
Dovetail Architects

Energy Statement

Block F, Bounds Green Industrial Estate

August 2023



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1.0 Executive Summary

The proposed development will be located at South Way, Bounds Green Industrial Estate, London N11 2UL. The application seeks approval for the construction of a new industrial building comprising 4 units as well as car parking and soft landscaping.

This statement has reviewed the scheme in accordance with GLA energy statement guidance document. It has concluded that in accordance with guidance the scheme will achieve overall an 18% improvement at the 'Be Lean' stage, surpassing the policy requirements at this stage by 3%.

A new section to the GLA requirements to measures Energy Use Intensity was assessed, the EUI target was met using SBEM calculations, in addition, the space heating targets are also met under the EUI assessment criteria.

Following a review of the cooling hierarchy, in which key elements were identified on how the scheme performed an overheating assessment using TM52 methodology was undertaken. Based upon the proposed fabric specification and the building ventilation system, Criterion A and B is achieved under the current year weather year. The assessment of future weather files also shows compliance against the DSY 2 and DSY 3 targets.

An assessment of renewable technologies has concluded that PV is the preferred technology to be applied to the scheme. This does afford future connection potential for a district or local heating system which upon review was not available at this stage.

The development has a target of 35% total reduction over Part L in the Be Green stage of the energy hierarchy. With the elected use of PV, the site-wide this is a 21% reduction over Part L. Combined with the 18% reduction from the Be Lean stage this brings the total CO₂ reduction over Part L requirements to 39%, exceeding the Policy target of 35%.

The residual emissions are allocated to the offset section of the GLA and are identified within the report.

2.0 Introduction

2.1 Purpose of the Report

Instructions were received from Dovetail Architects on Behalf of Capital Industrial 3 Limited to produce an Energy Statement for the proposed Block F, Bounds Green Industrial Estate development. This report has been produced to support the planning application to be submitted for the development, which is situated within the authority of the London Borough of Haringey.

This statement provides a response to the relevant planning policy objectives within the London Plan 2021, and the Haringey's Local Plan: Strategic Policies 2013 – 2026 (formerly the Core Strategy) and the Haringey Development Management DPD Adopted July 2017.

2.2 Site and Building Description

The development will be located at South Way, Bounds Green Industrial Estate, London N11 2UL. The application seeks approval for the construction of a new industrial building comprising 4 units as well as car parking and soft landscaping.

A proposed site layout has been included in Appendix 1.

2.3 Methodology

The methodological approach to this statement is specifically based upon the Greater London Authority (GLA) London Plan (March 2021) and the GLA guidance on preparing energy assessments as part of planning applications (June 2022).

That means that supporting information has been prepared to determine key areas of performance, namely:

1. SBEM Calculations
2. Dynamic Thermal Model
3. GLA Supporting Submission Spreadsheet.

Each of these tools have been used and based upon the current proposed drawings, elevations, and site plans for the development.

The Greater London Authority (GLA) Spreadsheet has been utilised in line with GLA guidance to assess the carbon emissions of the development through the London Plan's energy hierarchy of Be Lean, Be Clean, Be Green and Be Seen.

2.4 Limitations

This statement is generated based upon early design stage information, limited by the information available at the time of generation. Best endeavours have been undertaken to generate the necessary calculations to fulfil the requirements of the specific policy and demonstrate compliance.

However, the design may be subject to change and the tools used are a guide limited by their design as regulation compliance measures against a notional performance, they are not a guarantee of 'As Built' performance nor should they be treated as such.

The thermal dynamic analysis is developed through a model based upon a set of theoretical in-built parameters and simplified system definitions, as well as sensible assumptions where further information is not available at the current design stage.

Therefore, the accuracy of the temperatures obtained are constrained by the software and the available parameters, and the model provides only an indication of theoretical performance suitable for informing the building design team. The results cannot be considered a guarantee of future performance of the real building.

3.0 Planning Policy

3.1 Haringey's Local Plan: Strategic Policies 2013 – 2026, Haringey Development Management DPD & London Plan 2021

The following documents and policies outline the requirements for new developments regarding sustainability:

- Haringey's Local Plan: Strategic Policies 2013 – 2026, Policy SP4
- Haringey Development Management DPD Adopted July 2017, Policy DM 21 & Policy DM22
- London Plan 2021, Policies SI2, SI3, SI4 & SI5.

The "Energy Assessment Guidance – Greater London Authority guidance on preparing energy assessments as part of planning applications (April 2020)" will also be referred to as this provides crucial guidance on the requirements for an energy statement.

3.2 Haringey's Local Plan: Strategic Policies 2013 - 2026

Accordingly, Policies SP4, DM21 & DM22 have been identified as key policies for the scheme at Bounds Green Industrial Estate to respond to, that policy is set out below.

3.2.1 SP4 - Working towards a Low Carbon Haringey

Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

- 1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:*
 - a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and*
 - b. From 2011 onwards all new non-residential development shall be built to at least BREEAM 'very good' standard and should aim to achieve BREEAM 'Excellent' or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.*
- 2. The Council will promote low- and zero-carbon energy generation through the following measures:*
 - a. Requiring all developments to assess, identify and implement, where viable, site-wide and areawide decentralised energy facilities including the potential to link into a wider network;*

- b. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;*
- c. Working with neighbouring boroughs and other partners to explore ways of implementing subregional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and*
- d. All new developments will be required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.*

3.3 Haringey Development Management DPD

3.3.1 DM21: Sustainable Design, Layout and Construction

- A All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques. Proposals should:*
- a Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;*
 - b Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;*
 - c Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls*
 - d Wherever possible, use building materials with high environmental performance ratings; and*
 - e Seek opportunities for locally sourced labour.*
- B The Council will support appropriate measures to sustainably retrofit existing homes and non-residential buildings.*
- C Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.*
- D Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.*

3.3.2 DM22: Decentralised Energy

- A Subject to other policy requirements, proposals that contribute to the provision and use of Decentralised Energy network infrastructure will be supported.*

Communal energy systems

- B All development that incorporates site-wide communal energy systems should examine opportunities for extending such systems, irrespective of whether it is connected to a DE network.*
- C All development that incorporates site-wide communal energy systems should optimise opportunities for extending such systems beyond the site boundary to supply energy to neighbouring existing and planned future developments.*

Existing and planned future DE networks

- D All development proposals should prioritise connection to existing or planned future DE networks.*
- E All major development located within 500 metres of an existing DE Network, and minor new-build development located within 25 metres, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.*
- F All major development located within 500 metres of a planned future DE Network, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.*

DE network 'connection zones'

- G All major development located within 500 metres of a DE network 'connection zone' should be designed for connection to a DE network.*
- H All minor new-build development located within 25 metres of a DE network 'connection zone' should be designed for connection to a DE network.*

Customer charters

- I Where site-wide communal and district heating systems are operational, the Council will strongly encourage heat and energy service providers to enter into customer charters with domestic and micro-business customers.*

As identified in the policy above, the London Plan will be utilised for establishing the scheme carbon emissions and any offset contribution.

3.4 The London Plan - March 2021

Following Policy SP4 of London Borough of Haringey this statement utilises the London Plan to determine a response. The London Plan was updated in March 2021, introducing new elements for evaluation within developments as well as preparing for the proposed change in Building Regulations specifically Approved Document L and Approved Document O, both launched in June 2022.

This statement refers to 4no. key policies set out within the Sustainable Infrastructure section of the London Plan, the detail on these policies are appended but they are listed below:

- **Policy SI 2 – Minimising Greenhouse Gas Emissions**
- **Policy SI 3 – Energy Infrastructure**
- **Policy SI 4 – Managing Heat Risk**
- **Policy SI 5 - Water infrastructure.**

The Full Policy Text has been included in Appendix 2.

3.5 GLA Energy Assessment Guidance

This statement has been prepared utilising the latest guidance provided by GLA for energy statements and it seeks to follow the advised format from the Greater London Authority guidance on preparing energy assessments as part of planning applications (June 2022).

4.0 Establishing CO₂ Emissions

This section will address the development's carbon footprint in line with the London Plans energy hierarchy; Baseline, Be Lean, Be Clean, Be Green and Be Seen, detailed in Figure 1.

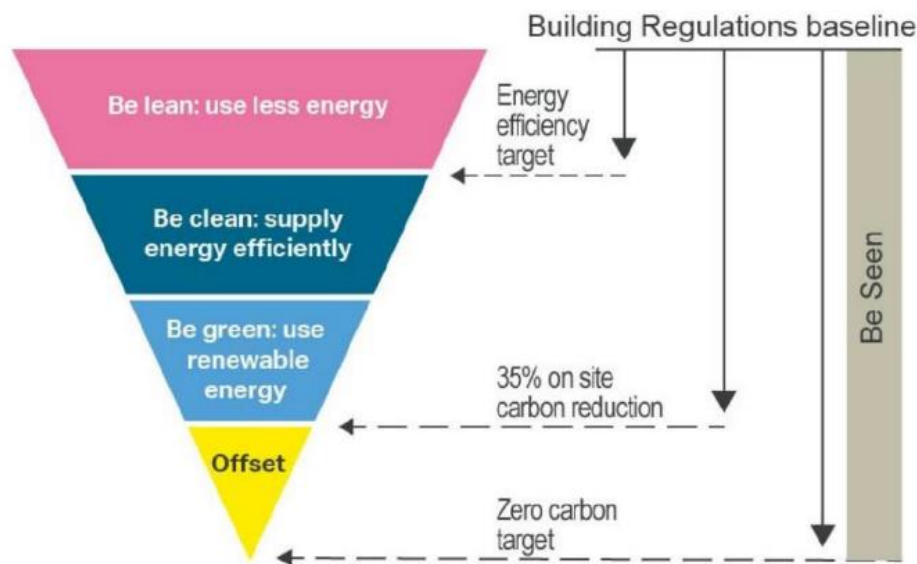


Figure 1 – The London Plan – Energy Hierarchy

Having reviewed the on-site elements, the statement will then address the predicted carbon offset payment to be made in order to fulfil Net Carbon Zero requirements.

4.1 Demand Reduction (Be Lean)

In efforts to reduce the overall carbon emissions associated with the development and to maximise the energy efficiency, as outlined in Policy SI 2 – Minimising Greenhouse Gas Emissions, the developer has a robust 'fabric first' approach to the build specification.

This has been achieved through building fabric improvements with an uplift on the minimum requirements of Approved Document Part L, and also specification of efficient mechanical and electrical services, including a number of 'add-on' measures to improve efficiency and performance.

The table over the page demonstrates how the specification of the development at Bounds Green Industrial Estate compares to the limiting values and minimum efficiencies allowed within Part L 2022.

Table 1: Comparison with Building Regulations Part L 2022

Fabric Specification		
Building Element	Limiting Part L 2022 Specification	Proposed Specification
External Walls U-Value	0.26	0.20
Roof U-Value	0.16	0.15
Ground Floor U-Value	0.18	0.18
Window U-Value	1.60	1.40
Door U-Value	2.20/140	N/A
Heating Efficiency	89.5%	100%
Pressure Test	8.00	5.00
Lighting Efficacy	95lm/w	95lm/w
MEP Specification		
Space Heating 1	Gas Boiler 89.5/heat Pump 250% or 320%	Electric Panel Heaters Efficiency 100%
Space Heating 2	N/A	VRF System to Office Spaces
Domestic Hot Water	Main heating system or Electric Instantaneous Hot Water – Efficiency 100% based upon less the 200litres usage	Main Heating System with Storage
Ventilation	Minimum Part F extract requirements	Minimum Part F extract requirements
Lighting	95 lm/w with occupancy control.	95lm/w

4.1.1 MEP Specification

Complimenting the fabric specification and of equal importance the Client has developed a MEP strategy that meets the new ADlv1 requirements. Lighting is LED throughout meeting the minimum 95lms target. Ventilation is in accordance with Approved Document F.

