

Building Regulations Part O Dynamic Thermal Modelling

Ashby Energy Assessors Ltd

T: 01476 870504

E: info@ashbyenergy.co.uk

W: ashbyenergy.co.uk

Land East of Lutterworth Road
BURBAGE

Project Reference Number: DDL 5779

Client: Davidsons Developments LTD

Date: 12/02/2024

Revision	Date	Changes	Prepared By	Checked By
V1	12/02/2024	Original Report	Kamil Hamela	Glenn Shewan

CONTENTS

- 1.0. Executive Summary
- 2.0. Analysis
- 3.0. Visualisation
- 4.0. Information used in the overheating assessment
- 5.0. Important Assumptions
- 6.0. Results
- 7.0. Conclusion

APPENDICES

- A. Methodology and standards

1.0. Executive Summary

A Building Regulations Part O Dynamic Thermal Modelling Overheating Assessment has been carried out by Ashby Energy Assessors on proposed 135 dwellings for Davidsons Developments LTD. There are 120 dwellings limited by noise, and these have been assessed in this report.

The overheating assessments have been carried out based on the plans and elevations provided, and the construction details as specified in section 4.1.

All the dwellings **comply** with limits set in CIBSE's TM59 and the additional Approved Document Part O requirements with windows limitations as detailed in Appendix B. The main items to overcome overheating in the dwellings are:

- Maximum solar factor (G-value) of whole window assembly = **0.46**,
- Specific rooms to achieve ventilation flow rates as per **Table 6**,
- Noise impact has been assessed based on the MEC LTD report reference: 25254-ENV-0401 Rev A,
- Other first floor windows openable at 650 mm (risk of falling) where applicable,
- System 3 ventilation trickle rate included to other wet rooms per Part F,
- pollution not considered in the overheating assessment,
- Front door to remain closed.

Full methodology, criteria and literature can be found in Appendices.

The results can be found in Table 6 - each dwelling have achieved Criteria A and B.

2.0. Analysis

2.1. Design

The simulation has been carried out using site plan, floor plans and elevations provided by Davidsons Developments LTD. The site plan used in this assessment is listed in the table 1 below.

Table 1 Architectural drawings numbers

Drawing Number	Title	Date
Planning	Ground Floor Plan	00/00/0000

The floor plans, elevations, and sections for each of the dwelling can be found in the Part O Overheating Assessments template report carried out by Ashby Energy Assessors for each of the house type.

2.2. Assessment

For the details of the simulation software, methodology, design criteria used in the assessment and literature, see appendices.

3.0. Visualisation

Screenshots below only show 74 plots.



4.0. Information used in the overheating assessment

4.1. Construction

Table 4 Construction

Element	Construction	U Value (W/m ² K)
Ground floor	Suspended Jablite Floor System	0.13
Cavity Wall	Low density block (0.15)	0.18
Timber Wall to RIR	90 mm + 90 mm PIR	0.13
Blockwork to garage	Blockwork + insulated plasterboard	0.23
Pitched roof (Joists)	400 mm Mineral Wool	0.11
Pitched roof (Rafters)	Rigid Foam between and below rafters	0.12
Flat roof	Warm Roof Construction	0.16
Windows	-	1.30
Doors	-	1.00

4.2. Other information

Table 5 Other inputs

Element	Value
Windows	
Solar Factor of window assembly	0.46
Inside Reveal	250 mm
Outside Reveal	70 mm
Coefficient of restriction	0.65
Controlled Inputs	
Occupancy	TM59 guidelines
Internal gains	TM59 guidelines
Window openings	Occupancy schedules
Occupied zones	Bedrooms, Living / Dining areas
Bedrooms >10 m ²	Double Bedrooms
Bedrooms <10 m ²	Single Bedrooms
Weather Data	Birmingham (DSY1_2020 High50)

4.3. Window schedule – daytime windows restriction



Key:



Windows can remain open

Windows must remain closed

4.4. Window schedule – nighttime windows restriction



Key:

	Windows can remain open
	Windows must remain closed

5.0. Important Assumptions

Security

If windows / doors are left fully open during the day and or night, depending upon where these are located, it could pose a security risk (ground floor or over easily accessible roofs and terraces). If this is the case, then these windows will need to have some form of external security such as fixed louvres.

The assessment includes ground floor bedrooms with windows that are not secure, but these also have noise implications and are modelled closed 24/7.

Pollution

The pollution issues have not been assessed; if identified, window openings will need to be assessed if those can still be used for overheating strategy. If there is pollution source nearby that limits the ability for natural ventilation, the assessment would need to be redone on that basis.

The assessment does not consider pollution.

Noise

Noise impact have not been assessed; if identified, window openings will need to be assessed if those can still be used for overheating strategy. If there is noise source nearby that limits the ability for natural ventilation, the assessment would need to be redone on that basis.

The assessment considers noise impact and restrictions on window openings during the day and at night.

Protection from falling

First floor windows satisfy the risk of falling criteria; therefore, these have been modelled open 650 mm for ventilation purposes where applicable.

Protection from entrapment

All openings have been designed to ensure no entrapment issues.

