



CWC

crookes walker
consulting

One North Parade

Manchester

Thermal Comfort Analysis

Date: 21/03/2025

Ref: 3369-CWC-XX-RP-N-7005

Revision Record

Date	Reference	Revision	Prepared By	Checked By	Authorised By
31/01/2025	3369-CWC-XX-RP-N-7005	00	Nazhan Nizam	Obaid Rahman	John Barnett
			NN	OR	JB
21/03/2025	3369-CWC-XX-RP-N-7005	01	Nazhan Nizam	Obaid Rahman	John Barnett
			NN	OR	JB

Contents

- 1.0 Executive summary 4
- 2.0 Introduction 6
 - 2.1 Weather data 6
 - 2.2 Thermal Model 7
 - 2.3 Modelling disclaimer 8
- 3.0 Assessment methodology 9
 - 3.1 CIBSE TM52 9
- 4.0 Input parameters 10
 - 4.1 Fabric parameters 10
 - 4.2 Ventilation strategy 10
 - 4.3 Space Conditions 11
- 5.0 Results 12
- 6.0 Appendix A – Annual Weather Data 13
- 7.0 Appendix B – PMV & PPD Detailed Results 14

1.0 Executive summary

The following report outlines the parameters that have been assigned to the thermal model for the One North Parade, in Manchester, to achieve compliance with *CIBSE Technical Memorandum 52 : The limits of thermal comfort: avoiding overheating in European buildings*.

The report explains the analysis that has been conducted on the proposed development. Details such as internal heat gains, and fabric details are outlined herein. A compliant strategy has been provided within the development and as such, the servicing strategy complies with the requirements of CIBSE TM52 and therefore achieves thermal comfort. The parameters for compliance include:

- Fabrics as per Table 2.
- Ventilation strategy as per Section 4.2.
- Internal heat gains as per Appendix C.

If the design deviates from the strategy described within this report, then this assessment will need to be re-run to ensure the final servicing strategy is compliant with CIBSE TM52.

Areas that are mechanically cooled are assessed against the Predicted Mean Vote (PMV) and Percentage People Dissatisfied (PPD) method as stated in CIBSE TM52 Section 6.2.1. To ensure thermal comfort, cooled zones must have a PMV lower than 0.5. Table 1 below summarises the result demonstrating the proposed One North Parade development satisfies the thermal comfort criteria.

Zone	Predicted Mean Vote Min/Max	Predicted Percentage Dissatisfied Min/Max	Result
L00_Kitchen	-0.37 / 0.37	5.07 / 7.80	Pass
L00_Security Room	-0.50 / 0.36	5.00 / 9.88	Pass
L00_RF Room	-0.47 / 0.40	5.00 / 9.66	Pass
L00_Reception	-0.43 / 0.43	5.82 / 8.90	Pass
L00_Restaurant/Bar/Lounge	0.06 / 0.27	5.08 / 6.56	Pass

Zone	Predicted Mean Vote Min/Max	Predicted Percentage Dissatisfied Min/Max	Result
L0M_Restaurant	-0.38 / 0.38	5.08 / 7.99	Pass
L02_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L03_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L04_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L05_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L06_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L07_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L08_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L12_Office	-0.17 / 0.16	5.00 / 5.57	Pass
L09_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L01_Office	-0.16 / 0.16	5.00 / 5.54	Pass
L0M_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L11_Office	-0.16 / 0.16	5.00 / 5.54	Pass
L10_Office	-0.16 / 0.16	5.00 / 5.54	Pass

Table 1. Cooled Zones Result Summary

2.0 Introduction

Crookes Walker Consulting (CWC) have undertaken a thermal comfort assessment calculations in-line with the methodology set out in the 'Chartered Institute of Building Services Engineers' (CIBSE) guidance document, *Technical Memorandum 52: The limits of thermal comfort: avoiding overheating in European building* ("CIBSE TM52").

Compliance with this guide is widely recognised as the benchmark for assessing thermal comfort in non-residential buildings.

