HOARE LEA

Bishopsgate Goods Yard Plot 05, Sclater Street Buildings. London.

Bishopsgate Goodsyard Regeneration Limited.

SUSTAINABILITY
ENERGY STRATEGY

REVISION 03 – 18 MARCH 2024

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
01	26/02/2024	Issue for planning	C. MacGillivray	R. Palmer	J. Nuttall
02	13/03/2024	Second Revision	L. Flockton	R. Palmer	J. Nuttall
03	18/03/2024	Inclusion of residential elements	C. MacGillivray	R. Palmer	J. Nuttall

Project number: 23/24734
Document reference: REP-2324734-5A-CM-20240318-Bishopsgate Goods Yard Sclater St Energy Strategy-Rev03.docx

Contents.

Executive summary.

This energy strategy has been prepared by Hoare Lea on behalf of Bishopsgate Goodsyard Regeneration Limited (hereafter referred to as 'the Applicant') in support of the reserved matters application for the development at Bishopsgate Goods Yard Plot 05, Sclater Street Buildings (hereafter 'the Proposed Development') within Shoreditch, London.

Development description.

Bishopsgate Goods Yard Plot 05, Sclater Street Buildings comprise of three heritage buildings: Mission Chapel, Victorian Building, and Weavers Cottages.

It is proposed that: Mission Chapel is repurposed to provide a café type facility; the Victorian Building is combined into a single commercial unit, with residential units above; and Weavers Cottage is to be restored, with Weavers Cottage outbuildings demolished to build a new 3-storey extension to create a coworking office space.

Table 1: Area schedule.

Building	Space Use	GIA m²
Victorian Building	Residential	232
	Retail	148
	Total	*612*
Weavers Cottages	Retail	87
	Offices	429
	Total	*516*
Mission Chapel	Retail	93
	Total	*93*
Victoria Building, Weavers Cottage and Mission Chapel	**Total**	**989**

Figure 1: Illustrative view of the Proposed Development (Credit: Chris Dyson Architects)

Applicable policy and regulations.

With respect to energy and carbon performance, this project must comply with the following policies and regulations:

National drivers; Approved Document Part L of the Building Regulations

Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO_2 emissions from new buildings. The assessment of the Proposed development against policy targets has been carried out using Building Regulations Part L (2021).

Calculations demonstrating the energy requirements and associated CO_2 emissions for the development have been carried out using Building Regulations approved software.

Regional drivers; Greater London Authority (GLA) Policy

The Energy Strategy follows Mayor's Sustainable Infrastructure policies and the energy hierarchy: 'Be Lean, Be Clean, Be Green, Be Seen' as detailed in the Greater London Authority (GLA) London Plan (2021).

Energy Assessment Guidance (June 2022)

The new Energy Assessment Guidance aligns with the London Plan (2021) and provides further guidance on the methodology required to demonstrate compliance with the London Plan (2021). This document sets out the methodology for assessing existing buildings which are to be refurbished.

Local Authority Local Plan

The proposed development is subject to the following local plans:

- London Borough of Tower Hamlets Local Plan 2031 (2020)