6.0. Results

All the zones in the assessment have passed both Criterion A and Criterion B.

Ground floor bedroom have failed the Criterion A and Criterion B because of windows not being secure and assumed open only 100 mm. All other zones comply with the Criteria A and B.

Table 6 Results

Plot	Zone	Criterion A (%)	Criterion B (hrs)	Additional Ventilation	Pass / Fail
1	Kitchen / Dining	0.78	-	-	Pass
	Sitting Room	2.46	-	-	
	Master Bedroom	0.98	31.17	30 l/s	
	Bedroom 2	0.00	11.17	-	
	Bedroom 3	1.35	27.67	40 l/s	
	Bedroom 4	0.00	14.00	-	
	Bedroom 5	0.13	16.00	-	
2	Kitchen / Dining	1.38	-	-	Pass
	Sitting Room	0.51	-	-	
	Study	2.90	-	30 l/s	
	Master Bedroom	0.00	14.17	-	
	Bedroom 2	0.00	10.67	-	
	Bedroom 3	0.36	28.17	40 l/s	
	Bedroom 4	0.81	26.50	55 l/s	
3	Kitchen / Dining	0.21	-	-	Pass
	Sitting Room	2.29	-	30 l/s	
	Master Bedroom	0.00	2.33	-	
	Bedroom 2	0.29	28.50	25 l/s	
	Bedroom 3	0.88	6.83	-	
4	Kitchen / Dining / Sitting	0.63	-	-	Pass
	Master Bedroom	0.00	5.83	-	
	Bedroom 2	0.00	5.83	-	
5	Kitchen / Dining / Sitting	0.84	-	-	Pass
	Master Bedroom	0.00	5.67	-	
	Bedroom 2	0.00	5.33	-	

6	Kitchen / Dining / Sitting	0.12	-	-	Pass
	Master Bedroom	0.00	5.00	-	
	Bedroom 2	0.00	4.83	-	
7	Kitchen / Dining	2.16	-	20 l/s	Pass
	Sitting Room	0.22	-	-	
	Master Bedroom	0.00	4.17	-	
	Bedroom 2	0.00	2.50	-	
8	Kitchen / Dining	2.70	-	23 l/s	Pass
	Sitting Room	0.09	-	-	
	Master Bedroom	0.00	4.33	-	
	Bedroom 2	0.00	2.67	-	
9	Kitchen / Dining	2.43	-	23 l/s	Pass
	Sitting Room	0.09	-	-	
	Master Bedroom	0.00	4.17	-	
	Bedroom 2	0.00	2.50	-	
10	Kitchen / Dining	2.34	-	-	Pass
	Sitting Room	1.77	-	-	
	Master Bedroom	0.05	32.00	-	
	Bedroom 2	0.00	17.00	-	
	Bedroom 3	0.75	31.17	-	
11	Kitchen / Dining	0.00	-	-	Pass
	Sitting Room	0.15	-	-	
	Master Bedroom	0.00	27.17	35 l/s	
	Bedroom 2	0.61	27.83	40 l/s	
	Bedroom 3	0.40	26.83	35 l/s	
12	Kitchen / Dining	0.00	-	-	Pass
	Sitting Room	0.98	-	-	
	Master Bedroom	0.00	31.50	40 l/s	
	Bedroom 2	0.34	28.83	38 l/s	
	Bedroom 3	0.23	31.00	30 l/s	
13	Kitchen / Dining	0.85	-	-	Pass
	Sitting Room	2.66	-	10 l/s	
	Master Bedroom	0.00	8.17	-	
	Bedroom 2	0.00	12.17	-	
	Bedroom 3	0.00	14.00	-	

14	Kitchen / Dining	2.07	-	-	Pass
	Sitting Room	1.77	-	-	
	Master Bedroom	0.00	4.17	-	
	Bedroom 2	0.00	14.00	-	
	Bedroom 3	0.00	8.83	-	
	Bedroom 4	0.20	15.83	-	
15	Kitchen / Dining	1.28	-	-	Pass
	Sitting Room	2.49	-	-	
	Master Bedroom	0.00	3.33	-	
	Bedroom 2	0.00	13.33	-	
	Bedroom 3	0.00	17.17	-	
	Bedroom 4	0.01	14.83	-	
16	Kitchen / Dining	0.00	-	-	Pass
	Sitting Room	1.61	-	-	
	Master Bedroom	0.00	24.17	-	
	Bedroom 2	0.13	15.17	-	
	Bedroom 3	0.00	18.00	-	
17	Kitchen / Dining / Living	2.44	-	-	Pass
	Sitting Room	2.38	-	-	
	Study	2.56	-	-	
	Master Bedroom	0.00	14.83	-	
	Bedroom 2	0.00	31.17	-	
	Bedroom 3	0.11	20.67	-	
	Bedroom 4	0.26	17.00	-	
18	Kitchen / Dining	1.95	-	-	Pass
	Sitting Room	1.32	-	-	
	Study	0.00	-	-	
	Master Bedroom	0.00	9.17	-	
	Bedroom 2	0.42	7.50	-	
	Bedroom 3	0.00	14.00	-	
	Bedroom 4	0.00	15.33	-	
	Bedroom 5	0.00	22.00	-	
28	Kitchen / Dining	0.90	-	-	Pass
	Sitting Room	2.11	-	-	
	Master Bedroom	0.48	11.83	-	
	Bedroom 2	0.00	11.83	-	