4.1.2 Energy Use Intensity and Space Heating Demand

Section 7.13 of the GLA Energy Assessment Guidance sets out how Energy Use Intensity should be measured. A relatively new measure, as denoted in the guidance it is used as a key metric in the London Energy Transformation Initiative (Leti). The guidance asks that applicants should aim to achieve the values presented in Table 2 over the page.

Table 2: EUI and Space Heating Demand Values

Building Type	Energy Use Intensity (kWh/m ² /year)	Space Heating (kWh/m ² /year)
Residential	35	15
School	65	15
Office	55	15
Hotel	55	15
All other non-residential	55	15

Leti suggests that accurate calculations of EUI is via Passivhaus Planning Package (PHPP) or dynamic modelling. In this submission SBEM has been used as the primary tools to determine EUI, given they are required for Building Regulation compliance.

Appendix L of SBEM methodology has been used to determine the unregulated energy usage for the units, this has been added to the total used in the GLA output sheet. The results are summarised in Table 3 below.

Table 3: Scheme EUI and Space Heating Demand Values

Building Type	EUI (kWh/m ² /year) (excluding renewable energy)	Space Heating Demand (kWh/m ² /year) (excluding renewable energy)	Methodology Used
Unit 1	38.68	3.27	SBEM
Unit 2	50.73	3.54	SBEM
Unit 3	50.62	3.52	SBEM
Unit 4	51.6	2.5	SBEM

As denoted above, space heating demand and EUI targets are met for all units

4.1.3 Be Lean Summary

To understand the overall proposed energy use of the development, and in line with Policy SI2 of the London Plan, a minimum 15% carbon reduction needs to be achieved. Software outputs of the calculations completed can be made available on request. Software outputs of the SBEM calculations completed can be found in Appendix 3 & 4 respectively.

Table 4 below demonstrates the development's breakdown of carbon emissions based on the building modelled against the Part L Baseline utilising SBEM, as well as using the GLA Spreadsheet in order to calculate emissions utilising SBEM carbon factor, in compliance with policy requirement.

Table 4: Carbon Emissions Breakdown Be Lean

	GLA Spreadsheet SBEM		
	Total Emissions (kg/CO ₂ /year)	CO ₂ Savings (kg/CO ₂ /yr)	Percentage savings (%)
Part L 2021 Baseline (BER)	20.6	-	-
Be Lean (BER)	16.9	3.7	18%

As a result of the SBEM modelling outputs for the development, Table 4 shows the Target CO₂ Emissions (TER) of the development to be 20.6 tonnes/CO₂/year. The predicted carbon emissions are demonstrated to be an uplift against this amount, currently modelled to achieve 16.9 tonnes/CO₂/year at the 'Be Lean' stage.

Overall, this is a 3.7 tonnes/year improvement against the target amount, equating to 18% carbon reduction being achieved at the 'Be Lean' stage. This is in accordance with the 15% CO₂ emissions that must be achieved through energy efficiency measures, as per Policy SI2 of the London Plan 2021.

4.2 Cooling

4.2.1 Background

Extreme hot weather is a significant risk for London. Observed temperatures in built-up urban areas can be significantly higher than in the surrounding countryside, by up to 9°C in the centre of London. This Urban Heat Island effect and projections for increased average temperatures and more extreme hot weather event in the future mean that developers must consider the risk of high internal temperatures during the planning and design process of constructing new buildings.

Policy SI4 seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation, and to reduce overheating due to the impacts of climate change. All major developments should reduce potential overheating and reliance on air conditioning systems and demonstrate this in accordance with the following cooling hierarchy:

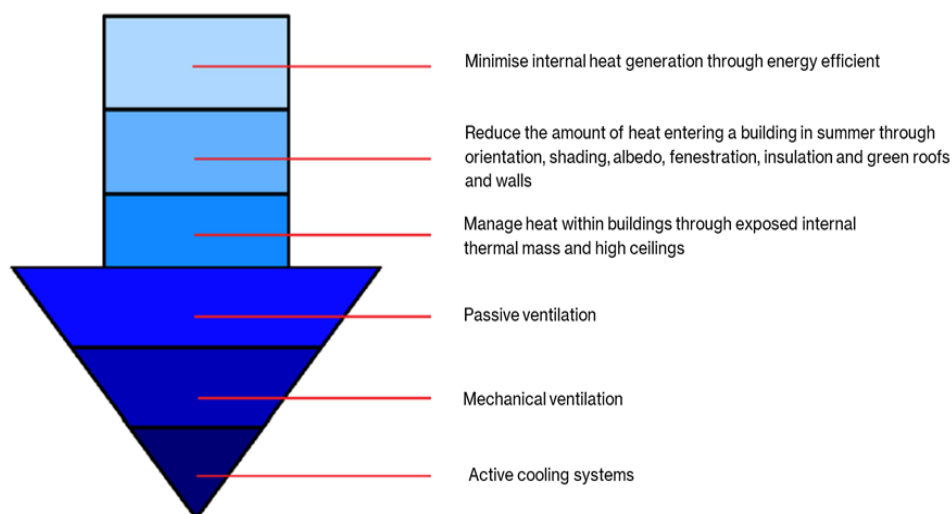


Figure 2 - Cooling Hierarchy

4.2.2 Cooling Hierarchy

Following the guidance set out in the GLA and referring to Policy SI 4 a response is provided to each of the suggested categories in Table 5:

Table 5: Cooling Hierarchy	
Category	Scheme Response
1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.	The development will have associated green amenity space for building users and is maintaining several trees already on site to serve as green infrastructure. This green infrastructure has the potential to reduce the risk of heat island effect, acting as heat soak for the scheme.
2. Minimise internal heat generation through energy efficient design.	Lighting will be LED with low levels of gain expected versus conventional lighting systems. It is therefore expected that internal gains should be kept to the minimum. Ventilation will be provided to the building in accordance with AD F.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings.	The development at Bounds Green Industrial Estate will incorporate natural ventilation is utilised across the scheme with to help with purging excess heat through the summer.
4. Provide passive ventilation.	Dovetail Architects have incorporated passive ventilation into the design of the development at Bounds Green Industrial Estate to exploit both wind driven and buoyancy driven ventilation. This is in order to remove warm air from the indoor spaces without the use of mechanical ventilation therefore reducing the energy demand on the development for cooling processes and mitigating CO ₂ emissions.
5. Provide mechanical ventilation.	Ventilation to communal areas is based upon AD F requirements only and natural ventilation through openable windows.
6. Provide active cooling systems.	Active cooling is provided in the form of the air conditioning/ VRF system to the assumed office space areas for the purposes of the building modelling.

4.3 Overheating Risk Analysis

As noted in the previous section, the Client has commissioned a dynamic model to ascertain performance against the policy requirements. This model is in line with CIBSE TM52 criteria and as suggested in Section 8.4 of the GLA guidance it assesses the impact future weather files.

The last dynamic thermal modelling report has been provided in Appendix 5 of this document. Assumptions for the model are clearly listed throughout the report. A summary of the performance and results are available below.

The software used for thermal model analysis was IESVE 2022 Version 3:0.0 which is in accordance with CIBSEAM11 Building Energy and Performance Modelling Guide. Within the software, ModelIT was used to make a 3D geometry of the building, MacroFlo to assign the opening profiles for windows and doors and Apache to assign the thermal templates to occupied zones. Once simulated the results were extracted in VistaPro module of the software.

4.3.1 Current Weather File Results

The results obtained for London Central DSY1 weather file show that the operative temperature in the offices is not expected to exceed the threshold levels against CIBSE TM52 criteria, using the input parameters as mentioned in Section 2.0 of this report. The results are summarised in below table.

Table 6: CIBSE TM52 Results - DSY 1 Weather File				
Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

4.3.2 Future Weather File Results

The expected offices were assessed against the future weather files London Central DSY2 and DSY3 for the 2020s to assess the operative temperatures for extreme overheating events. With the use of VRF cooling systems, the operative temperatures are expected to stay under the thresholds of Criteria 1-3 of CIBSE TM52. The table over the page summarises the temperature exceedance for each criterion.

Table 7: CIBSE TM52 Results - DSY 2 Weather File

Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

Table 8: CIBSE TM52 Results - DSY 3 Weather File

Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

The expected offices are assessed against CIBSE TM52 criteria that requires the occupied rooms to pass two out of the three criteria listed in Section 1.2 of this report. The offices are assigned with VRF air conditioning system. Therefore, these rooms are expected to maintain a comfortable operative temperature to satisfy the overheating criteria set out in CIBSE TM52 guide for current weather file DSY 1 and future weather file DSY 2 and DSY 3.

These results are subject to the building being constructed to the specifications described in the report, and to the occupancy, equipment and window opening profiles being similar to those specified in the report.

4.4 Heating Infrastructure Be Clean

An exercise has been completed reviewing the potential for the proposed development at Block F, Bounds Green Industrial Estate to connect to an existing district heat network. The Mayor of London Heat Map has been reviewed to confirm the closest possible connection point.

As demonstrated from Figure 3, the closest connection point is Blackhorse Lane, approximately 6.8km from the proposed site location. Due to the extended distance between these two points, it is considered that this would not be a feasible application.

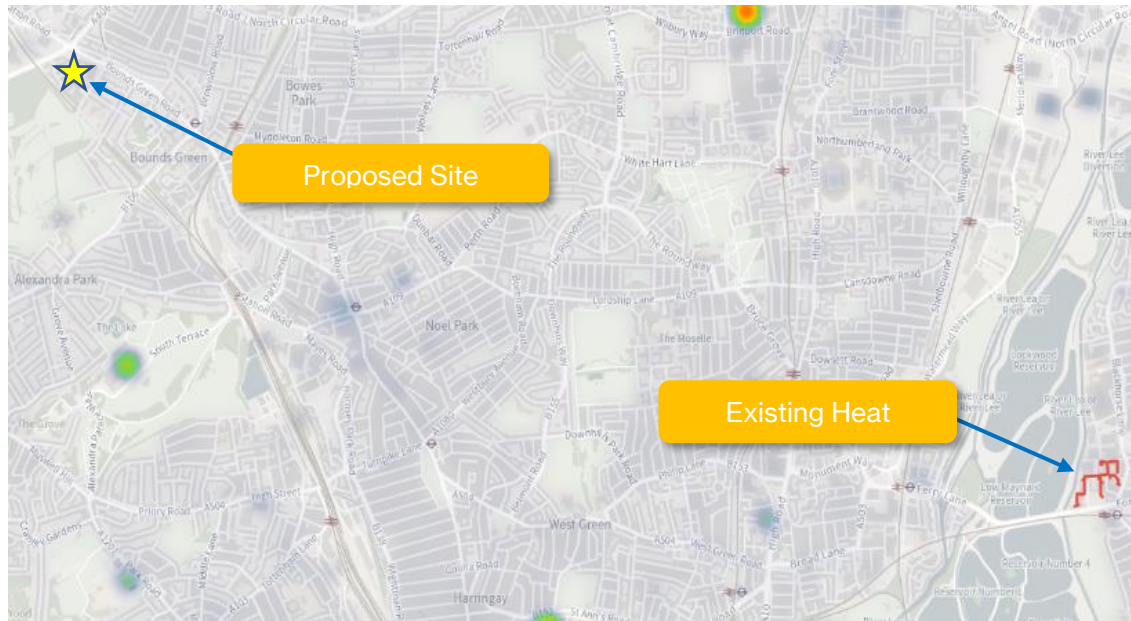


Figure 3 – Mayor of London Heat Map - www.maps.gov.uk/heatmap

Figure 4 Shows the distance from the development site to the closest proposed District Heating scheme, the Arnos Grove extension. This is approximately 430m therefore potential future connection may be a possibility but given the nature of the buildings in operation and heating demands, it would not be a practical solution for the development.