Energy strategy results

New Build Results

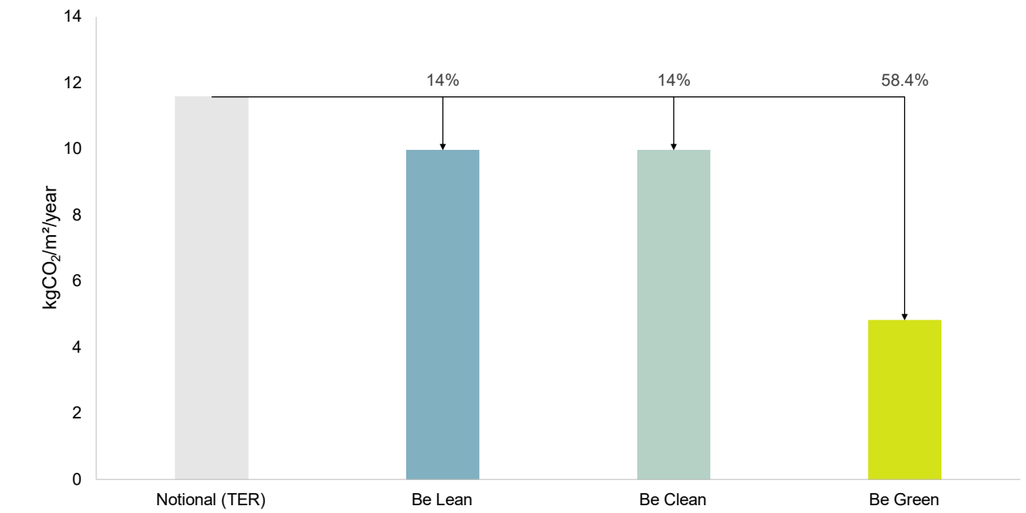

Figure 2: New Build carbon reduction summary

Non-residential Refurbishment Results

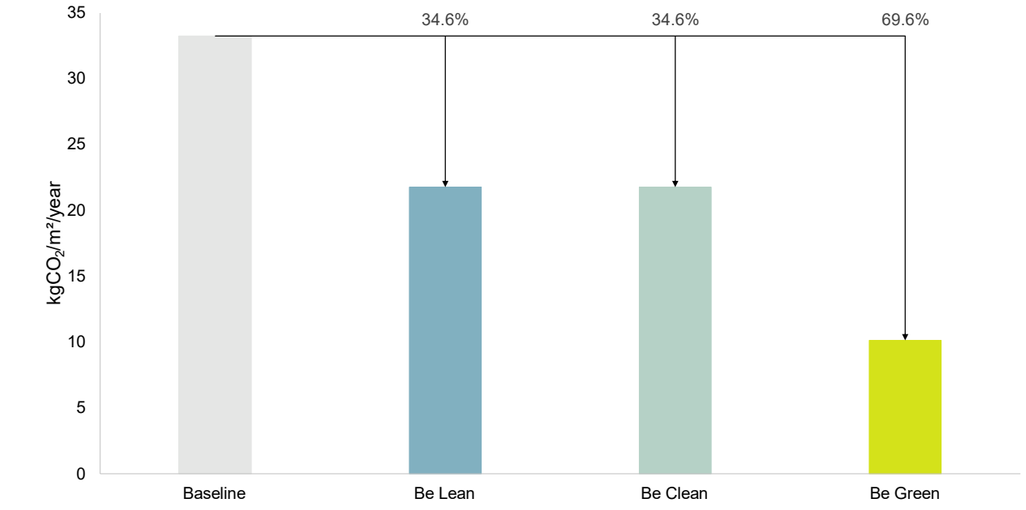

Figure 3: Non-residential refurbishment carbon reduction summary

Residential Refurbishment Results

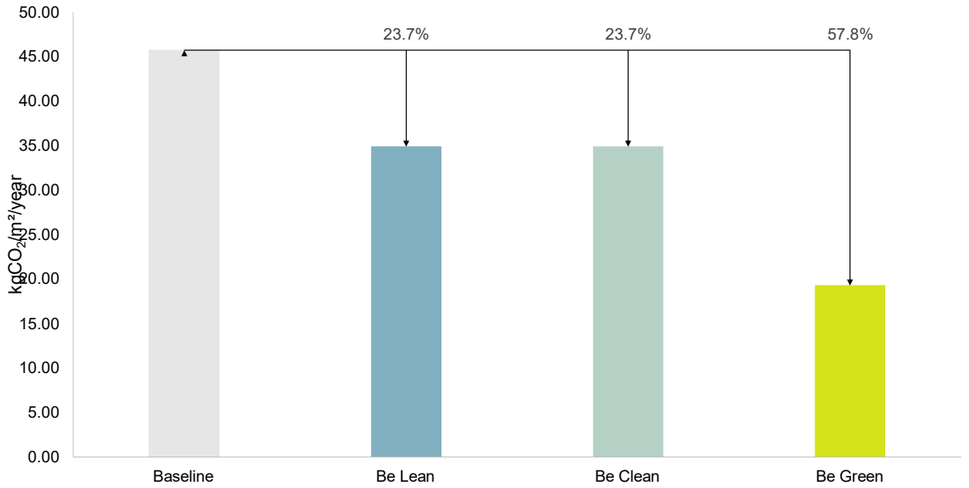

Figure 4: Residential refurbishment carbon reduction summary

Whole Refurbishment Results

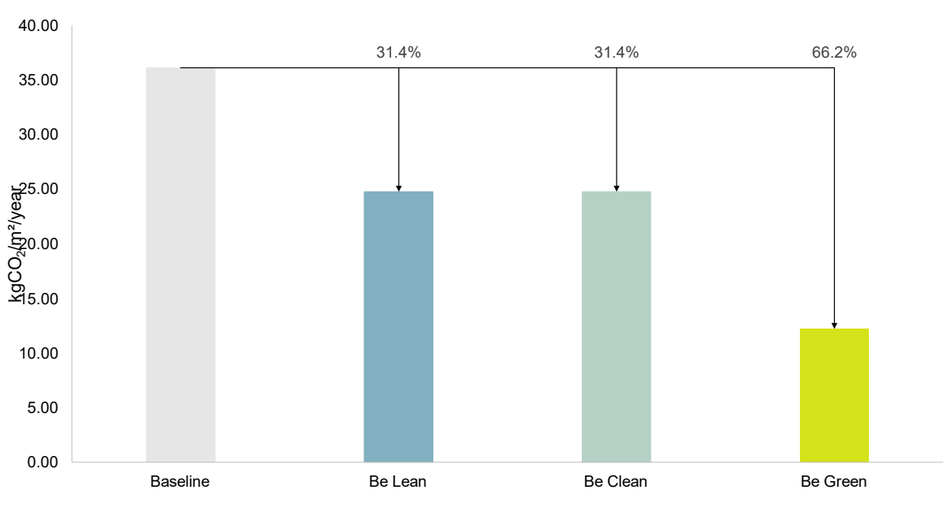

Figure 5: Whole refurbishment carbon reduction summary

Table 2: Part L Performance Summary Table

Assessment	Baseline	Be Lean/Clean		Be Green	
	tCO_2/year	tCO_2/year	% Reduction	tCO_2/year	% Reduction
New Build	3.31	2.85	14.0	1.38	58.4
Non-residential Refurbishment	18.28	11.96	34.6	5.56	69.6
Residential Refurbishment	7.56	5.77	23.7	3.19	57.8
Whole Refurbishment	25.84	17.73	31.4	8.75	66.2

Be lean summary.

New build
Target: 15% carbon reduction

14.0% reduction over baseline
Appendix A details the target fabric and system performance parameters.

Non-residential Refurbishment
Target: improvement over baseline

34.6% reduction over baseline
Appendix A details the target fabric and system performance parameters

Residential Refurbishment Target: improvement over baseline

23.7% reduction over baseline
Appendix A details the target fabric and system performance parameters

Whole Refurbishment Target: improvement over baseline

31.4% reduction over baseline
Appendix A details the target fabric and system performance parameters

Be clean summary.

New build
Target: DHN Connection

No further reduction over baseline
There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).

Non-residential Refurbishment
Target: DHN Connection

No further reduction over baseline
There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).

Residential Refurbishment
Target: DHN Connection

No further reduction over baseline
There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).

Be green summary.

New Build
Target: 35% carbon reduction

58.4% reduction over baseline
Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.
26.2m^2 solar photovoltaic array proposed at roof level

Non-residential Refurbishment
Target: improvement over baseline

69.6% reduction over baseline
Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.

Residential Refurbishment
Target: improvement over baseline

57.8% reduction over baseline
Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.

Whole Refurbishment
Target: improvement over baseline

66.2% reduction over baseline
Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.

Be seen.

Target: disclosure of the development's energy use	GLA's be seen webform will be submitted as part of the planning application. An updated "as built" be seen webform is to be submitted during RIBA Stage 6. The development will include the necessary metering, energy monitoring and data processes to facilitate the annual reporting requirements.

Carbon offset payment.

New Build Target: 100% reduction of New Build calculated emissions.	Estimated payment: £3,933
Refurbishment	N/A

New Build Areas only

Table 3: Carbon offset payment calculation

	Site-Wide Regulated Carbon Dioxide Emission Savings (tonnes CO_2/yr.) Regulated	
Baseline: Part L 2021 Building Regs	3.31	
After energy demand reduction (Be Lean)	2.85	
After heat network / CHP (Be Clean)	2.85	
After renewable energy (Be Green)	1.38	
	Site-Wide Regulated domestic carbon dioxide savings	
	(tonnes CO_2/yr.)	(%)
Savings from energy demand reduction	0.46	13.90%
Savings from heat network / CHP	0.00	0.00%
Savings from renewable energy	1.47	44.40%
Cumulative on-site savings	**1.93**	**58.4%**
Total target savings	3.30	100.0%
Shortfall	**1.40**	**41.7%**
GLA Offset Payment Rate (£/tCO_2)	£2,850	
Total Offset Payment	**£3,933**	

Total offset payment = Residual emissions x local carbon offset price x offset period

1. Introduction.

Hoare Lea has been commissioned by Bishopsgate Goodsyard Regeneration Limited, hereafter referred to as 'the Client', to undertake an Energy Strategy report to support the reserved matters planning application for Bishopsgate Goods Yard Plot 05, Sclater Street Buildings, hereafter referred to as 'the Proposed Development' which is located within Shoreditch, London.

