitchen/Dining	47	1
	Living	128	2.7
	Master Bedroom	115	1.3
	Single Bedroom 2	89	1
	Twin Bedroom 3	166	1.9
37	Kitchen/Living/Dining/Entrance	8	0.2
	Master Bedroom	1	0
38	Kitchen	22	0.5
	Living/Diner	41	0.9
	Master Bedroom	10	0.1
	Single Bedroom 2	0	0
	Twin Bedroom 3	97	1.1
39	Kitchen/Living/Dining/Entrance	2	0
	Master Bedroom	1	0
40	Kitchen/Living/Dining	49	1
	Master Bedroom	0	0
	Single Bedroom 2	0	0
41	Kitchen/Living/Dining/Entrance	2	0
	Master Bedroom	1	0
42	Kitchen/Living/Dining/Entrance	32	0.7
	Master Bedroom	0	0
	Single Bedroom 2	18	0.2
43	Kitchen/Living/Dining/Entrance	16	0.3
	Master Bedroom	0	0
	Single Bedroom 2	1	0
44	Kitchen/Living/Dining	6	0.1
	Master Bedroom	28	0.3
	Single Bedroom 2	97	1.1
45	Kitchen/Living/Dining/Entrance	1	0
	Master Bedroom	0	0

46	Kitchen/Living/Dining	59	1.2
	Master Bedroom	105	1.2
47	Kitchen/Living/Dining/Entrance	0	0
	Master Bedroom	1	0
48	Kitchen/Living/Dining/Entrance	127	2.7
	Master Bedroom	160	1.8
	Single Bedroom 2	196	2.2
49	Kitchen/Living/Dining/Entrance	139	2.9
	Master Bedroom	131	1.5
	Single Bedroom 2	36	0.4
50	Kitchen/Living/Dining/Entrance	31	0.7
	Master Bedroom	162	1.8