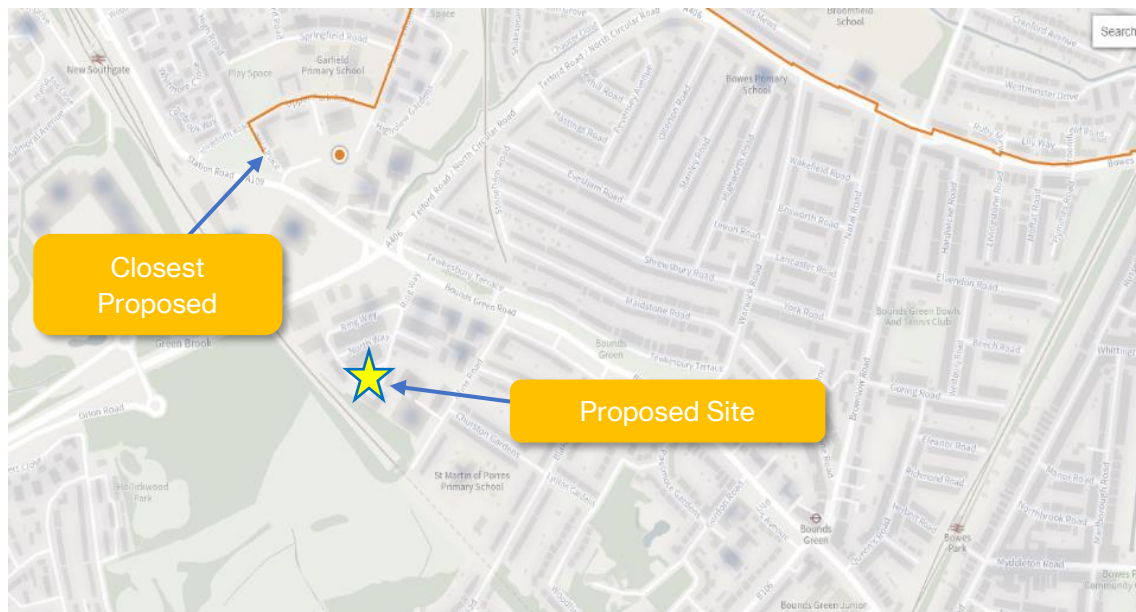


Figure 4 – Mayor of London Heat Map - www.maps.gov.uk/heatmap

Table 9 below shows that due to this, there has been no further improvement in CO₂ emissions at the 'Be Clean' stage.

Table 9: Carbon Emissions Breakdown Be Clean			
	GLA Spreadsheet SBEM		
	Total Emissions (kg/CO ₂ /yr)	CO ₂ Savings (kg/CO ₂ /yr)	Percentage savings (%)
Part L 2013 Baseline (TER)	20.6	-	-
Be Lean (DER/BER)	16.9	3.7	18%
Be Clean (DER/BER)	16.9	-	-

4.6 Renewable Energy (Be Green)

The GLA guidance sets out that assessments should explain how the opportunities for producing, storing and using renewable energy on-site will be maximised, in line with Policy SI 2.

It accepts that the main body of the energy assessment, detailed site specific analysis should only be provided for those renewable energy technologies considered feasible. For this scheme they are identified below:

4.6.1 Solar Thermal Heating

Solar thermal panels collect solar radiation to heat water that can then be used for either space heating or domestic hot water. There are two types of competing solar thermal technologies; flat-plate and evacuated tube.

Evacuated tube collectors are more efficient and therefore require less active collector array than the equivalent output of a flat plate system. However, in general, capital costs for the two technologies are comparable.

The system consists of solar collectors that are often roof mounted. Liquid is passed through the solar collectors and then to a heat exchanger in a domestic hot water cylinder, which will also have a top-up heat source (gas, biomass, or electricity) to ensure reliability of supply.

Solar thermal collectors can still produce energy from diffuse sunlight and are therefore less susceptible to performance reductions from orientation and angle compared to PV.

A typical 3-4m² collector area system (area dependent on technology) is capable of providing 50% the annual domestic hot water demand for a typical 2-3 bed house. The proportion of hot water provided varies over the course of a year, with the system achieving 100% coverage during the summer months and 5% during the winter.

It is questionable whether the Solar Thermal could meet the 35% requirement, and even if so, it would not be the most efficient or cost-effective method to do so. As such, the use of solar thermal is not considered appropriate for this scheme.

4.6.2 Heat Pumps

A ground source heat pump (GSHP) can harness the energy from the ground for use within buildings. This makes it possible to use the heat in the ground during the winter months to meet our heating needs. In the summer months it is also possible to cool buildings using ground temperatures that are lower than ambient air.

A typical ground system consists of a ground to water heat exchanger often called the 'ground loop' or 'ground coil', a heat pump and a distribution system. Water (or other solution) is passed round the system 'absorbing' heat from the ground and upgrading this heat via the heat pump into the building.

The heat exchanger can consist of either a vertical borehole system, where long pipes are driven deep into the ground or a horizontal trench system, which operates at shallower depths. The performance of a HP is measured using a COP (coefficient of performance). This defines the amount of useful energy output from the heat pump compared to the energy input. Typical systems can achieve a COP in the region of 350-400%.

The COP is maximised where the flow temperature of the heating circuit is between 35-40°C and therefore GSHP are ideally suited for connection to under-floor heating. The potential scale of GSHP is only limited by the availability of land for the ground loop and reasonable levels of energy abstraction. Typical costs for ground source heat pumps range from £800/kW for trench systems to £1,500/kW for vertical borehole systems.

Based on discussions with the Client, the constraints of the proposed site and scheme layout do not lend well to the use of ground source heat pumps and as a result of this, this technology has not been considered to be feasible.

Air source heat pumps (ASHP) work in a similar way to ground source and are able to extract heat from the outdoor air, even when the outside temperatures are very low, for use in space heating and hot water systems. ASHP are also available in air – air formats, in which the heat is emitted into the building through ductwork, in which instance can also provide the option for air conditioning or cooling in summer, however they cannot serve hot water systems.

These systems only require space for an external condenser unit, which makes them much simpler to install when compared to GSHP. These systems also offer a significant reduction in carbon emissions from that of a conventional heating system (especially electric heating systems).

It is not the Client's current intention to install ASHP or GSHP into the development's design, owing largely due to the spacing requirements needed and associated noise issues in operation.

4.6.3 Photovoltaics

Photovoltaic panels convert solar radiation into direct current electricity. In principle, they are an ideal source of renewable energy as they harness the most abundant source of energy on the Earth, the sun, and they produce electricity, which is the most useful form of energy.

PV's are silent in operation, have no moving parts and have a long life with low maintenance levels. PV systems can be connected to the grid or battery arrays in remote locations. Grid connected systems consist of PV arrays connected to the grid through a charge controller and an inverter. PV cells are more efficient at lower temperatures so good ventilation should be allowed around the PV modules where possible.

As the development benefits from a generous amount of roofspace, it is currently proposed to utilise Solar PV to reduce the carbon and energy requirements in operation. It is proposed that 9.83 kWp of PV will be installed, which equates to approximately 7,762 kWh/yr of energy generated from renewable or low carbon technologies.

Table 10: Carbon Emissions Breakdown Be Green			
	GLA Spreadsheet SBEM		
	Total Emissions (Tonnes/CO ₂ /yr)	CO ₂ Savings (Tonnes/CO ₂ / yr)	Percentage savings (%)
Part L 2013 Baseline (TER)	20.6	-	-
Be Lean (BER)	16.9	3.7	18%
Be Clean (BER)	16.9	-	-
Be Green (BER)	12.5	4.4	21%
Total Savings	-	8.1	39%

Table 10 shows that following the application of 9.83 kWp of PV there is a CO₂ saving of 8.1 tonnes/CO₂/yr, this equates to a 21% improvement against the last issue Part L Baseline utilising SBEM in accordance with London Plan requirements. This combined with the Be Lean fabric measures, results in a 39% reduction in CO₂ against the Part L Baseline, assuring the minimum 35% carbon reduction overall is achieved, as per Policy SI2.

4.7 Be Seen

4.7.1 Unregulated Emissions

In compliance with Policy SI2 and the GLA guidance for energy assessments, the unregulated CO₂ emissions have been calculated. This has been achieved utilising the last issue BRUKL document equipment energy use data, and applying the carbon factors in the London Plan GLA Spreadsheet. The total unregulated CO₂ emissions for the scheme are forecast to be approximately 4.26 tonnes/CO₂/yr, this has been calculated using the updated SBEM carbon factor, as per Policy SI2 requirements.

4.7.2 Energy Consumption

To understand the overall proposed energy use of the development, and in line with Policy SI2, SBEM calculations for the proposed development have been undertaken. A further breakdown of the calculations can be made available on request. Table 11 demonstrates the development's energy use, based on the last Design Stage SBEM calculations completed to date.

Table 11: Predicted Energy Consumption – Non-Residential Space	
Regulated	Units (kwh/yr)
Space Heating	3,314.63
Hot Water	14,982.47
Lighting	46,364.54
Auxiliary	277.26
Sub-Total	64,938.90
Unregulated	Units (kwh/yr)
Equipment	31,348.39
Total Predicted Energy Consumption	96,287.29
Following PV Implementation	-7,762.00
Net Total Predicted Energy Consumption	88,525.29

As shown in Tables 11 above, the SBEM outputs have highlighted that the total regulated energy consumption of the development will be 64,938.90 kWh/yr, additionally, unregulated energy consumption for the development is calculated to be 31,348.39 kWh/yr.

As highlighted in Section 4.6.3, the Client is proposing to install 9.83 kWp of PV which is estimated to reduce energy consumption by 7,762 kWh/yr, reducing the Net Total predicted energy consumption to 88,525.29 kWh/yr.

4.8 Carbon Offset Payment

In line with Policy SI2 of the London Plan, Block F, Bounds Green Industrial Estate must achieve net carbon zero or contribute an offset payment to cover the shortfall in CO₂ emissions in order to achieve the net zero carbon target. Haringey Borough Council stipulates a price per tonne amount of £95 per tonne of CO₂e x 30 years (climate change trajectory) must be met to meet the net carbon zero requirement.

A GLA Carbon Emissions Reporting Spreadsheet has been completed in order to apply SBEM carbon factor in accordance with the London Plan requirements. The GLA Summary Table is shown in Appendix 6.

Table 10 shows that following the energy hierarchy under the GLA Spreadsheet SBEM, there are 12.5 tonnes/CO₂/yr remaining. This report has identified a shortfall contribution payment of £35,541 is required to offset the development's CO₂ emissions in accordance with Policy SI2 and the GLA Guidance for energy assessments. The full GLA spreadsheet can be found in Appendix 7.