1.1 Application site description and location.

Bishopsgate Goods Yard Plot 05, Sclater Street Buildings comprise of three heritage buildings: Mission Chapel, Victorian Building, and Weavers Cottages.

It is proposed that: Mission Chapel is repurposed to provide a café type facility; the Victorian Building is combined into a single commercial unit, with residential units above; and Weavers Cottage is to be restored, and Weavers Cottage outbuildings demolished to build a new 3-storey extension to create a coworking office space.

Table 4: Area schedule.

Building	Space Use	GIA m²
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	Total	*93*
All	**Total**	**989**

Figure 6 Proposed development. Source: Chris Dyson Architects

1.2 Approach to the strategy

This energy statement proposes recommendations regarding the approach to reducing carbon dioxide (CO_2) emissions and optimising energy efficiency within the development. This strategy summarises the pertinent regulatory and planning policies applicable to the Proposed Development, and sets targets commensurate with these policies, which the Proposed Development will seek to achieve.

The Energy Strategy has been developed using a 'fabric first' approach through the 'be lean', 'be clean', 'be green' energy hierarchy.

After 'Be green' an additional stage of the energy hierarchy has been introduced: 'Be seen' - monitor, verify and report on energy performance in-use. The 'be seen' stage endorses the disclosure of the Proposed Development's energy use with annual energy consumption being displayed on a public online platform accompanied by the predicted energy performance at the design stage.

This approach will demonstrate how developments are performing in-use and will underpin progress in reducing carbon emissions, operational running costs and will encourage the industry's route to achieving zero carbon buildings.

1.3 Definitions and limitations

Definitions:
The following definitions should be understood throughout this statement:

- Energy demand: the 'room-side' amount of energy which must be input to a space to achieve comfortable conditions. In the context of space heating, this is the amount of heat which is emitted by a radiator, or other heat delivery mechanism.
- Energy requirement: the 'system-side' requirement for energy (fuel). In the context of a space heating system using a gas boiler, this is the amount of energy combusted (e.g. gas) to generate useful heat (i.e. the energy demand).
- Regulated CO_2 emissions: the CO_2 emissions emitted as a result of the combustion of fuel, or 'consumption' of electricity from the grid, associated with regulated sources (those controlled by Part L of the Building Regulations).
- Unregulated CO_2 emissions: the CO_2 emissions emitted as a result of the combustion of fuel, or 'consumption' of electricity from the grid, associated with unregulated sources (those not controlled by Part L of the Building Regulations) e.g., server rooms, tenant IT equipment, lifts, kitchen equipment etc.

Disclaimer
The appraisals within this statement are based on Part L calculation methodology and should not be understood as a predictive assessment of likely future energy requirements or otherwise. Occupants may operate their systems differently, and / or the weather may be different from the assumptions made by Part L approved calculation methods, leading to differing energy requirements.

2. Drivers.

As a summary, the national planning policy appliable to the Proposed Development are outlined within this section.

2.1.1 Building Regulations Part L (2021).

Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO2 emissions from new buildings relating to the conservation of fuel and power in buildings.

All new buildings must now meet the requirements of Part L (2021) unless captured by the traditional arrangements associated with the ability to use older versions of the regulations. All new buildings must meet the requirements of Part L1 (Domestic – Dwellings) or Part L2 (Non-Domestic).

The Bishopsgate Goods Yard Plot 01 will be assessed in accordance with criteria set out in Part L2.

Schedule 1: Conservation of Fuel and Power.
Schedule 1 of the Building Regulations Part L (applicable to be domestic and non-domestic Building) states that reasonable provisions shall be made for the conservation of fuel and power in building by:

Limiting heat gains and losses:

- through thermal elements and other parts of the building fabric; and
- from pipes, ducts and vessels used for space heating, space cooling and hot water services.

Providing fixed building services which:

- are energy efficient;
- have effective heat controls; and
- are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances.

The Proposed Development will be assessed in accordance with criteria set out in Part L2A.

Demonstrating compliance – Part L2.
To demonstrate compliance with Part L, Volume 2, there are a number of regulations which must be met. Regulation 25 through to 26C detail the required energy performance of the new building.

Table 5: Part L2 Criteria.

Regulation 25	Minimum energy performance requirements for new buildings These requirements are in the form of a target primary energy rate and a target emission rate.
Regulation 25B	Nearly zero-energy requirements for new buildings Where a building is erected, it must be a nearly zero-energy building
Regulation 26	CO_2 Emission rates for new buildings Where a building is erected, it shall not exceed the target CO_2 emission rate (TER) for the building
Regulation 26C	Target Primary Energy rates for new buildings Where a building is erected, it must exceed the target primary energy rate (TPER) for the building

2.1.2 National Planning Policy Framework.

The updated National Planning Policy Framework (NPPF) was published in July 2021 and was updated in December 2023: it has superseded all Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) documents, with the exception of PPS10 (Waste). The NPPF sets out the Government's strategy on the delivery of sustainable building.

The NPPF places responsibility for policy making with the Local Planning Authority, who shall communicate their policies through Local Plans and facilitate the creation of Neighbourhood Plans. The NPPF states that there is a presumption in favour of sustainable building.

The following is extracted from paragraph 11 of the NPPF:

"Plans and decisions should apply a presumption in favour of sustainable Building.

For plan-making this means that:

a) plans should positively seek opportunities to meet the building needs of their area, and be sufficiently flexible to adapt to rapid change;
b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas[5] , unless:
  i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of building in the plan area; or
  ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

For decision-taking this means:

a) approving building proposals that accord with an up-to-date building plan without delay; or
b) where there are no relevant building plan policies, or the policies which are most important for determining the application are out-of-date7, granting permission unless:
  i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the building proposed 6; or
  ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."

In respect of energy policy contained within the NPPF, paragraph 155 sets out that:

"To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, that maximises the potential for suitable building, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their building; and

c) *identify opportunities for building to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers."*

2.2 Relevant Regional, Local and Site-specific Policies.

As a summary of regional, local and site-specific planning policy documents applicable to the Proposed Development have been identified and include the below listed:

- London Plan (March 2021)
- London Borough of Tower Hamlets Local Plan 2031 (Adopted 2020)

2.2.1 London Plan (adopted March 2021)

The New London Plan, published March 2021, requires major non-domestic building and rebuilding proposals to submit a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

Within this strategy, it is requested that, as a minimum, it should contain the following information where feasible:

Table 6: Summary of key policies related to energy and carbon – London Plan 2021.