28	Bedroom 3	1.77	27.00	-	Pass
	Bedroom 4	0.00	15.00	-	
	Bedroom 5	0.15	16.83	-	
29	Kitchen / Dining	2.75	-	-	Pass
	Sitting Room	1.93	-	-	
	Master Bedroom	0.00	7.83	-	
	Bedroom 2	0.12	5.67	-	
	Bedroom 3	0.07	15.50	-	
	Bedroom 4	0.85	18.17	-	
	Bedroom 5	0.09	13.67	-	
30	Kitchen / Dining	2.11	-	-	Pass
	Sitting Room	2.97	-	15 l/s	
	Study	2.87	-	-	
	Master Bedroom	0.00	16.83	-	
	Bedroom 2	0.00	29.50	-	
	Bedroom 3	0.00	15.17	-	
	Bedroom 4	0.00	13.17	-	
31	Kitchen / Dining	0.00	-	-	Pass
	Sitting Room	0.00	-	-	
	Master Bedroom	0.09	18.17	-	
	Bedroom 2	0.00	12.00	-	
	Bedroom 3	0.69	7.50	-	
	Bedroom 4	0.00	7.33	-	
32	Kitchen / Dining	0.78	-	-	Pass
	Sitting Room	2.66	-	-	
	Master Bedroom	0.00	6.00	-	
	Bedroom 2	0.08	5.00	-	
	Bedroom 3	0.00	10.33	-	
	Bedroom 4	0.14	12.67	-	
	Bedroom 5	0.00	11.33	-	
33	Kitchen / Dining	0.86	-	-	Pass
	Sitting Room	0.88	-	-	
	Study	2.59	-	6 l/s	
	Master Bedroom	0.00	6.67	-	
	Bedroom 2	0.00	11.33	-	
	Bedroom 3	0.24	6.83	-	
	Bedroom 4	0.13	11.50	-	

34	Kitchen / Dining	2.87	-	40 l/s	Pass
	Sitting Room	1.78	-	8 l/s	
	Master Bedroom	0.00	14.00	-	
	Bedroom 2	0.00	17.50	-	
	Bedroom 3	0.00	13.17	-	
35	Kitchen / Dining	2.90	-	27 l/s	Pass
	Sitting Room	1.49	-	8 l/s	
	Master Bedroom	0.00	13.50	-	
	Bedroom 2	0.00	16.50	-	
	Bedroom 3	0.00	13.33	-	
36	Kitchen / Dining	2.98	-	20 l/s	Pass
	Sitting Room	1.90	-	8 l/s	
	Master Bedroom	0.00	14.67	-	
	Bedroom 2	0.00	17.50	-	
	Bedroom 3	0.00	13.33	-	
37	Kitchen / Dining	3.00	-	15 l/s	Pass
	Sitting Room	0.10	-	-	
	Master Bedroom	0.00	14.50	-	
	Bedroom 2	0.00	17.50	-	
	Bedroom 3	0.00	13.83	-	
43	Kitchen / Dining	0.78	-	-	Pass
	Sitting Room	2.49	-	-	
	Master Bedroom	0.00	8.33	-	
	Bedroom 2	0.00	10.83	-	
	Bedroom 3	0.18	11.83	-	
44	Kitchen / Dining	0.48	-	-	Pass
	Sitting Room	2.90	-	10 l/s	
	Master Bedroom	0.00	9.50	-	
	Bedroom 2	0.00	14.33	-	
	Bedroom 3	0.00	13.33	-	
45	Kitchen / Dining	0.58	-	-	Pass
	Sitting Room	2.99	-	18 l/s	
	Master Bedroom	0.10	16.17	-	
	Bedroom 2	0.00	11.50	-	
	Bedroom 3	0.00	12.00	-	

46	Kitchen / Dining / Living	0.87	-	-	Pass
	Sitting Room	1.72	-	6 l/s	
	Study	2.90	-	5 l/s	
	Master Bedroom	0.00	15.33	-	
	Bedroom 2	0.12	29.00	-	
	Bedroom 3	0.00	14.83	-	
	Bedroom 4	0.00	13.33	-	
48	Kitchen / Dining	2.78	-	-	Pass
	Sitting Room	1.40	-	-	
	Master Bedroom	0.00	9.17	-	
	Bedroom 2	0.00	13.83	-	
	Bedroom 3	0.00	13.00	-	
49	Kitchen / Dining	2.68	-	20 l/s	Pass
	Sitting Room	1.76	-	-	
	Master Bedroom	0.00	10.33	-	
	Bedroom 2	0.30	21.50	-	
	Bedroom 3	0.09	15.33	-	
50	Kitchen / Dining	2.85	-	22 l/s	Pass
	Sitting Room	1.92	-	-	
	Master Bedroom	0.00	10.33	-	
	Bedroom 2	0.26	22.67	-	
	Bedroom 3	0.13	15.50	-	
51	Kitchen / Dining	2.79	-	25 l/s	Pass
	Sitting Room	1.74	-	-	
	Master Bedroom	0.00	10.33	-	
	Bedroom 2	0.34	21.67	-	
	Bedroom 3	0.10	15.33	-	
52	Kitchen / Dining / Living	0.39	-	-	Pass
	Sitting Room	1.21	-	-	
	Study	2.83	-	13 l/s	
	Master Bedroom	0.19	18.17	-	
	Bedroom 2	0.28	17.50	-	
	Bedroom 3	0.00	13.17	-	
	Bedroom 4	0.00	12.50	-	
53	Kitchen / Dining	0.68	-	-	Pass
	Sitting Room	0.45	-	-	