Haringey Borough Council adopted the new carbon offset price of £95 on 1 January 2020 and state they will progress the implementation of a higher carbon offset price. The quoted figure is based upon early planning stage drawings and the current carbon offset price, therefore any future changes to the design or layout of the development may impact the overall total required, and any final figure should be agreed between the local authority and the client.

5.0 Conclusion

This statement has reviewed the proposed development at South Way, Bounds Green Industrial Estate, London N11 2UL, which consists of a new one storey industrial building comprising 4 units as well as car parking and soft landscaping and provided an assessment of the proposed scheme against the relevant documents and policies:

- Haringey's Local Plan: Strategic Policies 2013 – 2026, Policy SP4
- Haringey Development Management DPD Adopted July 2017, Policy DM 21 & Policy DM22
- London Plan 2021, Policies SI2, SI3, SI4 & SI5.

The statement has highlighted that the scheme currently proposes to utilise a good thermal envelope to minimise heat loss, introduce efficient heating and lighting systems as well as low carbon technologies, which will drive energy efficiency in the building. This is in line with Policy SI2 requirements of sustainable design and reducing energy use.

Through the energy hierarchy highlighted in Policy SI2, this statement has demonstrated that under SBEM, the scheme is achieving a 39% reduction in CO₂ emissions, surpassing the minimum reduction stated under Policy SI2 of the London Plan 2021. This is inclusive of a 18% reduction at the 'Be Lean' stage, thereby surpassing the 15% requirement for non-residential developments; and a further 21% through the implementation of 9.83 kWp of PV.

Energy Use Intensity (EUI) and the space heating targets are met for the building.

The overheating risk in the building is expected to be acceptable for all the building spaces, based on TM52 methodology. The future weather files shows the development meets the criteria of this assessment.

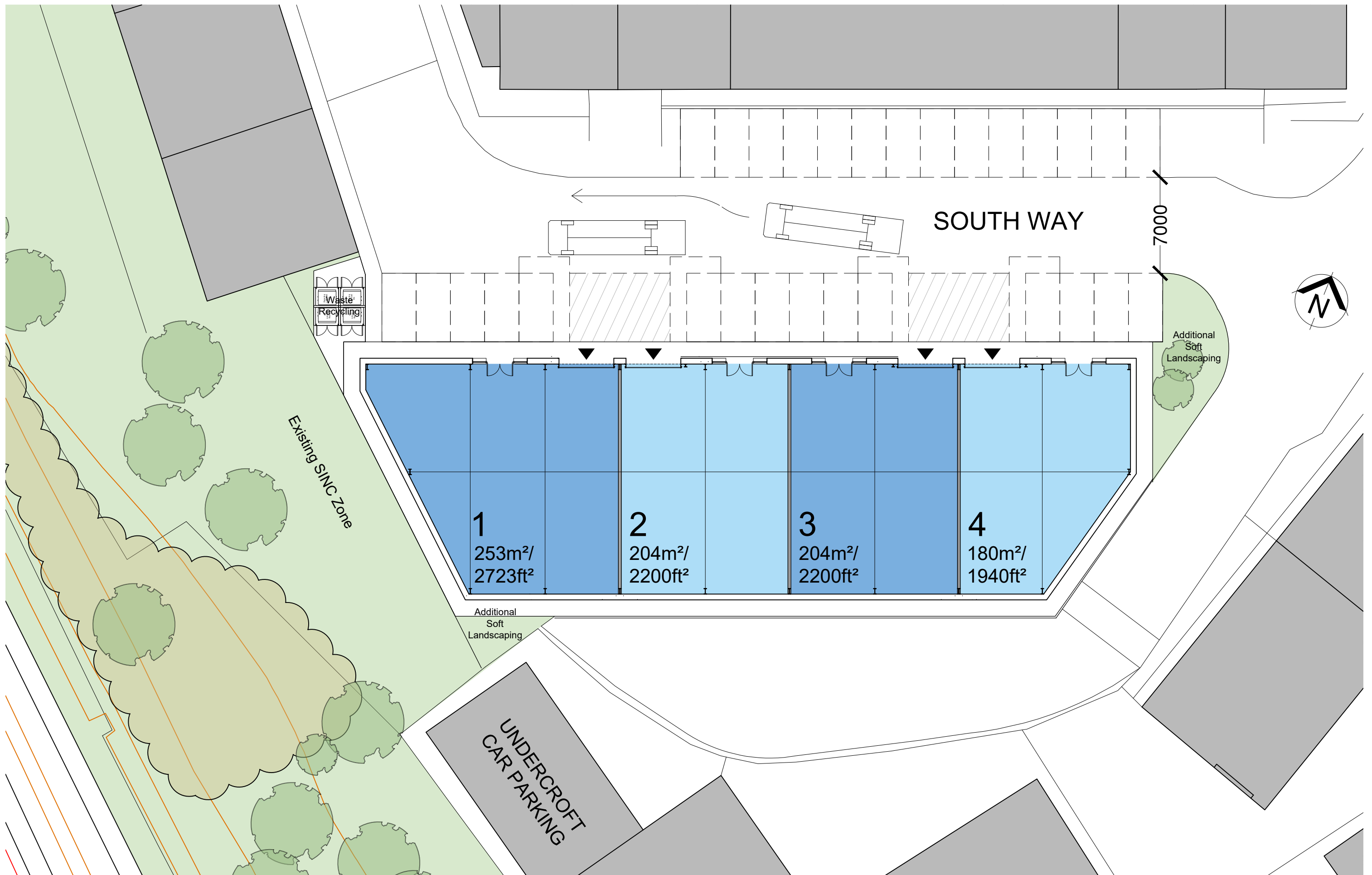
Furthermore, to achieve net carbon zero in line with Policy SI2, this report has identified that currently a total of £35,541 is required to offset the scheme's remaining 12.5 tonnes/CO₂/yr. This achieves the Net Carbon Zero requirement outlined in Policy SI2. This figure is based upon the last assessed plans and layout of the scheme provided and may be subject to change as the final design progresses, any final figure should also be agreed between the local authority and the Client.

Whilst PV is the preferred specification at this present time, the strategy and required contribution may be subject to change as design develops further. Nonetheless, it will be ensured that where any changes are made, the policy requirements listed will be maintained.



Appendix 1

Proposed Site Layout



PROPOSED SITE PLAN

BLOCK F, BOUNDS GREEN INDUSTRIAL ESTATE, N11 2UL

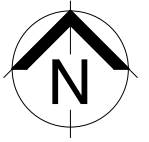
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LOCATION PLAN

BLOCK F, BOUNDS GREEN INDUSTRIAL ESTATE, N11 2UL

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Appendix 2

Full Policy Text

Policy SI 2 - Minimising Greenhouse Gas Emissions

- A.** Major development should be net zero-carbon.¹⁵¹ This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
1. be lean: use less energy and manage demand during operation
 2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
 3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
 4. be seen: monitor, verify and report on energy performance.
- B.** Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.
- C.** A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
1. through a cash in lieu contribution to the borough's carbon offset fund, or
 2. off-site provided that an alternative proposal is identified and delivery is certain.
- D.** Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually
- E.** Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.
- F.** Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions

Policy SI 3 Energy Infrastructure

- A.** *Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.*
- B.** *Energy masterplans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy masterplans should identify:*
- 1. major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)*
 - 2. heat loads from existing buildings that can be connected to future phases of a heat network*
 - 3. major heat supply plant including opportunities to utilise heat from energy from waste plants*
 - 4. secondary heat sources, including both environmental and waste heat*
 - 5. opportunities for low and ambient temperature heat networks*
 - 6. possible land for energy centres and/or energy storage*
 - 7. possible heating and cooling network routes*
 - 8. opportunities for futureproofing utility infrastructure networks to minimise the impact from road works*
 - 9. infrastructure and land requirements for electricity and gas supplies*
 - 10. implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector*
 - 11. opportunities to maximise renewable electricity generation and incorporate demand-side response measures.*
- C.** *Development Plans should:*
- 1. identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure*
 - 2. identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks.*
- D.** *Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:*
- 1. the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:*
 - a) connect to local existing or planned heat networks*
 - b) use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)*
 - c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)*
 - d) use ultra-low NOx gas boilers*

- 2. CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality*
 - 3. where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.*
- E.** *Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.*

Policy SI 4 Managing Heat Risk

- A.** *Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.*
- B.** *Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:*
- 1. reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure*
 - 2. minimise internal heat generation through energy efficient design*
 - 3. manage the heat within the building through exposed internal thermal mass and high ceilings*
 - 4. provide passive ventilation*
 - 5. provide mechanical ventilation*
 - 6. provide active cooling systems.*

Policy SI 5 Water Infrastructure

- A.** *In order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner.*
- B.** *Development Plans should promote improvements to water supply infrastructure to contribute to security of supply. This should be done in a timely, efficient and sustainable manner taking energy consumption into account.*
- C.** *Development proposals should:*
- 1. through the use of Planning Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption)*
 - 2. achieve at least the BREEAM excellent standard for the 'Wat 01' water category¹⁶⁰ or equivalent (commercial development)*
 - 3. incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing.*

D. *In terms of water quality, Development Plans should:*

- 1. promote the protection and improvement of the water environment in line with the Thames River Basin Management Plan, and should take account of Catchment Plans*
- 2. support wastewater treatment infrastructure investment to accommodate London's growth and climate change impacts. Such infrastructure should be constructed in a timely and sustainable manner taking account of new, smart technologies, intensification opportunities on existing sites, and energy implications. Boroughs should work with Thames Water in relation to local wastewater infrastructure requirements.*

E. *Development proposals should:*

- 1. seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided 160 Achieve at least a 12.5% improvement over defined baseline performance standard*
- 2. take action to minimise the potential for misconnections between foul and surface water networks.*

F. *Development Plans and proposals for strategically or locally defined growth locations with particular flood risk constraints or where there is insufficient water infrastructure capacity should be informed by Integrated Water Management Strategies at an early stage.*