Policy reference	Overview – London Plan
Policy SI 2	Minimising greenhouse gas emissions – The energy strategy should be developed to follow the following energy hierarchy: – Be Lean – Be Clean – Be Green – Be Seen – non-residential building should achieve 15% reduction through energy efficient measures (i.e. Be Lean stage); – minimum on-site reduction of carbon emissions by at least 35% beyond building regulations; – where 100% reduction cannot be demonstrated on site, shortfall should be provided as agreed with the local borough through cash in lieu contribution; – proposals stating how the site will be future-proofed to achieve net zero carbon by 2050; – major building proposals should calculate and minimise unregulated carbon emissions; – overheating modelling should be undertaken in line with CIBSE TM59 guidance; – whole life cycle carbon emissions to be reported;
Policy SI 4	Managing heat risk – Buildings should minimise adverse impacts of the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure. – Major building 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 cooling hierarchy.

Energy Assessment Guidance (June 2022)

The new Energy Assessment Guidance aligns with the London Plan (2021), and provides further guidance on the methodology required to demonstrate compliance with the London Plan (2021).

Key policy summary for non-residential developments

Development type	Energy Hierarchy Stage	Target
New Build elements of the proposed development	All Major Developments	Zero Carbon for regulated emissions against Part L 2021 Baseline (i.e. 100% reduction in carbon emissions)
	Be Green	35% reduction in regulated emissions against Part L 2021 Baseline to be met on-site with remainder to be met via offset payments.
	Be Lean	15% reduction in regulated emissions against the Part L 2021 Baseline from energy efficiency measures only (i.e. Be Lean stage reduction)
Refurbishment elements of the proposed development	All Stages	Improvement against a GLA Refurbishment Baseline, based on Energy Assessment Guidance Appendix 3, at each stage of the energy hierarchy. No specific numerical target for improvement but "…every effort should be made to improve the energy performance of the building in line with London Plan carbon targets and to follow the energy hierarchy." (6.25)

Relevant clauses from the GLA Energy Assessment Guidance (June 2022) regarding refurbishments can be found in the table below:

Clause	Description
6.15	Where an existing building or group of buildings is refurbished and the development qualifies as a major refurbishment , applicants are required to provide an energy assessment demonstrating how the individual elements of the energy hierarchy have been implemented and how reductions in regulated CO2 emissions have been achieved.
6.17	Development proposals are required to evaluate the feasibility of Combined Heat & Power (CHP) systems and where a new CHP system is appropriate, examine opportunities to extend the system beyond the Site boundary. Where future network opportunities are identified, proposals should provide a reduction in expected CO_2 emissions through the use of on-site renewable energy generation, where feasible.
6.18	Policy 5.7 requires that developments should provide a reduction in expected CO_2 emissions through the use of on-site renewable energy generation, where feasible.
6.21	Once the baseline has been established, applicants will be expected to demonstrate that they have incorporated improvement measures that maximise performance at each stage of the energy hierarchy.
6.22	The BER/DER of the refurbished building should be determined following improvements at each stage of the energy hierarchy using Building Regulations compliance software. These figures should then be used to report the CO2 savings at each stage of the energy hierarchy in the carbon emissions reporting spreadsheet and included in the energy assessment.
6.23	The performance values used to calculate the CO2 emission improvements at each stage of the energy hierarchy should also be outlined. In addition, confirmation should be provided of the source of the assumptions for the improvements in building elements or services, including specific U-value calculations for proposed build-ups, manufacturer's datasheet etc.
6.24	The developer is required to report how the proposed improvement measures compare with the notional specification for existing buildings in Appendix 4. To meet the GLA's carbon reduction target it is expected that applicants will exceed these standards. It is acknowledged that the Approved Documents allow for flexibility in meeting the recommended standards due to potential restrictions to building work upgrades, for instance listed building status or heritage projects. Therefore, any limitations in meeting these recommended standards should be stated.
6.25	It is generally acknowledged that the level of carbon savings that can be achieved through a refurbishment can vary considerably, however every effort should be made to improve the energy

Clause	Description
	performance of the building in line with London Plan carbon targets and to follow the energy hierarchy.

2.3 Local drivers – London Borough of Tower Hamlets Local Plan 2031 (2020)

This Tower Hamlets Local Plan (adopted January 2020) sets out how the Borough will manage growth and ensure shared benefits with all residents through to 2031. It identifies how many new homes, jobs and services are needed to support our growing population, and where and how they should be provided. It will also aims to influence the way that local communities interact with each other and the spaces around them.

The plan provides a series of policies to ensure Building is well-designed, accessible, safe and respects and enhances the environment, and can be delivered alongside new infrastructure and local services.

The key targets associated with sustainability as set out in Tower Hamlets Local Plan are as follows: D.ES7: A zero carbon borough, S.TR1: Sustainable travel, D.SG3: Health impact assessments, D.ES2: Air quality, D.ES9: Noise and vibration, D.ES10: Overheating, S.ES1: Protecting and enhancing environment, D.ES3 Urban greening and biodiversity, D.ES4: Flood risk, D.ES5: Sustainable drainage, D.ES6: Sustainable water and wastewater management, D.DH2: Attractive streets, spaces and public realm, D.OWS3: Open space and green grid networks.

With particular relevance to the study undertaken within this report Policy D.ES7 *A zero carbon borough* states that;

Policy D.ES7

1. Improvement on the 2013 building regulations: Zero carbon (to be achieved through a minimum 45% reduction in regulated carbon dioxide emissions on-site and the remaining regulated carbon dioxide emissions to 100% - to be offset through a cash in lieu contribution). This is for both residential and non-residential Building.
2. Building is required to maximise energy efficiency based on the following standards:
    a. All new non-residential Building over 500 square metres floorspace (gross) are expected to meet or exceed BREEAM 'excellent' rating.
    b. All major non-residential refurbishment of existing buildings and conversions over 500 square metres floorspace (gross) must meet at least BREEAM non-domestic refurbishment 'excellent' rating.
    c. As a minimum, all self-contained residential proposals will be strongly encouraged to meet the Home Quality Mark.
3. Major residential and major non-residential Building will be required to submit an energy assessment. Minor non-residential Building will be strongly encouraged to prepare an assessment.
4. The energy assessment should demonstrate how the building has been designed in accordance with the energy hierarchy and how it will:
    a. maximise energy efficiency as per the requirements set out in Part 2
    b. outline the feasibility of low nitrogen dioxide decentralised energy, and
    c. seek to provide up to 20% reduction of carbon dioxide emissions through on-site renewable energy generation.
5. The sustainable retrofitting of existing building with provisions for the reduction of carbon emissions will be supported.