2.1 Weather data

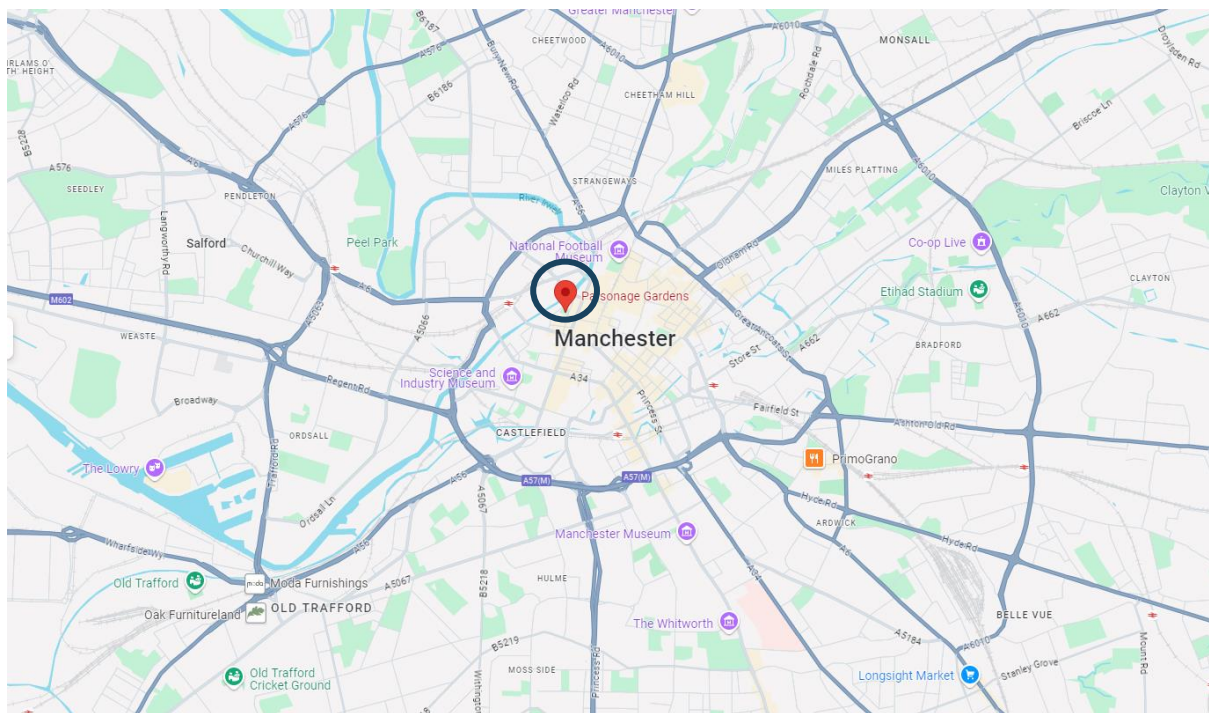


Figure 1. Site location

The site is in central Manchester, hence, the Manchester DSY1 2020 high emissions scenario 50th percentile weather data has been used for the overheating calculations. The Manchester DSY1 2020 high emissions scenario 50th percentile air temperature profile is shown in Appendix A.