Appendix 3

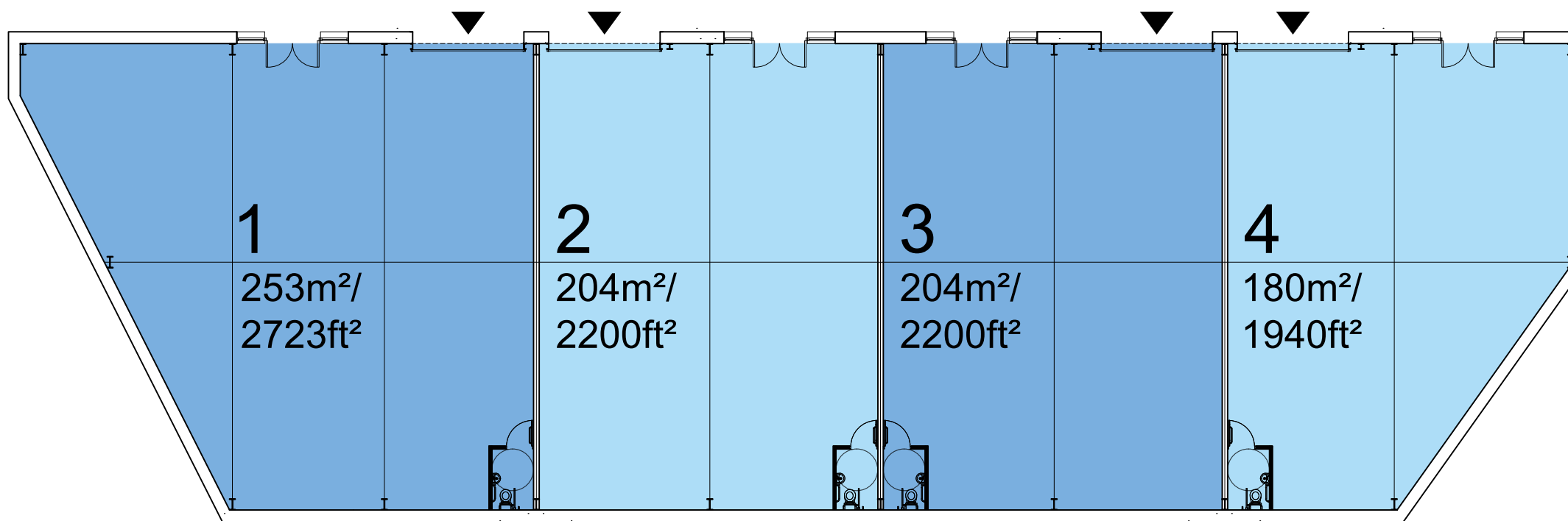
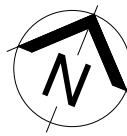
SBEM Calculations

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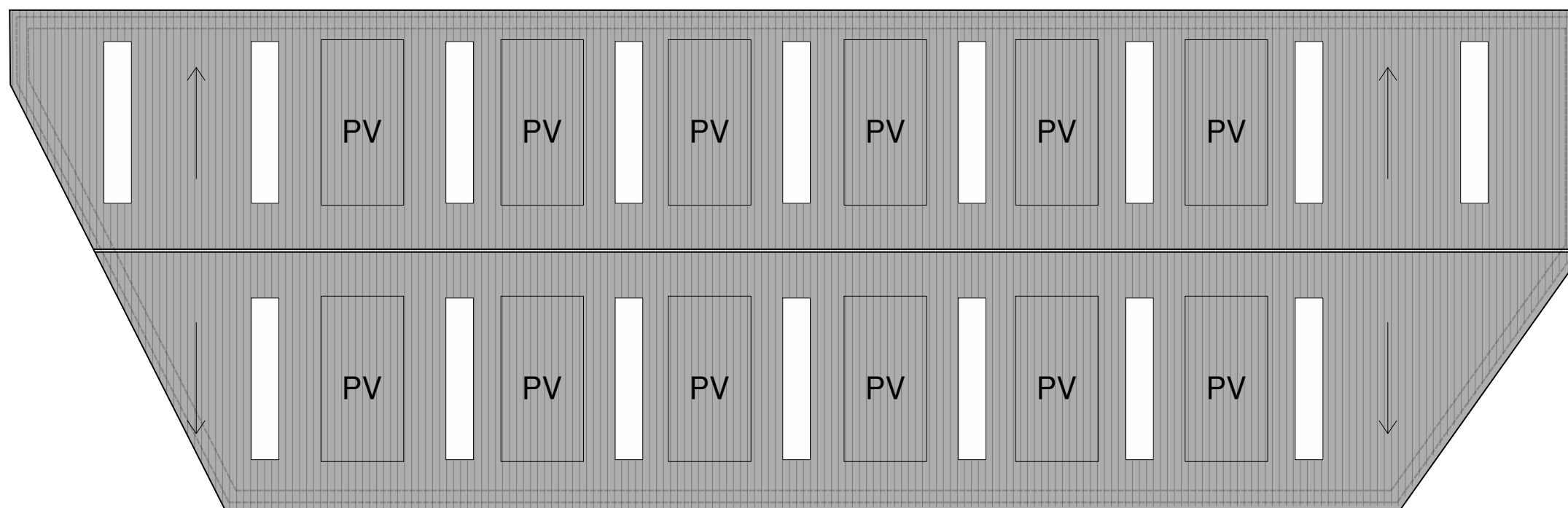


Appendix 4

Proposed Floor Plans



PROPOSED GROUND FLOOR PLAN



PROPOSED ROOF PLAN



Appendix 5

Dynamic Thermal Modelling Report

Dovetail Architects

Units 1 – 4, Block 7, Bounds Green Industrial Estate

Dynamic Thermal Model Report



March 2023



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Appendices

Appendix A - Visual Representation of the Operative Temperatures

1.0 Introduction

1.1 Purpose of the Report

Focus Consultants 2010 LLP were instructed by Dovetail Architects to undertake a Dynamic Thermal Analysis of their new warehouse units 1-4 in Bounds Green Industrial Estate in London, based on CIBSE TM52 methodology.

The overheating risk assessment has been based on a dynamic thermal model created in IES Virtual Environment software, including all the external openings and shading elements, as well as internal partitions and doors. The assessment has been undertaken based on information provided by the design team. Where information has not been available, suitable assumptions have been made and are described within this report. 3D visuals of the model geometry are provided in Appendix A of this report.

The relevant methodologies used to assess thermal comfort are provided by CIBSE guides. The dynamic thermal analysis has been developed to evaluate the building performance according to the following CIBSE guides:

- AM11: Building Energy and Environmental Modelling.
- Guide A: Environmental design.
- TM52: The limits of thermal comfort, avoiding overheating in European buildings.

1.2 CIBSE Relevant Methodology

The CIBSE AM11 guide sets out the software packages suitable to undertake a dynamic thermal simulation and analysis, within which the IES Virtual Environment package is included.

The CIBSE TM52 guide defines a general procedure to assess the risk of summer overheating, in accordance with the adaptive comfort methodology. This methodology is based on the following three criteria, a room that fails any two of the three criteria is classed as overheating.

1. The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature by 1°K or more during the occupied hours of a typical non-heating season (1st May to 30th September). The number of hours shall not be more than 3% of the occupied hours.
2. The second criterion deals with the severity of overheating within any one day, the level of which is a function of both temperatures rise and its duration. This criterion sets a daily limit for acceptability. The weighted exceedance shall be less than or equal to 6 in any one day.
3. The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable. The operative temperature less the maximum acceptable temperature shall not exceed 4 °K.

TM52 also defines the methodology to model the operative temperatures within the rooms of a building. This methodology is implemented within the software used and takes account of the different factors involved in thermal comfort, i.e., air and radiant temperature, air velocity, relative humidity, metabolic rate (based on occupants' activity) and clothing level.

1.3 Software

The dynamic thermal analysis has been undertaken using the Integrated Environmental Solutions Ltd software package as below:

IES Virtual Environment, Version 2022.3.0.0

- SunCast (solar shading analysis)
- MacroFlo (natural ventilation modelling)
- Apache (thermal modelling and simulation)
- VistaPro (advanced analysis of results).

This software is considered suitable to assess the building through dynamic thermal simulation in accordance with the selection criteria within CIBSE AM11. A specific tool to obtain the operative temperatures and to assess the risk of overheating in accordance with the CIBSE TM52 adaptive comfort methodology is implemented within the VistaPro module of this software.

1.4 Limitations

The dynamic thermal analysis is developed through a model based upon a set of theoretical in-built parameters and simplified system definitions, as well as sensible assumptions where further information is not available at the current design stage. Therefore, the accuracy of the temperatures obtained are constrained by the software and the available parameters, and the model provides only an indication of theoretical performance suitable for informing the building design team. The results cannot be considered a guarantee of future performance of the real building.

2.0 Model Parameters

2.1 Construction Specifications

The main construction features should be reviewed by the design team for accuracy; however, the table below sets out the parameters used in the model for specific elements.

Table 1: Opaque Element Parameters

Type	U-value (W/m ² /K)	Thermal Mass (kJ/m ² /K)
External Wall	0.20	7.48
Ground Floor	0.18	201.25
Internal Door	2.20	13.87
Internal Partition	0.20	8.75
Intermediate Ceiling/Floor	0.18	240.00

Table 2: Glazed Element Parameters

Type	U-value (W/m ² /K)	g-value glass only (%)
External Windows	1.40	0.63
Skylights	1.40	0.50

The buildings have been dynamically modelled in IESVE software and sensible assumptions are made in terms of the proposed fabric and mechanical systems to be installed to the development. Figure 1 shows the 3D visual of the building modelled in IESVE.



Figure 1: 3D Visual of the Dynamic model of Block F units

2.2 Current Weather File

The latest CIBSE Design Summer Year (DSY) data has been utilised as specified by the TM59 guide. The weather file used for the analysis is London Central DSY1 for the 2020s, high emissions, 50% percentile scenario, which can be considered the most appropriate for the site location and has been used in previous analyses. The thermal analysis is based upon dynamic response using ten-minute simulation time steps over an annual period using hourly weather data.

2.3 Future Weather File

The weather file used for the projected climate change analysis is London Central DSY2 and DSY 3 for the 2020s, high emissions, 50% percentile scenario. The thermal analysis is based upon dynamic response using ten-minute simulation time steps over an annual period using hourly weather data.

2.4 Internal Gains and Occupancy Profiles

2.4.1 Thermal Comfort Category

CIBSE guides suggests three building categorises buildings into three categories depending on the expected occupancy behaviour of the building. Figure 1 shows the suggested building categories and the relevant explanation for each category. Category II, normal expectation is applied for the offices to assess overheating risk.

Category	Explanation
I	High level of expectation (only used for spaces occupied by very sensitive and fragile persons)
II	Normal expectation (for new buildings and renovations)
III	A moderate expectation (used for existing buildings)
IV	Values outside the criteria for the above categories (only acceptable for a limited periods)

Figure 2: Suggested building categories, excerpt from CIBSE Guide TM52

2.4.2 NCM Activity Assigned

The dynamic simulation calculated energy demands for each zone in the building according to the expected activity within in. Different activities may have different operating profiles and energy demands. The National Calculation Methodology (NCM) provides an activity database that provides typical building category and relevant room activities to be used in the dynamic simulation.

The table below summarises the NCM activity assigned to the Offices. NCM building category B2 to B7: Industrial process building is assigned as an overall building type.

The respective Internal Gains area summarised in the table below.