2.4 Condition 44 – Energy strategy for Reserved Matters

Each Reserved Matters submission shall be accompanied by an energy addendum which details how it accords with the site-wide Energy Strategy (including with regard to overheating) and demonstrates how the relevant phase / building meets the relevant carbon emission reductions targets. This should also address the policy requirements in place at the time of the reserved matters application. Any addendum shall also demonstrate that:

Responses to the below Condition 44 has been outlined below

1. *The energy efficiency targets (Be Lean) have been achieved.*

Section 5 shows that the new build Be Lean saving are currently expected to be 14.0% which falls short of this target. The buildings fabric target U-Values match or better the notional buildings 2021 U-values.

The Proposed Development will be supplied with high efficiency lighting installations representing best practise. Full lighting control systems including daylight linkage and presence detection will also be incorporated into the design. Lighting efficiencies will improve on those of the notional building.

The table below details where the actual design has bettered the values of the notional building at Be Green stage (highlighted in green).

Building Services	Plot 05	Notional Building
DHN Carbon Conversion Factor	0.094 $kgCO_2/kWh$	0.23 $kgCO_2/kWh$
DHN Primary Energy Factor	1.042 kWh_{PE}/kWh	1.05 kWh_{PE}/kWh
System Specific Fan Power (SFP)	1.6 W/l/s	1.8 W/l/s
Fan Coil Unit SFP	0.20 W/l/s	0.3 W/l/s
Heat Recovery	85%	76%
Offices	1.25 $W/m^2/100lux$	95 lm/W
WC/Circulation/Store Lighting	110 lm/W	95 lm/W
Lighting Controls	Daylight dimming to perimeter office and core office areas with auto-on dimmed. Auto-on off to WCs/circulation, manual to plant rooms	Daylight dimming to perimeter areas. Man-on-off to toilets and Plant spaces, manual controls elsewhere.

2. *The proposed heating strategy for Reserved Matters applications:*

See section 7 for response to this.

3. *The optimal solution in the context of the wider site, considering network flow and return temperatures and connections to earlier and later phases*

See Be Clean and Be Green section for response to this.

4. *Will facilitate the creation of the masterplan site heat network*

See Be Clean and Be Green section for response to this.

5. *Will facilitate the future connection to wider heat networks*

See Be Clean and Be Green section for response to this.

6. *Will facilitate heat sharing where possible*

See Be Clean and Be Green section for response to this.

7. *Solar PV provision has been maximised.*

See Be Green section and Appendix D for further information on this. Solar PV has been maximized as far as possible at this stage, within having a heritage impact.

8. *Where the energy addendum demonstrates that the relevant phase will not comply with the energy reductions targets specified, a carbon offset payment shall be required*

The proposed development will be Net Zero Carbon in line with the London Plan. New build emissions not mitigated through the Be Lean, Be Clean, Be Green process will be offset through a carbon offset payment to the Local Boroughs of Tower Hamlets and Hackney.

The new build design with the energy efficiency measures applied is achieving a reduction of 58.4% against Part L 2021 and the 2022 London Plan Guidance.

The savings have been maximized as far as possible noting that The GLA's guidance on the London Plan states that non-domestic buildings may struggle to achieve this target at first but should maximise on site savings, which this project is demonstrating.

An offset payment of £3,933 will be required to be paid to satisfy the requirements of Condition 42 and to achieve net zero.

3. Assessment Methodology

The following is a summary of the data used and inputs / assumption made for simulation geometry modelling.

3.1 Site Context

The site, highlighted below, is located in Shoreditch and is situated between the A10, A1209 and the Rail line.

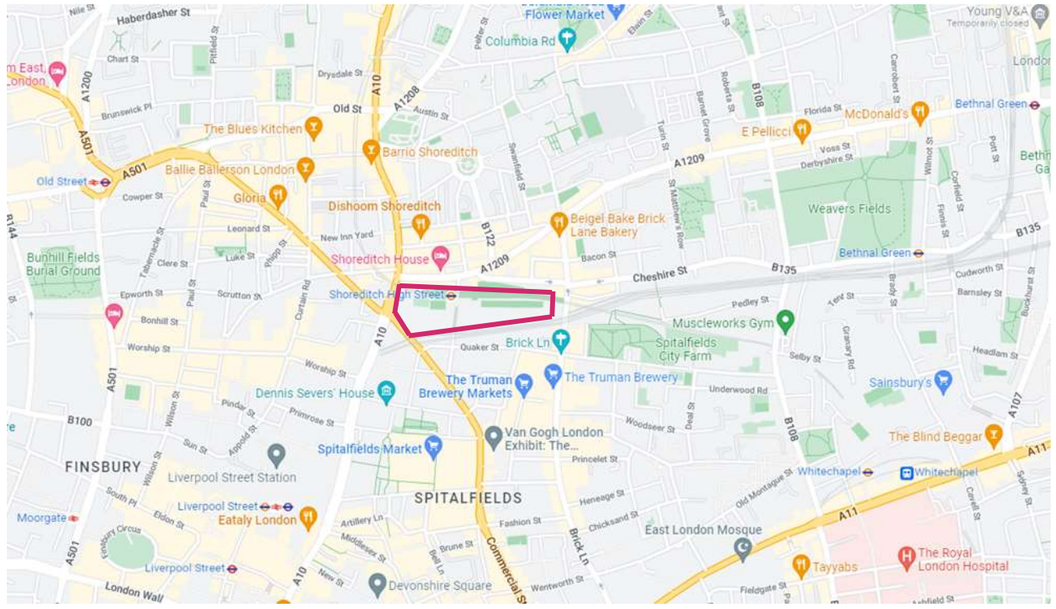


Figure 7: Location of the Bishopsgate Goods Yard Plot 05, Scatler Street development with respect to the surrounding area.

Surrounding existing and Proposed Developments which will impact the Proposed Development have been incorporated into the model in order to more accurately model the local environment in which the building will sit.

3.2 Site location and weather data.

A building's thermal performance is its response to external environmental conditions. The more dependant a building is on passive features to achieve acceptable internal comfort, the more important the use of external weather information becomes.

Climate data is assigned to the virtual environment of the dynamic model to simulate external weather conditions that are likely to occur. Thermal comfort calculations require the simulation to be tested against CIBSE Design Summer Year (DSY) climate data in order to best assess how spaces will perform during a year with hot summer conditions.

The UK Meteorological Office (MO) collects weather data at stations across the UK. Climate variables measured at hourly intervals include air temperatures, wind speed and direction and air pressure amongst various other characteristics.