2.2 Thermal Model

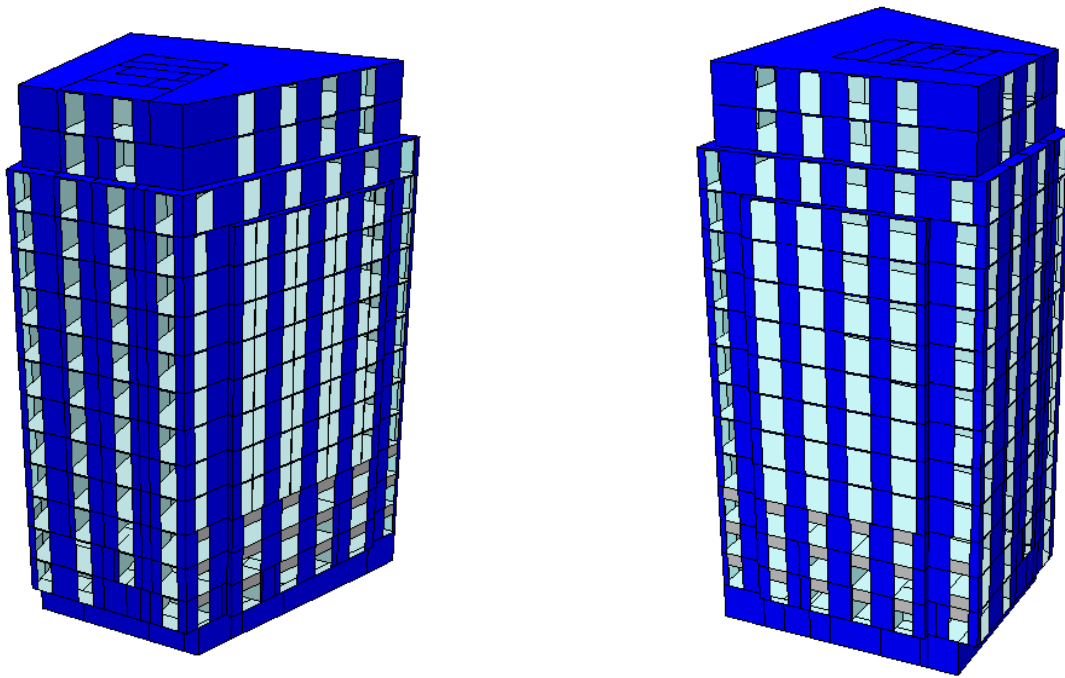


Figure 2. Thermal model North view (left) and East view (right)

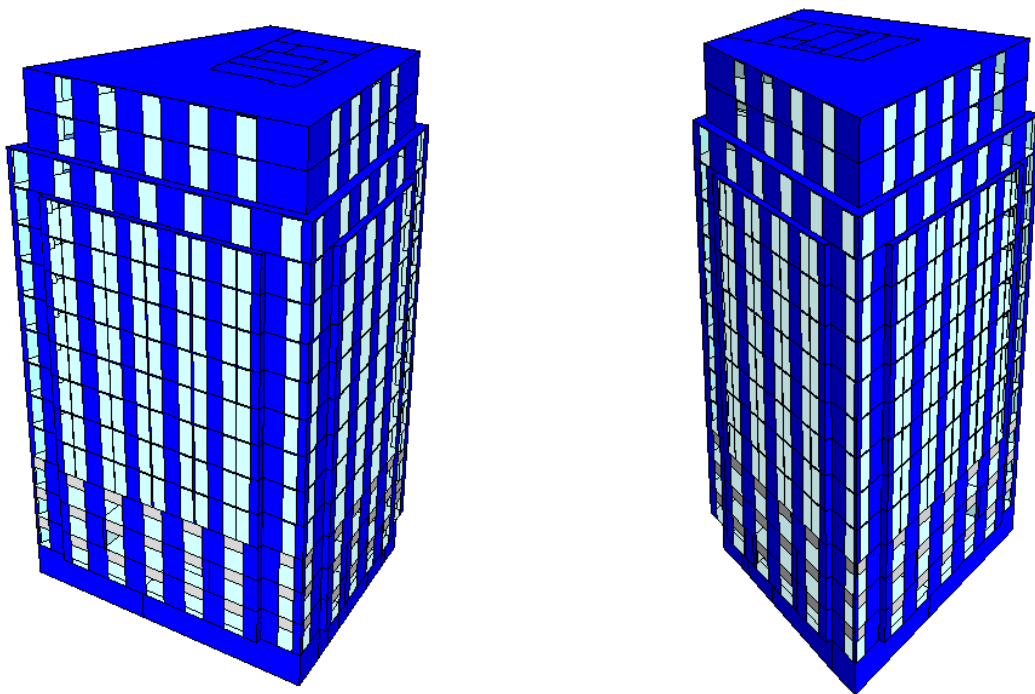


Figure 3. Thermal Model South view (left) and West view (right)

2.3 Modelling disclaimer

The building has been modelled with accredited software package IES:VE version 2024.0.1.0, which is a dynamic simulation software, compliant with CIBSE AM11 Building performance modelling.