53	Study	2.97	-	7 l/s	Pass
	Master Bedroom	0.00	4.50	-	
	Bedroom 2	0.00	9.17	-	
	Bedroom 3	0.32	21.83	-	
	Bedroom 4	0.86	26.67	-	
54	Kitchen / Dining / Living	0.72	-	-	Pass
	Sitting Room	1.46	-	-	
	Study	2.85	-	8 l/s	
	Master Bedroom	0.27	30.67	60 l/s	
	Bedroom 2	0.18	29.67	47 l/s	
	Bedroom 3	0.00	15.83	-	
	Bedroom 4	0.00	13.83	-	
55	Kitchen / Dining	0.79	-	-	Pass
	Sitting Room	0.88	-	-	
	Study	2.95	-	-	
	Master Bedroom	0.00	5.67	-	
	Bedroom 2	0.00	11.50	-	
	Bedroom 3	0.84	25.00	-	
	Bedroom 4	0.41	31.50	41 l/s	
56	Kitchen / Dining	1.86	-	-	Pass
	Sitting Room	1.15	-	-	
	Master Bedroom	0.09	21.83	-	
	Bedroom 2	0.05	11.17	-	
	Bedroom 3	0.14	29.67	35 l/s	
57	Kitchen / Dining	1.47	-	-	Pass
	Sitting Room	0.49	-	-	
	Master Bedroom	0.09	21.83	-	
	Bedroom 2	0.04	11.83	-	
	Bedroom 3	0.00	13.83	-	
58	Kitchen / Dining	1.82	-	-	Pass
	Sitting Room	0.79	-	-	
	Master Bedroom	0.17	4.67	-	
	Bedroom 2	0.10	13.17	-	
	Bedroom 3	0.00	14.17	-	
59	Kitchen / Dining	1.56	-	-	Pass
	Sitting Room	0.51	-	-	

59	Master Bedroom	0.11	4.67	-	Pass
	Bedroom 2	0.05	13.17	-	
	Bedroom 3	0.00	14.67	-	
60	Kitchen / Dining	2.17	-	-	Pass
	Sitting Room	0.63	-	-	
	Master Bedroom	0.00	5.83	-	
	Bedroom 2	0.00	12.83	-	
	Bedroom 3	0.00	14.17	-	
61	Kitchen / Dining	0.84	-	-	Pass
	Sitting Room	0.38	-	-	
	Master Bedroom	0.00	8.33	-	
	Bedroom 2	0.00	7.67	-	
	Bedroom 3	0.00	9.00	-	
62	Kitchen / Dining	1.90	-	-	Pass
	Sitting Room	0.91	-	-	
	Master Bedroom	0.45	11.33	-	
	Bedroom 2	0.10	30.50	35 l/s	
	Bedroom 3	1.76	26.33	-	
	Bedroom 4	0.06	28.83	35 l/s	
	Bedroom 5	0.52	30.50	35 l/s	
63	Kitchen / Dining	1.60	-	-	Pass
	Sitting Room	0.80	-	-	
	Master Bedroom	0.34	10.17	-	
	Bedroom 2	0.02	28.67	35 l/s	
	Bedroom 3	1.54	24.33	-	
	Bedroom 4	0.00	25.83	35 l/s	
	Bedroom 5	0.46	29.33	35 l/s	
64	Kitchen	2.63	-	-	Pass
	Sitting Room	0.97	-	-	
	Study	1.95	-	-	
	Master Bedroom	0.21	19.5	-	
	Bedroom 2	0.31	17.83	-	
	Bedroom 3	0.04	29.67	44 l/s	
	Bedroom 4	0.19	30.33	33 l/s	
65	Kitchen / Dining / Living	1.64	-	-	Pass
	Sitting Room	1.25	-	-	