Table 3: NCM Activity and Internal Gains assigned

NCM Activity Assigned	Industrial Office
Equipment Sensible Gain	13.80 W/m ²
Occupancy Sensible Gain	73.00 W/person
Lighting Sensible Gain	11.25 W/m ²

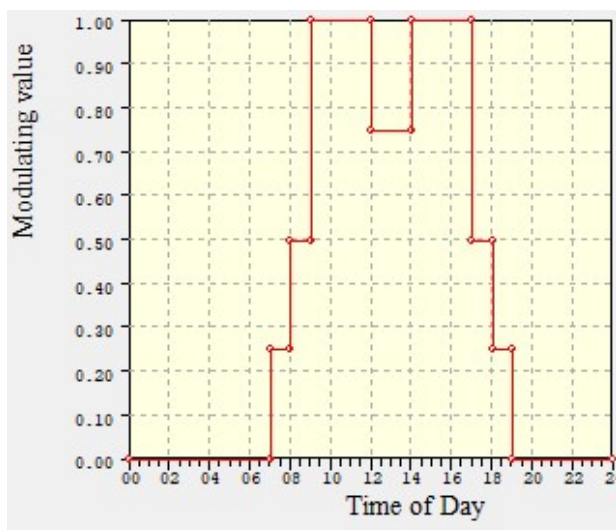


Figure 4: Variation Profile for Occupancy

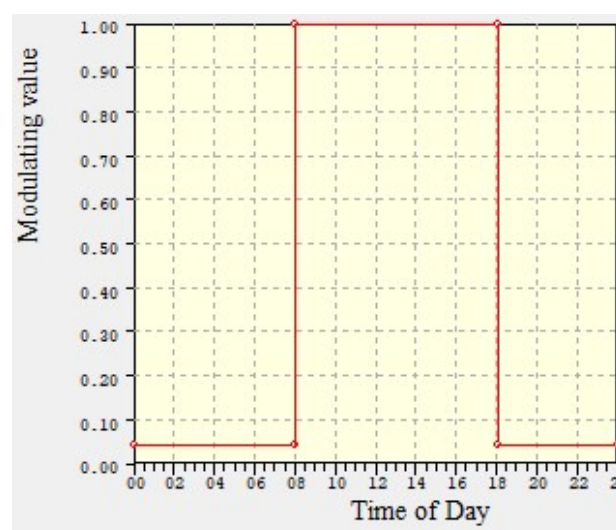


Figure 3: Operation Profile for Equipment

2.5 Natural Ventilation

Natural ventilation through window openings and internal doors has been modelled following the profiles defined by CIBSE TM59. The guidance in each case reads as follows.

Windows in each room should be controlled separately and modelled as open when both the internal dry bulb temperature exceeds 22 °C and the room is occupied. Internal doors can be included and left open in the model in the daytime but should be assumed to be closed when the occupants are sleeping.

The windows assigned in the thermal model are as summarised in the table below. Closed internal doors have been modelled with a crack flow coefficient of 1.3 l/(s·m·Pa^{0.6}). Using a ramp opening profile for the windows, windows are assigned to linearly open when internal temperature exceeds 22°C and closed when it reaches 26°C.

Table 6: Opening Angles and Exposure Type

Opening Type	Max Angle Open (°)	Openable Area (%)	Opening Profile	Exposure Type
External windows bedrooms	30.00	90.00	tdr>22	Semi-exposed

The use of internal blinds has not been considered at this stage. The opening types as assigned in the thermal model are visually represented in below figure.

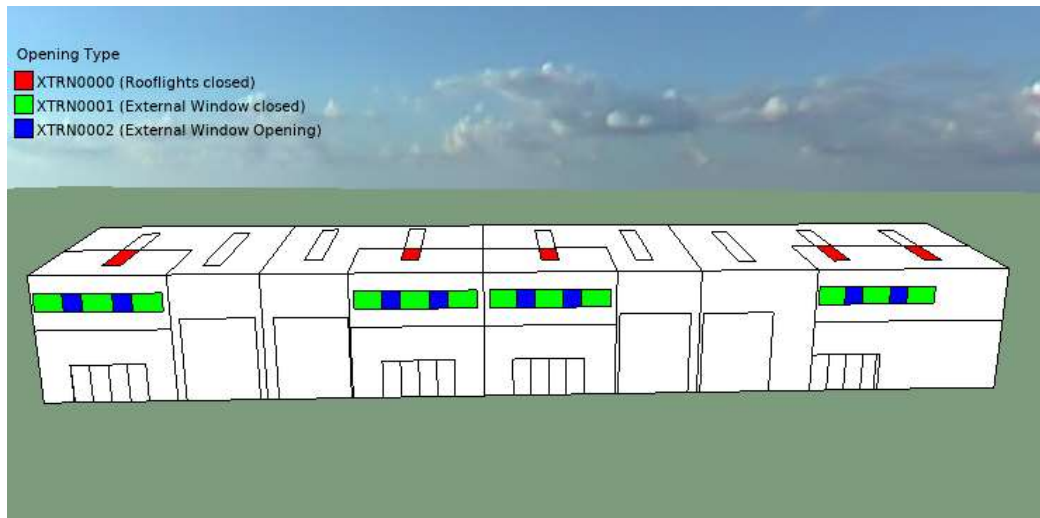


Figure 5: Window Types assigned

2.6 Infiltration and Air Speed

The infiltration rate has been assumed to be 0.15 ACH in the communal and circulation spaces, which is equivalent to an air permeability of $5 \text{ m}^3/(\text{h.m}^2)$ @ 50 Pa according to CIBSE Guide A. As advised in CIBSE TM52 and TM59 guides the modelled air speed in all spaces is set at 0.1 m/s.

2.7 Mechanical System Parameters

The heating/cooling system assigned to condition the office spaces is a VRF system with efficiency and set-points as summarised in table below:

Table 6: Opening Angles and Exposure Type		
	Heating System	Cooling System
Seasonal Efficiency (VRF)	4.20	6.00
Set-point	22°C	24°C
Operation Profile	On when occupied October to April	On when occupied May to September

3.0 Results

3.1 CIBSE TM52 Criteria

As summarised in Section 1.2 of this report, CIBSE TM52 has the following three Criteria to assess risk of overheating in an occupied space.

Criterion 1: Limit of 3% of occupied hours that the Operative Temperature exceeds the Maximum Acceptable Temperature by 1°K.

Criterion 2: Limit of 6 to the daily weighted exceedance, temperature rise over acceptable temperature (°K) multiplied by its duration (hours).

Criterion 3: Absolute maximum daily temperature, Operative Temperature less Maximum Acceptable Temperature < 4 °K.

3.2 Current Weather File

The results obtained for London Central DSY1 weather file show that the operative temperature in the offices is not expected to exceed the threshold levels against CIBSE TM52 criteria, using the input parameters as mentioned in Section 2.0 of this report. The results are summarised in below table.

Table 6: CIBSE TM52 Results - DSY 1 weather file				
Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

3.3 Future Weather File

The offices were assessed against the future weather files London Central DSY2 and DSY3 for the 2020s to assess the operative temperatures for extreme overheating events. With the use of VRF cooling systems, the operative temperatures are expected to stay under the thresholds of Criteria 1-3 of CIBSE TM52. Below table summarises the temperature exceedance for each criterion.

Table 6: CIBSE TM52 Results - DSY 2 weather file

Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

Table 6: CIBSE TM52 Results - DSY 3 weather file

Room Name	Criterion 1	Criterion 2	Criterion 3	TM52
Office – Unit 1	0.00	0.00	0.00	Pass
Office – Unit 2	0.00	0.00	0.00	Pass
Office – Unit 3	0.00	0.00	0.00	Pass
Office – Unit 4	0.00	0.00	0.00	Pass

4.0 Conclusion

The software used for thermal model analysis was IESVE 2022 Version 3:0.0 which is in accordance with CIBSEAM11 Building Energy and Performance Modelling Guide. Within the software, ModelIT was used to make a 3D geometry of the building, MacroFlo to assign the opening profiles for windows and doors and Apache to assign the thermal templates to occupied zones. Once simulated the results were extracted in VistaPro module of the software.

The offices are assessed against CIBSE TM52 criteria that requires the occupied rooms to pass two out of the three criteria listed in Section 1.2 of this report. The offices are assigned with VRF air conditioning system. Therefore, these rooms are expected to maintain a comfortable operative temperature to satisfy the overheating criteria set out in CIBSE TM52 guide for current weather file DSY 1 and future weather file DSY 2 and DSY 3. Appendix A shows the visual representation of the operative temperatures for Offices 1-4 for DSY 1, DSY 2 and DSY 3 weather files.

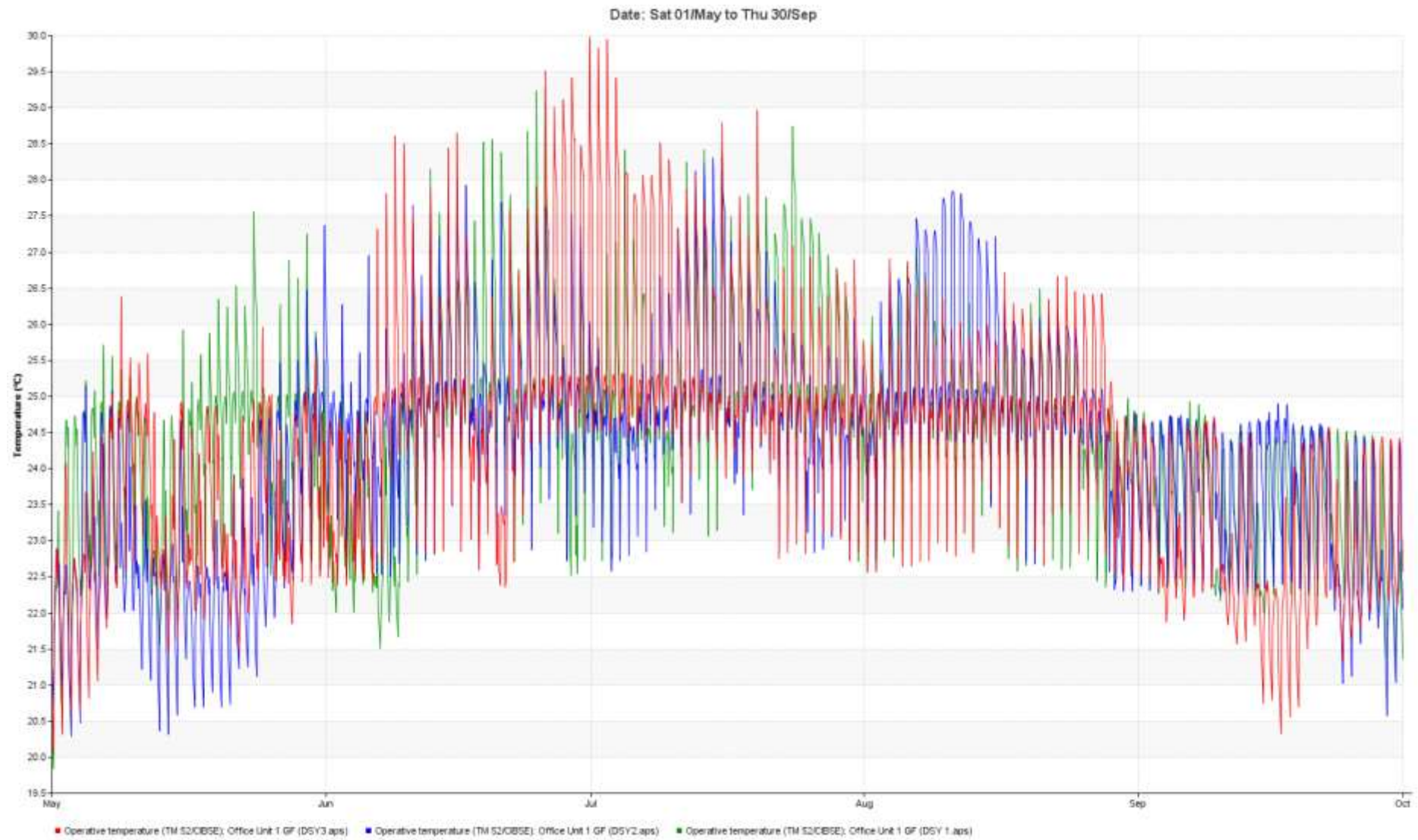
These results are subject to the building being constructed to the specifications described in this report, and to the occupancy, equipment and window opening profiles being similar to those specified in this report. The limitations described within Section 1.4 of this report should also be taken into consideration when interpreting the results obtained.