The analysis was undertaken by an Energy Specialist; an individual who has acquired substantial expertise or a recognised qualification for undertaking assessments, designs, and installations of Low and Zero Carbon solutions in the commercial buildings sector and is not professionally connected to a single Low and Zero Carbon technology or manufacturer.

It should be noted that the data generated by this work is obtained using computer simulations. These simulations are the best means of predicting the performance of the building at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.

Whilst the simulations have been undertaken in good faith using reasonable skill and care, Crookes Walker Consulting Limited can take no responsibility for differences between the computer simulations and the actual performance of the completed building due to the inherent complexity and variability of the physics in a building and its environment.

3.0 Assessment methodology

3.1 CIBSE TM52

CIBSE TM52 is a standardised approach to predict the thermal comfort in non-domestic buildings. It is based on the adaptive thermal comfort method where the comfort temperature in free running buildings is related to the outdoor temperature.

Compliance with this framework does not ensure that people will always be comfortable, due to variations on the intended use, rather, it aims to limit the length of time during which discomfort may be felt. All assumptions and mitigations made within this report must form part of the construction contract, or the model incorporating the changes will need to be re-run to prove compliance. Any inclusion of blinds or openable windows etc. must not be ignored.

For mechanically cooled areas, CIBSE TM52 requires the risk of overheating be assessed against the predicted mean vote (PMV). The zones should aim to provide an indoor environment where the PMV index is near or equal to zero. PMV values exceeding 0.5 and are deemed to overheat and therefore not compliant with the requirement.

The thermal environment for the One North Parade development is classified as Category B as defined in Table A.1 of Annex A, BS EN 7730.

4.0 Input parameters.

4.1 Fabric parameters

A 'fabric first' approach has been taken for the One North Parade development, u-values that are better than the minimum required for compliance with Building Regulations. Table 2 below confirms the fabric parameters assigned:

	Fabric Parameters
External Wall	0.17 W/m ² K
Glazing	1.40 W/m ² K 0.40
Roof	0.10 W/m ² K
Ground Floor	0.10 W/m ² K
Air permeability	3.00 m ³ /(h.m ²)@50Pa

Table 2. Fabric Parameters

4.2 Ventilation strategy

Ventilation is delivered by mechanical means through multiple heat recovery units with plate heat exchangers. Table 3 below gives the flow rates for each zone:

	Mechanical Ventilation Strategy
Offices	12 l/s/p
Changing Room	20 ACH
Eating/Drinking Area	12 l/s/p
Food Preparation Area	15 l/s/p

Table 3. Ventilation Flow Rates

4.3 Space Conditions

Zone	Set Points Heating Cooling (°C)	Occupancy (p/m²)	Metabolic Rate	Clo Min Max	Equipment (W/m²)	Lighting (W/m²)
Eating / Drinking Area	22 24	5	1.10	0.6 1.0	5	8
Reception	19 23	5	1.00	0.6 1.0	15	8
Office (Open)	21 23	10	1.20	0.7 0.9	15	8
Office (Office)	21 23	10	1.20	0.7 0.9	15	8