65	Study	2.42	-	-	Pass
	Master Bedroom	0.59	20.50	-	
	Bedroom 2	0.50	31.67	-	
	Bedroom 3	0.00	27.50	43 l/s	
	Bedroom 4	0.12	29.33	35 l/s	
66	Kitchen / Dining / Living	2.05	-	-	Pass
	Sitting Room	2.03	-	-	
	Study	2.50	-	-	
	Master Bedroom	0.46	19.50	-	
	Bedroom 2	0.58	31.83	-	
	Bedroom 3	0.00	29.00	43 l/s	
	Bedroom 4	0.00	25.50	35 l/s	
67	Kitchen / Dining	2.68	-	25 l/s	Pass
	Sitting Room	2.86	-	32 l/s	
	Master Bedroom	0.55	18.17	-	
	Bedroom 2	0.09	27.00	30 l/s	
	Bedroom 3	0.25	29.00	32 l/s	
68	Kitchen / Dining	0.94	-	-	Pass
	Sitting Room	0.31	-	-	
	Study	2.34	-	-	
	Master Bedroom	0.00	7.83	-	
	Bedroom 2	0.24	23.67	-	
	Bedroom 3	0.00	20.67	-	
	Bedroom 4	0.36	30.50	37 l/s	
	Bedroom 5	0.16	31.17	50 l/s	
69	Kitchen / Dining	2.95	-	45 l/s	Pass
	Sitting Room	1.22	-	-	
	Master Bedroom	0.13	15.50	-	
	Bedroom 2	0.25	27.83	33 l/s	
	Bedroom 3	0.34	29.50	33 l/s	
70	Kitchen / Dining	3.00	-	38 l/s	Pass
	Sitting Room	2.93	-	16 l/s	
	Master Bedroom	0.10	31.17	48 l/s	
	Bedroom 2	0.00	15.67	-	
	Bedroom 3	0.10	27.50	35 l/s	
71	Kitchen / Dining	3.00	-	81 l/s	Pass

71	Sitting Room	1.35	-	-	Pass
	Master Bedroom	0.00	11.50	-	
	Bedroom 2	0.00	27.00	45 l/s	
72	Kitchen / Dining	2.94	-	69 l/s	Pass
	Sitting Room	1.05	-	-	
	Master Bedroom	0.00	11.17	-	
	Bedroom 2	0.00	24.83	45 l/s	
73	Kitchen / Dining	2.98	-	71 l/s	Pass
	Sitting Room	0.80	-	-	
	Master Bedroom	0.00	10.83	-	
	Bedroom 2	0.00	22.83	45 l/s	
74	Kitchen / Dining	2.97	-	75 l/s	Pass
	Sitting Room	1.78	-	-	
	Master Bedroom	0.00	12.33	-	
	Bedroom 2	0.00	30.33	45 l/s	
75	Kitchen / Dining	0.72	-	-	Pass
	Sitting Room	1.62	-	8 l/s	
	Master Bedroom	0.00	27.33	45 l/s	
	Bedroom 2	0.05	15.83	-	
	Bedroom 3	0.51	18.50	-	
	Bedroom 4	0.30	30.17	35 l/s	
76	Kitchen / Living	2.04	-	20 l/s	Pass
	Master Bedroom	0.00	26.83	45 l/s	
	Bedroom 2	0.29	27.33	52 l/s	
	Bedroom 3	0.62	21.50	-	
77	Kitchen / Living	2.95	-	15 l/s	Pass
	Master Bedroom	0.00	31.00	42 l/s	
	Bedroom 2	0.13	20.50	-	
	Bedroom 3	0.68	29.83	35 l/s	
78	Kitchen / Living	2.76	-	20 l/s	Pass
	Master Bedroom	0.00	28.00	45 l/s	
	Bedroom 2	0.32	27.67	52 l/s	
	Bedroom 3	0.70	29.00	35 l/s	
79	Kitchen / Living	2.35	-	30 l/s	Pass
	Bedroom 1	0.28	29.33	45 l/s	

80	Kitchen / Living	1.75	-	25 l/s	Pass
	Bedroom 1	0.00	23.17	45 l/s	
81	Kitchen / Living	1.88	-	25 l/s	Pass
	Bedroom 1	0.00	25.33	45 l/s	
82	Kitchen / Living	2.69	-	30 l/s	Pass
	Bedroom 1	0.35	31.50	45 l/s	
83	Kitchen / Living	1.10	-	25 l/s	Pass
	Bedroom 1	0.00	19.50	45 l/s	
84	Kitchen / Living	2.09	-	30 l/s	Pass
	Bedroom 1	0.14	24.50	45 l/s	
85	Kitchen / Living	0.98	-	25 l/s	Pass
	Bedroom 1	0.00	17.00	45 l/s	
86	Kitchen / Living	1.96	-	30 l/s	Pass
	Bedroom 1	0.13	25.67	45 l/s	
87	Kitchen / Living	2.97	-	18 l/s	Pass
	Master Bedroom	0.19	31.67	51 l/s	
	Bedroom 2	0.02	32.00	46 l/s	
	Bedroom 3	0.26	26.17	35 l/s	
88	Kitchen / Living	0.88	-	-	Pass
	Master Bedroom	0.11	29.33	52 l/s	
	Bedroom 2	0.00	27.33	42 l/s	
89	Kitchen / Living	2.29	-	16 l/s	Pass
	Master Bedroom	0.03	30.33	8 l/s	
	Bedroom 2	0.00	29.33	45 l/s	
	Bedroom 3	0.10	20.17	35 l/s	
90	Kitchen / Dining	2.19	-	-	Pass
	Master Bedroom	0.00	9.83	-	
	Sitting Room	2.9	-	25 l/s	
	Bedroom 2	0.00	29.67	32 l/s	
	Bedroom 3	0.00	28.67	32 l/s	
91	Kitchen / Dining	1.54	-	-	Pass
	Master Bedroom	0.00	10.00	-	