CIBSE licenses the historic weather data from the MO for 14 locations in the United Kingdom: Belfast, Birmingham, Cardiff, Edinburgh, Glasgow, Leeds, London (3 sites), Manchester, Newcastle, Norwich, Nottingham, Plymouth, Southampton and Swindon.

The weather variables are synthesised into 2 types of CIBSE weather file:

- Design Summer Year (DSY)
  The DSY is a single continuous year rather than a composite one made up from average months.
  The DSY is used for overheating analysis.

- Test Reference Year (TRY)
  The TRY is composed of 12 separate months of data each chosen to be the most average month from the collected data.
  The TRY is used for operational energy analysis and for compliance with the UK Building Regulations (Part L).

Following the standardised methodology behind the Part L requirements, the closest CIBSE weather file location for the proposed development is the London TRY (2016) and has been utilised for the purposes of these calculations.

3.3 Architectural drawings.

The geometry used to assess the proposed development and the subsequent energy model was determined by the following information received from Chris Dyson Architects.

Table 7: Architectural Information.

Drawing Type	Format	Document Package	Date Received
Plans	.dwg	A_P5_1000 A_P5_1000_B1 A_P5_1001 A_P5_1002 A_P5_1003 A_P5_1004	02/02/2024
Elevations	.dwg	A_P5_1100_Street A_P5_1101_West_Chapel A_P5_1101_West_VB A_P5_1102_Rear A_P5_1103_East_Chapel A_P5_1103_East_Cottages	02/02/2024
Sections	.dwg	A_P5_1200 A_P5_1201 A_P5_1202 A_P5_1204	02/02/2024

Dynamic Simulation Model.
Based on the architectural and building services information, Dynamic Simulation Models were created to undertake appropriate assessments on the proposed design.

Integrated Environmental Solutions Virtual Environment (IESVE 2022.2.0.0) is an approved Dynamic Simulations Modelling (DSM) software package that has the capabilities of enabling the user to create a virtual representation of a building.

Models built in the IESVE have been used to consider compliance with Approved Document Part L2 2021 using the National Calculation Methodology alongside the assessment of operational energy consumption.

A visualisation of the model including adjacent buildings (used for solar modelling) is shown below:

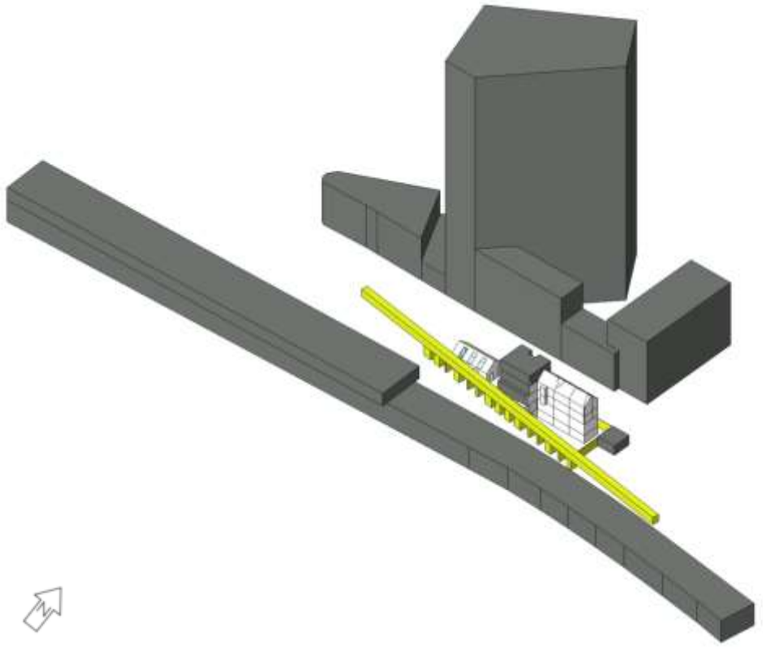


Figure 8: IESVE Model of 75 London Wall.

Elmhurst Energy Model.
Based on the information above, assessments were undertaken on the proposed design of the residential areas.

Elmhurst Energy provides Design SAP Calculation Software compliant with each iteration of Part L of the Building Regulations using the National Calculation Methodology. Design SAP10 and the associated technical procedures have been used for undertaking the assessment of the refurbished residential areas.

Energy assessment approach – Non-domestic refurbishment and new build
Energy assessment of the Proposed Development has been undertaken in line with the GLA's Energy Assessment Guidance (June 2022). This guidance outlines a variable assessment approach for new build and major refurbishments which is summarised in Table 8.

The Proposed Development consists of both renovation and newly built elements, therefore both methodologies have been undertaken, and results presented separately in this report in line with GLA guidance. The energy model has been divided into refurbished areas and new build areas as demonstrated in Figure 9.

Table 8: GLA energy assessment methodology

Development type	Energy Hierarchy Stage	Target
New Build elements of the proposed development	All Major Developments	Zero Carbon for regulated emissions against Part L 2021 Baseline (i.e. 100% reduction in carbon emissions)
	Be Green	35% reduction in regulated emissions against Part L 2021 Baseline to be met on-site with remainder to be met via car payments.

Development type	Energy Hierarchy Stage	Target
GLA's Energy Assessment Guidance (June 2022) Section 6.1 – 6.14 & Section 7)	Be Lean	15% reduction in regulated emissions against the Part L 2021 Baseline from energy efficiency measures only (i.e. Be Lean stage reduction)
Refurbishment elements of the proposed development *GLA's Energy Assessment Guidance (June 2022) Section 6.15 – 6.25*	All Stages	Improvement against a GLA Refurbishment Baseline, based on Energy Assessment Guidance Appendix 3, at each stage of the energy hierarchy. No specific numerical target for improvement but "…every effort should be made to improve the energy performance of the building in line with London Plan carbon targets and to follow the energy hierarchy." (6.25)

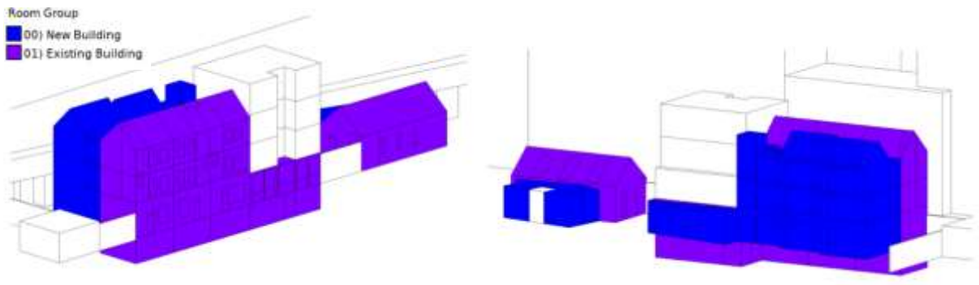


Figure 9: Graphical representation of the development showing elements being refurbished (purple) and elements being assessed as new build (blue), and adjacent buildings (white). SE view (left), and NE view (right)

To assess the development in line with GLA Energy Assessment Guidance (June 2022) Sections 6 & 7 requirements the modelling runs outlined in the table below have been carried out, and their results presented throughout this report.