Table 4. Space Conditions

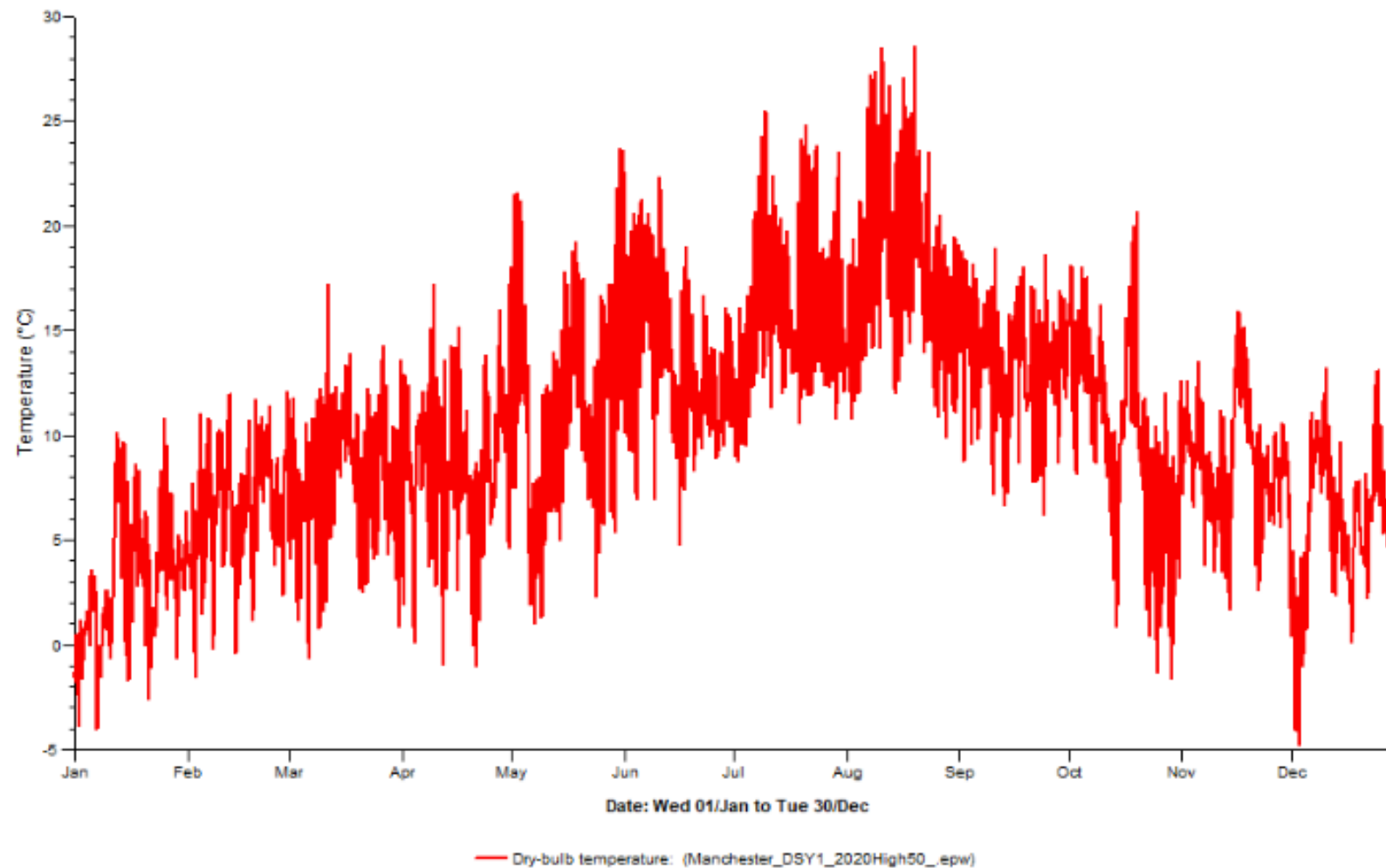
5.0 Results

The One North Parade development achieves with the requirements of CIBSE TM52. Table 4 summarises the results for the assessment. Detailed results can be found in Appendix B.