91	Sitting Room	2.76	-	25 l/s	Pass
	Bedroom 2	0.00	24.00	32 l/s	
	Bedroom 3	0.00	28.67	32 l/s	
92	Kitchen / Living / Dining	2.64	-	-	Pass
	Sitting Room	1.89	-	25 l/s	
	Master Bedroom	0.42	19.00	-	
	Bedroom 2	0.00	30.33	35 l/s	
	Bedroom 3	0.10	7.83	-	
	Bedroom 4	0.00	8.83	-	
	Study	2.08	-	14 l/s	
93	Kitchen / Dining	0.64	-	-	Pass
	Sitting Room	2.74	-	35 l/s	
	Study	2.68	-	-	
	Master Bedroom	0.00	31.67	45 l/s	
	Bedroom 2	0.66	25.00	-	
	Bedroom 3	0.00	31.33	44 l/s	
	Bedroom 4	1.06	26.67	-	
	Bedroom 5	0.69	31.00	-	
94	Kitchen / Dining	3.00	-	-	Pass
	Master Bedroom	0.40	28.83	49 l/s	
	Sitting Room	0.80	-	-	
	Bedroom 2	0.00	27.33	35 l/s	
	Bedroom 3	0.00	10.17	-	
95	Kitchen / Dining	1.65	-	25 l/s	Pass
	Master Bedroom	0.00	28.33	42 l/s	
	Bedroom 2	0.35	30.00	50 l/s	
	Bedroom 3	0.75	28.17	38 l/s	
96	Kitchen / Dining	1.20	-	-	Pass
	Sitting Room	1.84	-	25 l/s	
	Master Bedroom	1.07	30.50	70 l/s	
	Bedroom 2	0.29	29.17	53 l/s	
	Bedroom 3	1.00	31.33	42 l/s	
97	Kitchen / Living	0.00	-	-	Pass
	Master Bedroom	0.00	30.67	45 l/s	
	Bedroom 2	0.00	10.17	-	

98	Kitchen / Living	0.00	-	-	Pass
	Master Bedroom	0.00	31.50	45 l/s	
	Bedroom 2	0.00	10.00	-	
99	Kitchen / Living	0.03	-	-	Pass
	Master Bedroom	0.00	31.67	45 l/s	
	Bedroom 2	0.00	10.83	-	
100	Kitchen / Living	0.00	-	-	Pass
	Master Bedroom	0.00	30.67	45 l/s	
	Bedroom 2	0.00	10.67	-	
101	Kitchen / Dining	1.50	-	-	Pass
	Sitting Room	2.10	-	20 l/s	
	Master Bedroom	1.20	31.17	70 l/s	
	Bedroom 2	0.29	32.00	50 l/s	
	Bedroom 3	1.13	31.83	42 l/s	
102	Kitchen / Living	0.82	-	-	Pass
	Master Bedroom	0.08	31.67	52 l/s	
	Bedroom 2	0.00	25.50	42 l/s	
103	Kitchen / Living	0.17	-	-	Pass
	Master Bedroom	0.02	27.83	52 l/s	
	Bedroom 2	0.00	19.67	42 l/s	
104	Kitchen / Living	0.51	-	-	Pass
	Master Bedroom	0.03	28.33	52 l/s	
	Bedroom 2	0.00	23.50	42 l/s	
105	Kitchen / Living	1.10	-	-	Pass
	Master Bedroom	0.09	31.50	52 l/s	
	Bedroom 2	0.00	27.17	42 l/s	
106	Kitchen / Dining	0.15	-	-	Pass
	Sitting Room	1.56	-	-	
	Master Bedroom	0.29	6.83	-	
	Bedroom 2	0.54	28.50	-	
	Bedroom 3	0.15	20.67	42 l/s	
107	Kitchen / Dining	0.78	-	-	Pass
	Sitting Room	2.17	-	-	
	Master Bedroom	0.00	8.17	-	