Table 9: Models Assessed

Energy Hierarchy Stage	New Build	Refurbishment
Baseline	Part L 2021 Baseline	GLA Energy Assessment Guidance June 2022 Appendix 3 Baseline
Be Lean	Fabric upgrades, notional heating + hot water efficiencies	Fabric upgrades, baseline heating + hot water efficiencies
Be Clean	Proposed New Build, including any CHP or Heat Network connection (not applicable for this development)	Proposed Refurbishment, including any CHP or Heat Network connection (not applicable for this development)
Be Green	Proposed New Build, including proposed heating + hot water efficiencies for connection to ASHP led DHN and PV	Proposed Refurbishment, including proposed heating + hot water efficiencies for connection to ASHP led DHN and PV

Energy assessment approach – Residential.
Energy assessment of the Proposed Development has been undertaken in line with the GLA's Energy Assessment Guidance (June 2022). The guidance outlines the assessment approach for major refurbishments, as outlined in Table 10 below:

Table 10: GLA energy assessment methodology

Development type	Energy Hierarchy Stage	Target
Refurbishment elements of the proposed development *GLA's Energy Assessment Guidance (June 2022) Section 6.15 – 6.25*	All Stages	Improvement against a GLA Refurbishment Baseline, based on Energy Assessment Guidance Appendix 3, at each stage of the energy hierarchy. No specific numerical target for improvement but "…every effort should be made to improve the energy performance of the building in line with London Plan carbon targets and to follow the energy hierarchy." (6.25)

To assess the development in line with GLA Energy Assessment Guidance (June 2022) Sections 6 & 7 requirements the modelling runs outlined in the table below have been carried out, and their results presented throughout this report.

Table 11: Models Assessed

Energy Hierarchy Stage	Residential
Baseline	GLA Energy Assessment Guidance June 2022 Appendix 3 Baseline
Be Lean	Fabric upgrades, baseline heating + hot water strategy
Be Clean	Proposed Refurbishment, including any CHP or Heat Network connection (not applicable for this development)
Be Green	Proposed Refurbishment, including proposed heating + hot water efficiencies for connection to ASHP led DHN and PV

4. Cooling and overheating.

In tandem with the energy and CO_2 emissions appraisal, an assessment has been undertaken to determine the risk of summertime overheating, and subsequently consider measures for the minimisation of cooling demand and mitigating risk of overheating.

4.1 Cooling hierarchy.

The London Plan Policy 5.9 (Overheating and Cooling) requests that developments should reduce potential overheating risk and reliance on air conditioning systems. A 'cooling hierarchy' is provided and the Proposed Development has sought to follow this hierarchy.

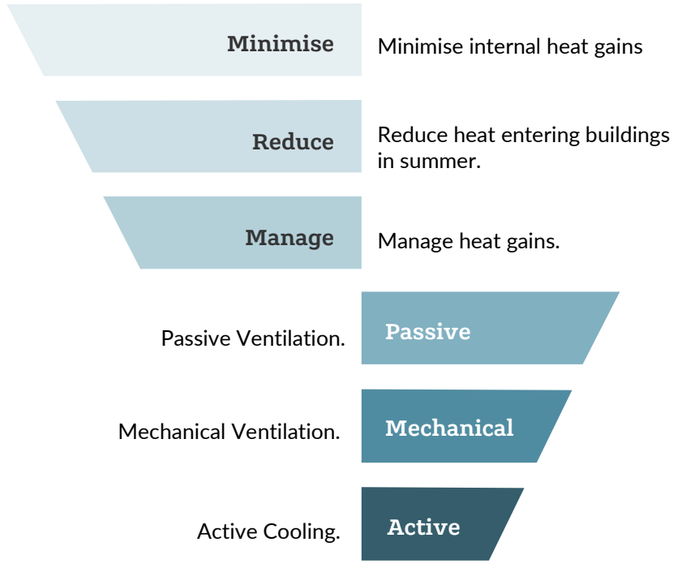


Figure 10: Cooling hierarchy.

4.2 Cooling demand reduction.

The table below compares the cooling energy demand of the New Build building against a notional building built to Part L2A parameters.

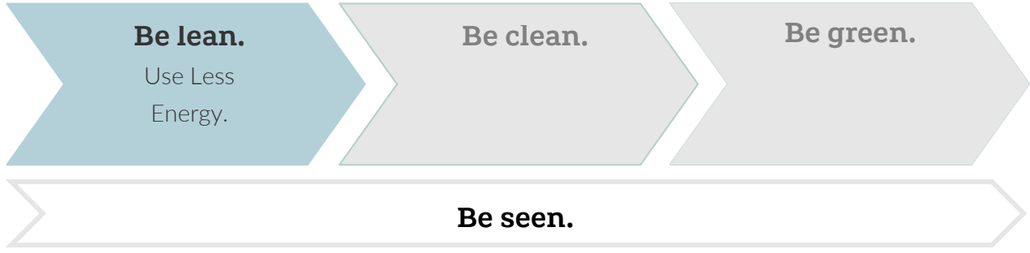
Table 12: Cooling Demand Reduction.

Space Use	Notional building	Actual building	Notional > Actual
Cooling demand (MJ/m^2)	4.21	6.65	No

As described in Section 5, a high percentage of glazing to wall area, along with low glazing g-value results in high solar gain which subsequently results in an increased cooling demand. To reduce this demand, the glazing to wall ratio can be reduced or the g-value can be increased; however, neither of these are suitable for the proposal due to the commercial nature of the proposed extended spaces.

5. Be lean.

Passive design and energy efficiency measures form the basis for the reduction in overall energy demand and carbon emissions for the proposed development. This energy strategy aims reduce the energy demand initially by optimising the envelope and building services within the proposed development.



5.1 Passive design and energy efficiency features.

Passive design measures are those which reduce the demand for energy within buildings, without consuming energy in the process.

These are the most robust and effective measures for reducing CO_2 emissions as the performance of the solutions, such as wall insulation, is unlikely to deteriorate significantly with time, or be subject to change by future property owners. In this sense, it is possible to have confidence that the benefits these measures will continue at a similar level for the duration of their installation.