Zone	Predicted Mean Vote Min/Max	Predicted Percentage Dissatisfied Min/Max	Result
L00_Kitchen	-0.37 / 0.37	5.07 / 7.80	Pass
L00_Security Room	-0.50 / 0.36	5.00 / 9.88	Pass
L00_RF Room	-0.47 / 0.40	5.00 / 9.66	Pass
L00_Reception	-0.43 / 0.43	5.82 / 8.90	Pass
L00_Restaurant/Bar/Lounge	0.06 / 0.27	5.08 / 6.56	Pass
L0M_Restaurant	-0.38 / 0.38	5.08 / 7.99	Pass
L02_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L03_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L04_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L05_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L06_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L07_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L08_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L12_Office	-0.17 / 0.16	5.00 / 5.57	Pass
L09_Office	-0.16 / 0.16	5.00 / 5.53	Pass
L01_Office	-0.16 / 0.16	5.00 / 5.54	Pass
L0M_Office	-0.16 / 0.16	5.00 / 5.52	Pass
L11_Office	-0.16 / 0.16	5.00 / 5.54	Pass
L10_Office	-0.16 / 0.16	5.00 / 5.54	Pass

Table 4: Cooled Zones Results Summary

6.0 Appendix A – Annual Weather Data



7.0 Appendix B – PMV & PPD Detailed Results

Zone	Predicted mean vote - hours in range						
	<= -0.50	>-0.50 to <=-0.30	>-0.30 to <=-0.10	>-0.10 to <=0.10	>0.10 to <=0.30	>0.30 to <=0.50	> 0.50
L00_Kitchen	0	563	469	290	2718	340	0
L00_Security Room	0	68	694	661	1442	6	0
L00_RF Room	0	71	576	679	1539	6	0
L00_Reception	0	401	438	0	958	291	0
L00_Restaurant/Bar/Lounge	0	0	0	2229	1786	0	0
L0M_Restaurant	0	328	323	2117	1026	221	0
L02_Office	0	0	700	1077	1094	0	0
L03_Office	0	0	699	1084	1088	0	0
L04_Office	0	0	699	1083	1089	0	0
L05_Office	0	0	697	1085	1089	0	0
L06_Office	0	0	699	1078	1094	0	0
L07_Office	0	0	697	1083	1091	0	0
L08_Office	0	0	699	1078	1094	0	0
L12_Office	0	0	643	1054	1174	0	0

Zone	Predicted mean vote - hours in range						
	<= -0.50	>-0.50 to <=-0.30	>-0.30 to <=-0.10	>-0.10 to <=0.10	>0.10 to <=0.30	>0.30 to <=0.50	> 0.50
L09_Office	0	0	696	1081	1094	0	0
L01_Office	0	0	706	1057	1108	0	0
L0M_Office	0	0	571	1321	979	0	0
L11_Office	0	0	654	1010	1207	0	0
L10_Office	0	0	689	1046	1136	0	0

All zones show no PMV above 0.5. The comfort cooled zone criteria are satisfied.

Zone	Predicted People Dissatisfied - hours in range					
	> 0.00	> 10.00	> 20.00	> 30.00	> 40.00	> 50.00
L00_Kitchen	4380	0	0	0	0	0
L00_Security Room	2871	1	0	0	0	0
L00_RF Room	2871	0	0	0	0	0
L00_Reception	2088	0	0	0	0	0
L00_Restaurant/Bar/Lounge	4015	0	0	0	0	0
L0M_Restaurant	4015	0	0	0	0	0

Zone	Predicted People Dissatisfied - hours in range					
	> 0.00	> 10.00	> 20.00	> 30.00	> 40.00	> 50.00
L02_Office	2871	0	0	0	0	0
L03_Office	2871	0	0	0	0	0
L04_Office	2871	0	0	0	0	0
L05_Office	2871	0	0	0	0	0
L06_Office	2871	0	0	0	0	0
L07_Office	2871	0	0	0	0	0
L08_Office	2871	0	0	0	0	0
L12_Office	2871	0	0	0	0	0
L09_Office	2871	0	0	0	0	0
L01_Office	2871	0	0	0	0	0
L0M_Office	2871	0	0	0	0	0
L11_Office	2871	0	0	0	0	0
L10_Office	2871	0	0	0	0	0