107	Bedroom 2	0.21	19.00	-	Pass
	Bedroom 3	0.00	7.33	-	
108	Kitchen / Dining	0.00	-	-	Pass
	Sitting Room	0.36	-	-	
	Master Bedroom	0.00	26.83	42 l/s	
	Bedroom 2	0.68	27.33	42 l/s	
	Bedroom 3	0.19	26.17	35 l/s	
109	Kitchen / Dining	0.46	-	-	Pass
	Sitting Room	2.35	-	-	
	Master Bedroom	0.34	27.83	55 l/s	
	Bedroom 2	0.00	11.67	-	
	Bedroom 3	0.03	12.33	-	
110	Kitchen / Dining	0.74	-	-	Pass
	Sitting Room	0.63	-	-	
	Master Bedroom	0.00	9.83	-	
	Bedroom 2	0.00	27.17	50 l/s	
111	Kitchen / Dining	0.57	-	-	Pass
	Sitting Room	0.55	-	-	
	Master Bedroom	0.00	9.00	-	
	Bedroom 2	0.00	26.00	50 l/s	
112	Kitchen / Dining	1.19	-	-	Pass
	Sitting Room	0.98	-	-	
	Master Bedroom	0.00	10.00	-	
	Bedroom 2	0.00	27.67	50 l/s	
113	Kitchen / Dining	0.70	-	-	Pass
	Sitting Room	0.57	-	-	
	Master Bedroom	0.00	9.17	-	
	Bedroom 2	0.00	26.00	50 l/s	
114	Kitchen / Dining	1.20	-	-	Pass
	Sitting Room	0.90	-	-	
	Master Bedroom	0.00	10.33	-	
	Bedroom 2	0.00	27.67	50 l/s	
115	Kitchen / Dining	0.77	-	-	Pass
	Sitting Room	0.62	-	-	
	Master Bedroom	0.00	9.33	-	

115	Bedroom 2	0.00	26.00	50 l/s	Pass
116	Kitchen / Dining	1.29	-	-	Pass
	Sitting Room	0.89	-	-	
	Master Bedroom	0.00	10.50	-	
	Bedroom 2	0.00	26.83	50 l/s	
117	Kitchen / Dining	0.82	-	-	Pass
	Sitting Room	0.78	-	-	
	Master Bedroom	0.00	9.83	-	
	Bedroom 2	0.00	26.50	50 l/s	
118	Kitchen / Dining	0.36	-	-	Pass
	Sitting Room	0.60	-	-	
	Master Bedroom	0.00	28.83	38 l/s	
	Bedroom 2	0.00	26.33	38 l/s	
	Bedroom 3	0.01	11.83	-	
119	Kitchen / Dining	0.20	-	-	Pass
	Sitting Room	0.32	-	-	
	Master Bedroom	0.00	20.50	38 l/s	
	Bedroom 2	0.00	20.67	38 l/s	
	Bedroom 3	0.00	9.50	-	
120	Kitchen / Dining	0.16	-	-	Pass
	Sitting Room	0.29	-	-	
	Master Bedroom	0.00	20.33	38 l/s	
	Bedroom 2	0.00	19.83	38 l/s	
	Bedroom 3	0.00	8.67	-	
121	Kitchen / Dining	0.45	-	-	Pass
	Sitting Room	0.43	-	-	
	Master Bedroom	0.00	9.67	-	
	Bedroom 2	0.00	26.33	50 l/s	
122	Kitchen / Dining	0.71	-	-	Pass
	Sitting Room	0.75	-	-	
	Master Bedroom	0.00	9.00	-	
	Bedroom 2	0.00	24.17	50 l/s	
123	Kitchen / Dining	2.01	-	-	Pass
	Sitting Room	1.74	-	-	
	Master Bedroom	0.01	14.67	-	

123	Bedroom 2	0.00	20.00	42 l/s	Pass
	Bedroom 3	0.10	21.67	42 l/s	
124	Kitchen / Living / Dining	3.00	-	84 l/s	Pass
	Sitting Room	1.37	-	-	
	Master Bedroom	0.00	31.00	28 l/s	
	Bedroom 2	0.00	21.00	-	
	Bedroom 3	0.70	20.67	-	
	Bedroom 4	0.60	17.50	-	
	Study	2.12	-	-	
125	Kitchen / Living / Dining	1.85	-	-	Pass
	Sitting Room	1.13	-	-	
	Master Bedroom	0.00	17.50	-	
	Bedroom 2	0.00	11.67	-	
	Bedroom 3	0.21	8.67	-	
	Bedroom 4	0.08	7.83	-	
	Study	1.14	-	-	
126	Kitchen / Dining	2.97	-	-	Pass
	Sitting Room	0.49	-	-	
	Master Bedroom	0.00	6.33	-	
	Bedroom 2	0.00	20.17	42 l/s	
	Bedroom 3	0.05	21.33	42 l/s	
127	Kitchen / Dining	2.56	-	-	Pass
	Sitting Room	0.39	-	-	
	Master Bedroom	0.00	7.33	-	
	Bedroom 2	0.00	19.67	42 l/s	
	Bedroom 3	0.00	20.50	42 l/s	
128	Kitchen / Living	0.97	-	-	Pass
	Master Bedroom	0.00	13.50	-	
	Bedroom 2	0.00	13.00	-	
129	Kitchen / Dining	2.99	-	55 l/s	Pass
	Sitting Room	1.24	-	-	
	Master Bedroom	0.02	15.67	-	
	Bedroom 2	0.23	29.50	35 l/s	
	Bedroom 3	0.23	26.67	35 l/s	
130	Kitchen / Dining	2.99	-	50 l/s	Pass