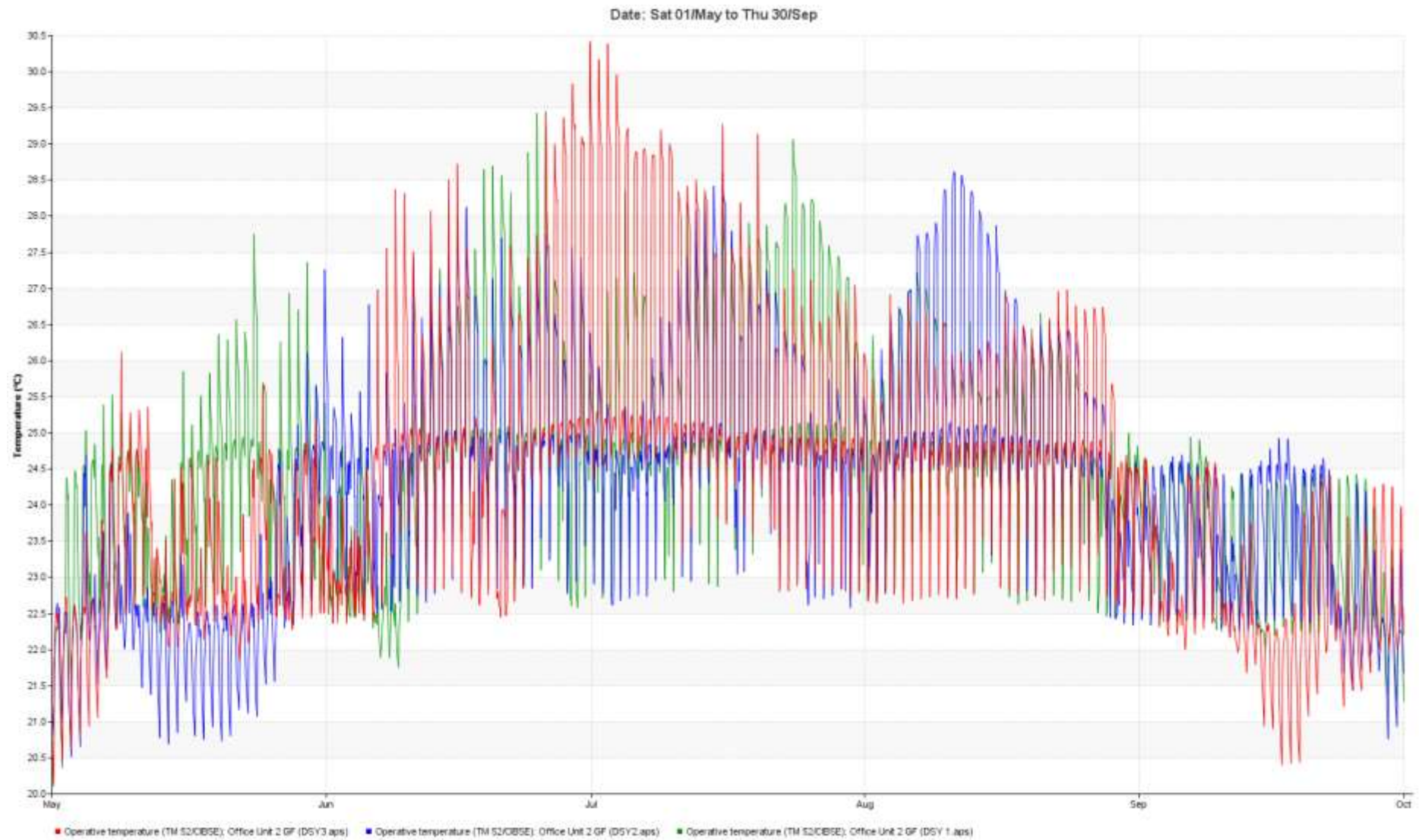
Appendix A

Visual Representation of the Operative Temperatures

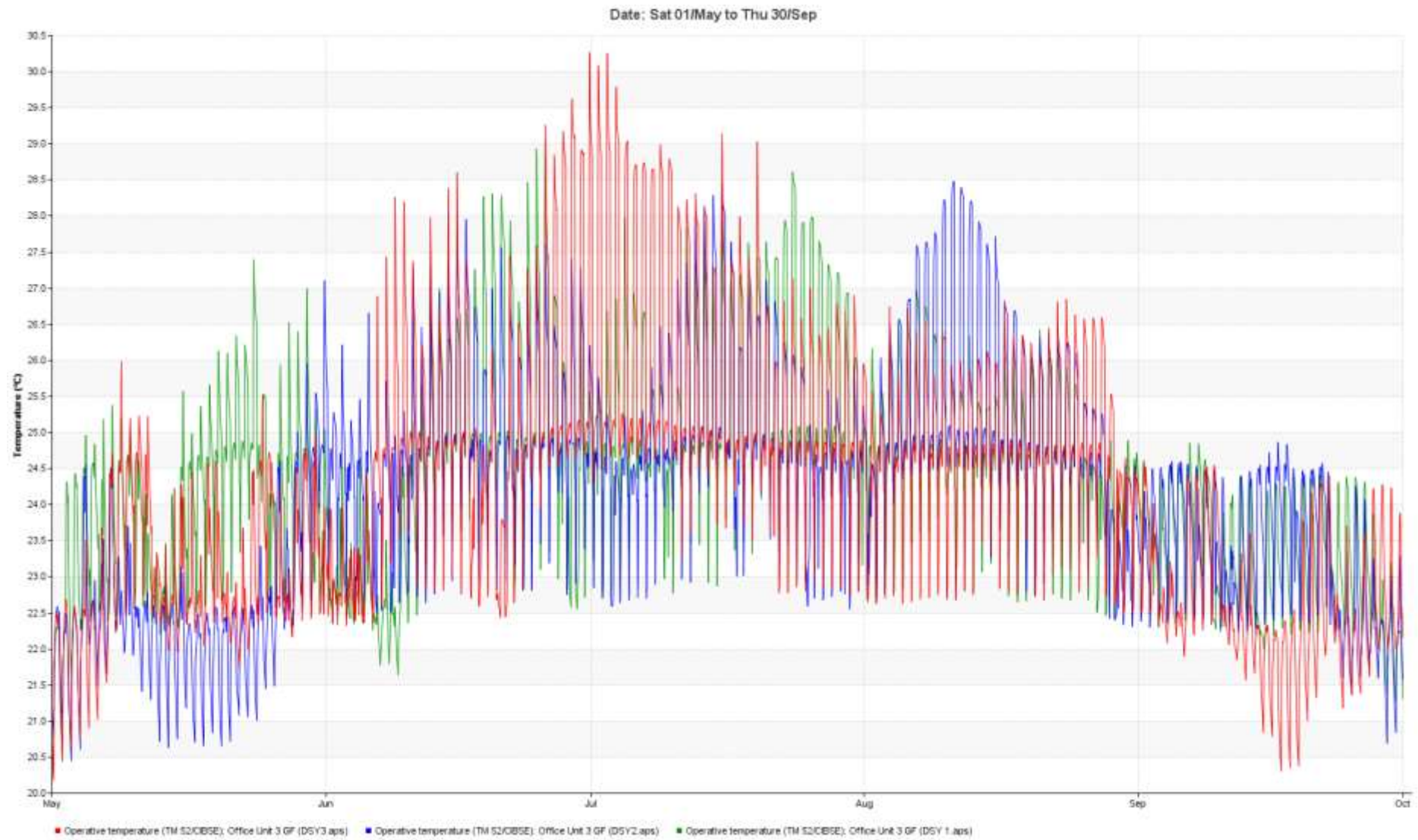
Operative Temperature : Office – Unit 1 for DSY 1, DSY 2, DSY 3



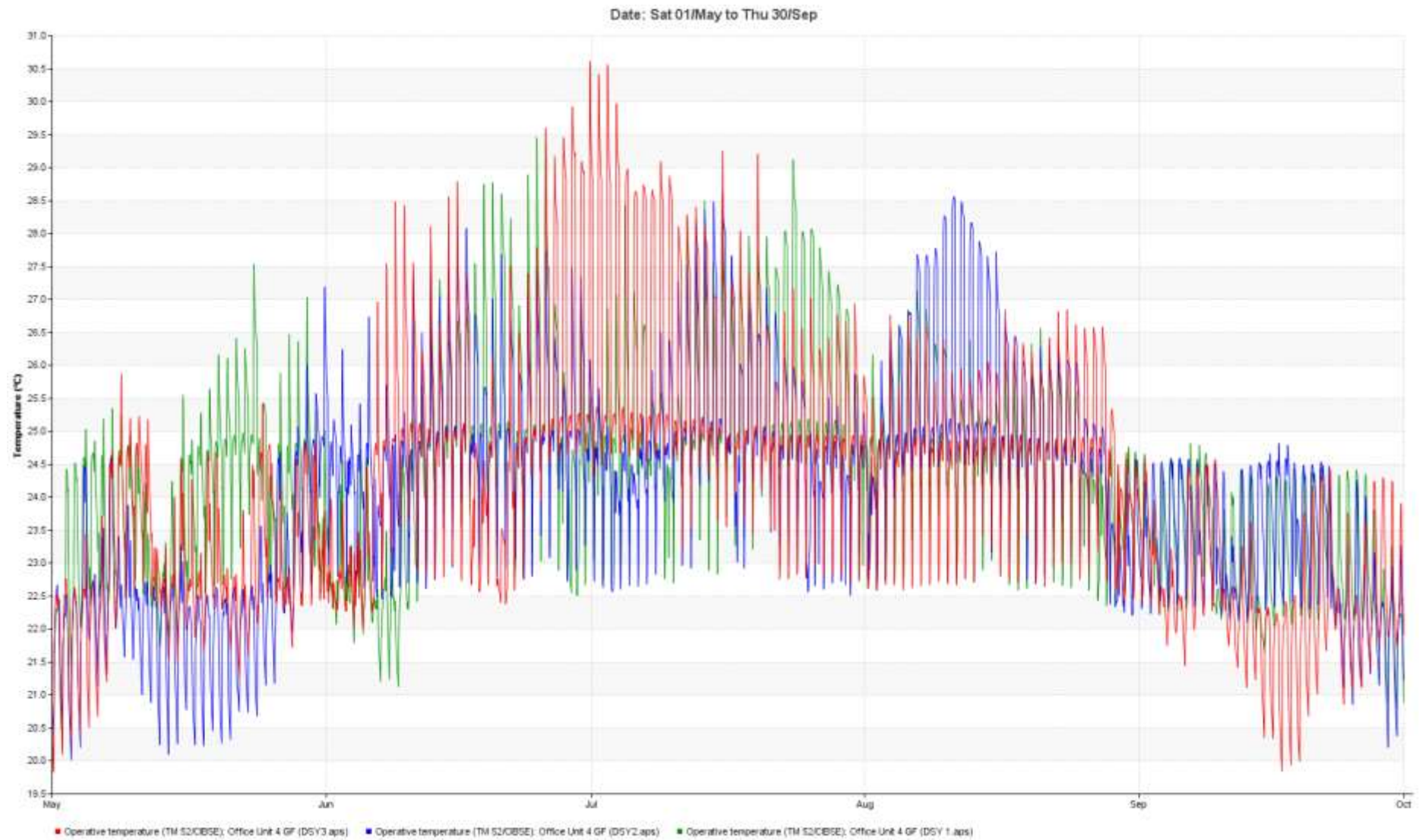
Operative Temperature : Office – Unit 2 for DSY 1, DSY 2, DSY 3