130	Sitting Room	0.31	-	-	Pass
	Study	1.70	-	-	
	Master Bedroom	0.12	7.00	-	
	Bedroom 2	0.24	28.83	38 l/s	
	Bedroom 3	0.41	18.50	-	
	Bedroom 4	0.22	28.33	38 l/s	
	Bedroom 5	0.79	29.17	38 l/s	
131	Kitchen / Living / Dining	2.95	-	88 l/s	Pass
	Sitting Room	0.53	-	-	
	Master Bedroom	0.00	13.33	-	
	Bedroom 2	0.00	21.83	-	
	Bedroom 3	0.31	26.50	55 l/s	
	Bedroom 4	0.32	28.33	45 l/s	
	Study	0.94	-	-	
132	Kitchen / Dining	2.98	-	55 l/s	Pass
	Sitting Room	0.15	-	-	
	Study	1.51	-	-	
	Master Bedroom	0.00	6.00	-	
	Bedroom 2	0.19	27.00	38 l/s	
	Bedroom 3	0.20	16.83	-	
	Bedroom 4	0.25	29.67	38 l/s	
	Bedroom 5	0.78	28.83	38 l/s	
133	Kitchen / Living / Dining	2.60	-	45 l/s	Pass
	Sitting Room	0.87	-	-	
	Master Bedroom	0.00	17.50	-	
	Bedroom 2	0.00	14.67	-	
	Bedroom 3	0.17	27.17	47 l/s	
	Bedroom 4	0.31	27.00	40 l/s	
	Study	0.61	-	-	
134	Kitchen / Living / Dining	3.00	-	85 l/s	Pass
	Sitting Room	1.25	-	15 l/s	
	Master Bedroom	0.08	18.67	-	
	Bedroom 2	0.10	30.83	40 l/s	
	Bedroom 3	0.00	6.67	-	
	Bedroom 4	0.16	29.50	43 l/s	
	Study	2.48	-	10 l/s	
135	Kitchen / Dining	2.86	-	88 l/s	Pass

135	Sitting Room	2.87	-	32 l/s	Pass
	Study	2.54	-	10 l/s	
	Master Bedroom	0.00	31.67	53 l/s	
	Bedroom 2	0.40	22.17	15 l/s	
	Bedroom 3	0.00	19.00	20 l/s	
	Bedroom 4	0.43	27.00	40 l/s	
	Bedroom 5	0.20	31.33	52 l/s	

Notes

Criterion A must be equal to or less than 3%

Criterion B must be equal to or less than 32 hours

7.0. Conclusion

A Building Regulations Part O Dynamic Thermal Modelling Overheating Assessment has been carried out by Ashby Energy Assessors on the proposed 4 bedroom, two storeys, detached dwelling using predominantly natural ventilation.

The overheating assessment has been carried out based on the plans and elevations provided, and the construction details as specified in section 4.1.

The house **complies** with limits set in CIBSE's TM59 and the additional Approved Document Part O requirements with openable windows as detailed in section 4.2. The main items to overcome overheating in the dwelling are:

- Maximum solar factor (G-value) of whole window assembly = **0.46**,
- First floor windows openable at 650 mm (risk of falling),
- Ground floor bedroom windows openable fully with security louvres installed,
- Bedroom 2 to achieve 4 air changes per hour ventilation rate above 22°C to remove excess heat,
- System 3 ventilation trickle rate included,
- Noise and pollution not considered in the overheating assessment,
- All other openable windows assumed open during occupied hours,
- Front door to remain closed,
- Weather data based on Norwich,
- No internal blinds or shades included in the assessment,
- Internal bedroom doors closed for security and privacy but assumed open at 50% for 5% of the time to allow occupant movement in and out of the rooms.

The aim of overheating assessment is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. The guidance and procedures are written for the purposes of protecting health and welfare. Following this guidance does not guarantee the comfort of building occupants.

The recommended definitions for the criteria should be explained to clients and there may be circumstances where stricter limits are appropriate for a particular building or building type.

Appendices

Appendix A Methodology and standards

A.1. Simulation Software

Simulation was carried out using DesignBuilder v 7.2.0.32 using EnergyPlus engine. Simulation weather data was CIBSE's weather file DSY1_2020 High50 to show compliance. DSY files include a whole year weather variables for various locations used for Dynamic Simulation Models (DSM).

A.2. Literature

The methodology used in the Overheating assessment, as well all the inputs can be found in below documents:

- TM52: 2013 The limits of thermal comfort: avoiding overheating in European buildings,
- TM59: 2017 Design methodology for the assessment of overheating risk in homes,
- Approved Document Part O 2021 edition,
- CIBSE Guide A,
- CIBSE Guide B.

A.3. Data used to produce a model

The analysis has been carried out based on the details provided in plans, elevations, window, and door schedules plus several additional assumptions relating to the TM59 assessment process. The details of which are shown in the body of the report above but also include:

A.4. TM59 Overheating criteria

Modelling was based on natural ventilation. Construction details taken from SAP calculations as detailed in Build Standard Appendix C. Modelling is based on Category II:

- I = vulnerable,
- II = New Build,
- III = Existing Building.

Heat Gains as detailed in TM59.