Operative Temperature : Office – Unit 3 for DSY 1, DSY 2, DSY 3



Operative Temperature : Office – Unit 4 for DSY 1, DSY 2, DSY 3





Appendix 6

GLA Summary Table

Part L 2021 Performance

Residential

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.0	
After energy demand reduction (be lean)	0.0	
After heat network connection (be clean)	0.0	
After renewable energy (be green)	0.0	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	0.0	0%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.0	0%
Cumulative on site savings	0.0	0%
Annual savings from off-set payment	0.0	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	0	-
Cash in-lieu contribution (£)	0	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Non-residential

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	20.6	4.3
After energy demand reduction (be lean)	16.9	4.3
After heat network connection (be clean)	16.9	4.3
After renewable energy (be green)	12.5	4.3

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

	Regulated non-residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	3.7	18%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	4.4	21%
Total Cumulative Savings	8.1	39%
Annual savings from off-set payment	12.5	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	374	-
Cash in-lieu contribution (£)	35,541	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2021 baseline	20.6		
Be lean	16.9	3.7	18%
Be clean	16.9	0.0	0%
Be green	12.5	4.4	21%
Total Savings	-	8.1	39%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	374.1	-

	Target Fabric Energy Efficiency (kWh/m ²)	Dwelling Fabric Energy Efficiency (kWh/m ²)	Improvement (%)
Development total	0.00	0.00	

	Area weighted non-residential cooling demand (MJ/m ²)	Total area weighted non-residential cooling demand (MJ/year)
Actual		
Notional		

EUI & space heating demand (predicted energy use)

[illegible]



Appendix 7

GfaLA Carbon Emissions Reporting Spreadsheet

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFEE.

RESIDENTIAL ENERGY CONSUMPTION AND CO ₂ ANALYSIS (PART L1)																																	
Unit identifier (e.g. plot number, dwelling type etc.) Model total floor area (m²) Number of units Total area represented by model (m²)				VALIDATION CHECK		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - SAP TER WORKSHEET																REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)								Fabric Energy Efficiency (FEE)			
				Calculated TER (kgCO ₂ / m²)	TER Worksheet TER (kgCO ₂ / m²)	Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space Heating (Heat source 2)	Fuel type Space Heating	Domestic Hot Water (Heat source 2)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP	Fuel type CHP	Total Electricity generated by CHP (-)	Fuel factors for electricity generated by CHP	Secondary Heating system	Fuel type Secondary Heating	Electricity generated by renewable (-)	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Lighting	Auxiliary	Cooling	Electricity generated by renewable technology (-)	Part L 2021 CO ₂ emissions (kgCO ₂ p.a.)	Target Fabric Energy Efficiency (TFEE) (kWh/m²)
TER Worksheet (Row 4)				TER Worksheet (Row 273)		TER Sheet (Row 307b + (Row 367b x 0.01)) OR Row 211	Select fuel type	TER Sheet (Row 310b + (Row 367b x 0.01)) OR Row 219	Select fuel type	if applicable TER Sheet (Row 307c + (Row 367c x 0.01))	Select fuel type	if applicable TER Sheet (Row 310c + (Row 367c x 0.01))	Select fuel type	if applicable TER Sheet (Row 307a + 310a) + (Row 362 x 0.01)	Select fuel type	if applicable TER Sheet (Row 307a + 310a) + (Row 361 + 362)	TER Sheet Row 309	Select fuel type	TER Sheet Row 333	TER Sheet Row 332 OR Row 232	TER Sheet (Row 313 + 331) OR Row 231	N/A											
Sum				0	0	0.0	-	0	N/A	0	N/A	0	N/A	0	N/A	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
NON-RESIDENTIAL ENERGY CONSUMPTION AND CO ₂ ANALYSIS (PART L2)																																	
Building Use Model Area (m²) Number of units Total area represented by model (m²)				VALIDATION CHECK		REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) TER - SOURCE: BRUKL OUTPUT																REGULATED CO ₂ EMISSIONS BY FUEL TYPE (kgCO ₂ /m² p.a.) TER - SOURCE: *SIM.CSV FILE								Part L 2021 CO ₂ emissions (kgCO ₂ p.a.)			
				Calculated TER (kgCO ₂ / m²)	BRUKL TER (kgCO ₂ / m²)	Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water	Electricity generated by renewable (-)	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Natural Gas	Grid Electricity	Bespoke DH Factor	Enter Carbon Factor 1	Enter Carbon Factor 2	Enter Carbon Factor 3	Electricity generated by renewable technology (-)													
Industrial	330	1	330	17.3	2.5	6.78	Grid Electricity	3.65	Grid Electricity																						5,709		
Industrial	240.2	1	240.2	18.8	2.7	6.2	Grid Electricity	3.66	Grid Electricity																						4,509		
Industrial	238.7	1	238.7	18.8	2.7	6.17	Grid Electricity	3.66	Grid Electricity																						4,480		
Industrial	218	1	218	27.1	3.8	7.06	Grid Electricity	3.62	Grid Electricity																						5,897		
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RESIDENTIAL ENERGY CONSUMPTION AND CO₂ ANALYSIS (PART L1)

NON-RESIDENTIAL ENERGY CONSUMPTION AND CO₂ ANALYSIS (PART L2)

	VALIDATION CHECK	REGULATED ENERGY CONSUMPTION BY END USE (kWh/m ² p.a.) 'BE' LEAN 'BER' - SOURCE: 'SIM.CSV FILE	REGULATED CO ₂ EMISSIONS BY FUEL TYPE (kgCO ₂ /m ² p.a.) - BER BRUKL - SOURCE: 'SIM.CSV FILE	
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SITE-WIDE ENERGY CONSUMPTION AND CO ₂ ANALYSIS									
REGULATED OVERALL CONSUMPTION									
REGULATED									

Calculated	REGULATED ENERGY CONSUMPTION										REGULATED CO ₂ EMISSIONS
							Electricity				

NON-RESIDENTIAL ENERGY CONSUMPTION AND CO ₂ ANALYSIS (PART L2)									
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SITE-WIDE ENERGY CONSUMPTION AND CO ₂ ANALYSIS									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
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301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	42	

The applicant should complete all the light blue cells including information on the 'be green' energy consumption figures and the 'be green' DER.

RESIDENTIAL ENERGY CONSUMPTION AND CO ₂ ANALYSIS (PART L1)																																		
Unit identifier (e.g. plot number, dwelling type etc.) Model total floor area (m²) Number of units Total area represented by model (m²)				VALIDATION CHECK		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET																REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)												
				Calculated DER (kgCO ₂ / m²)	DER Worksheet DER (kgCO ₂ / m²)	Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space Heating (Heat source 2)	Fuel type Space Heating	Domestic Hot Water (Heat source 2)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP	Fuel type CHP	Total Electricity generated by CHP (-)	Fuel factors for electricity generated by CHP	Secondary Heating system	Fuel type Secondary Heating	Electricity generated by renewable (-)	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Lighting	Auxiliary	Cooling	Electricity generated by renewable	Part L 2021 CO ₂ emissions (kgCO ₂ p.a.)		
					DER Sheet (Row 384)																													
						DER Sheet [Row 307b + (Row 367b x 0.01)]	Select fuel type	DER Sheet [Row 310b + (Row 367b x 0.01)]	Select fuel type	DER Sheet [Row 307c + (Row 367c x 0.01)]	Select fuel type	DER Sheet [Row 310c + (Row 367c x 0.01)]	Select fuel type	DER Sheet [(Row 307a + 310a) + (Row 362 x 0.01)]	Select fuel type	DER Sheet [(Row 307a + 310a) x (Row 361 + 362)]	Select fuel type	DER Sheet Row 309	Select fuel type	DER Sheet Row 333	DER Sheet Row 332	DER Sheet (Row 313 + 331)	DER Sheet Row 315											
Sum				0	0	0.0	-	0	N/A	0	N/A	0	N/A	0	N/A	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0			
NON-RESIDENTIAL ENERGY CONSUMPTION AND CO ₂ ANALYSIS (PART L2)																																		
Use	Area per unit (m²)	Number of units	Total area represented by model (m²)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT														REGULATED CO ₂ EMISSIONS BY FUEL TYPE (kgCO ₂ /m² p.a.) - BER BRUKL - SOURCE: 'SIM.CSV FILE														
				Calculated BER (kgCO ₂ / m²)	BRUKL BER (kgCO ₂ / m²)	Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water	N/A	N/A	N/A	N/A	N/A	N/A	Electricity generated by CHP (-)	N/A	N/A	N/A	Electricity generated by renewable technology (-)	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Natural Gas	Grid Electricity	Bespoke DH Factor	Electricity generated by CHP (-)	Enter Carbon Factor 1	Enter Carbon Factor 2	Enter Carbon Factor 3	Electricity generated by renewable technology (-)	Part L 2021 CO ₂ emissions (kgCO ₂ p.a.)		
Industrial	330	1	330	10.4	1.6	3.27	Grid Electricity	3.65	Grid Electricity							0					-7.65	9.43	0.05	1.63	0	18						-8	3,425	
Industrial	240.2	1	240.2	11.2	1.7	3.54	Grid Electricity	3.66	Grid Electricity							0					-9.08	11.36	0.07	1.65		20						-9	2,690	
Industrial	238.7	1	238.7	11.2	1.7	3.52	Grid Electricity	3.66	Grid Electricity							0					-8.98	11.33	0.07	1.58		20						-9	2,669	
Industrial	218	1	218	16.9	2.5	2.5	Grid Electricity	3.62	Grid Electricity							0					-4.19	13.03	0.08	1.88		21						-4	3,686	
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Applicants can use the 'be seen' methodology or an alternative predictive energy modelling methodology to fill in this tab.

Where 'be seen' reporting is used the reported EUI and space heating demand should align with energy consumption data reported in the planning stage submission for the 'be seen' policy, submitted via the online webform.

Residential predicted energy use

[illegible]

Non-residential predicted energy use

Building type	GIA	EUI & space heating demand (kWh/year)									Has the following energy use been included?		Results		Table 4 of the guidance comparison		Methodology used		
		Space heating demand	Annual Electricity Use	Annual Gas Use	Annual Oil Use	Annual Biomass Use	Annual District Htg Use	Annual District Clg Use	Elec Generation, Gross	Solar Thermal Generation	Regulated	Unregulated	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Software	Operational energy use assessment	notes (if expected performance differs from the Table 4 values in the guidance or other software used)
All other non-residential	330	1,079.10	12764.4	0							Yes	Yes	38.68	3.27	55	15	Part L2 - SBEM	Other (provide details in column T)	BRUKL Document
All other non-residential	240.2	850.308	12,185.35	0							Yes	Yes	50.73	3.54	55	15	Part L2 - SBEM	Other (provide details in column T)	BRUKL Document
All other non-residential	238.7	840.224	12,082.99	0							Yes	Yes	50.62	3.52	55	15	Part L2 - SBEM	Other (provide details in column T)	BRUKL Document
All other non-residential	218	545	11,248.80	0							Yes	Yes	51.6	2.5	55	15	Part L2 - SBEM	Other (provide details in column T)	BRUKL Document
Total	1026.9	3314.632	48281.54	0	0	0	0	0	0	0									