Table 13: Proposed fabric performance

Building element	Refurbishment Assumptions	New Build Elemental Values
Air permeability (m^3/h.m^2 at (50Pa))	25.00###	3.00
External wall U-value (W/m^2.K)	0.70*	0.13
Windows (W/m^2.K)	1.20#	1.20
Roof U-value (W/m^2K)	0.18## (Mission Hall) 0.35* (Victorian Building and Weavers Cottage)	0.11
Exposed floor U-value (W/m^2K)	0.70*	0.15
Door U-value (W/m^2K)	1.60#	1.60
Glazing performance		
Vision Glazing g-value	0.40#	0.40
Light Transmittance	71%	71%

*Existing fabric assumed to meet threshold values of Part L2 Table 4.2.

#New glazing, rooflights and doors on The Mission Hall, Victorian Building and Weavers cottages.

##New roof on The Mission Hall only

###Set as per the Non-Domestic EPC Conventions for England & Wales Issue 8 for buildings built pre-1995, repairs outlined in architectural proposals supersede evidence of high air permeability.

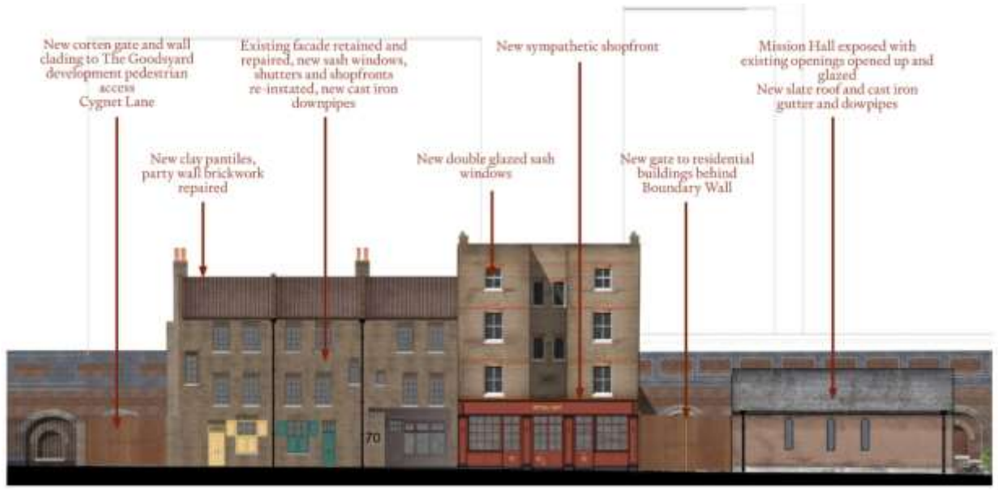


Figure 11: Proposed upgrades

Table 14: Proposed system parameters

System parameters	
Water and Space Heating	**Carbon Conversion Factor:** 0.094kgCO2/kWh **Primary Energy Factor:** 1.042kWh/kWh **System 01 -** Radiators (Circulation and Stairs) **System 02 -** Radiators (WC, Changing) **System 03 -** Fan Coil Unit (Office, Café)
Ventilation	**System 01** Natural Vent (Circulation and Stairs) **System 02** MVHR (WC, Changing) Heat recovery efficiency: 80% Specific fan power: 1.8 W/(l/s) **System 03** MVHR (Office, Café) Heat recovery efficiency: 80% Terminal unit specific fan power: 0.25 W/(l/s)
Lighting	**All low energy LED lighting** **Office Installed Power Density: 1.25 W/m²/100lux** **All other spaces lighting efficacy (including reception display lighting) 100 lm/W** Lighting Controls: - Circulation Areas: AUTO-ON-OFF - Office: AUTO-ON-DIMMED - WC / Changing: AUTO-ON-OFF

Be lean summary.

New build
Target: 15% carbon reduction
14.0% reduction over baseline
Appendix A details the target fabric and system performance parameters.

Non-residential Refurbishment
Target: improvement over baseline
34.6% reduction over baseline
Appendix A details the target fabric and system performance parameters

Residential Refurbishment
Target: improvement over baseline
23.7% reduction over baseline
Appendix A details the target fabric and system performance parameters

Whole Refurbishment
Target: improvement over baseline
31.4% reduction over baseline
Appendix A details the target fabric and system performance parameters

As described in the table below, most elements of the proposed New Build improve upon those in the notional building.

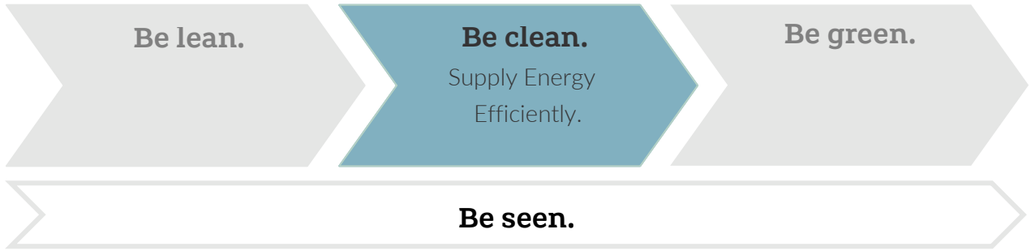
Table 15 Notional values comparison

Parameter		Notional	Actual
Air permeability at 50 pa ($m^3/(h.m^2)$)		3	3
U-value ($W/m^2.K$)	*Floor*	0.15	0.11
	External Wall	0.18	0.13
	Roof	0.15	0.11
	Door	1.9	1.4
	External Glazing /	1.4	1.2 / 1.2
G value		0.29	0.4 / 0/4
Glazing to External Wall Percentage		40%	37%
Space heating	*Carbon Conversio*	0.23	0.23
	Primary Energy Fa	1.05	1.05
Lighting	*Luminaire*	95	110
	Occupancy contro	Yes	Yes
	Daylight control	Yes	Yes
	Constant illuminar	No	No
Central Ventilation SFP (w/(l/s))		1.8	1.6
Terminal unit SFP (w/(l/s))		0.3	0.2
Cooling		SEER = 4.4 (2.7)	SEER = 5 (5)
Heat recovery		76%	85%
Variable Speed Bumps (multiple sensors)		Yes	Yes
Variable speed fans (CO2 sensors)		Yes	Yes

However, the glazing to external wall percentage is high and coupled with a g-value higher than the notional results in comparatively higher solar gains. Consequently, the New Build will experience higher cooling loads requiring greater amounts of auxiliary energy than the notional building. In order for these non-domestic spaces to meet the various functional requirements of the development, the proposal must maintain glazing as specified. Nonetheless, Be Lean reductions have been achieved.

6. Be clean.

This stage of the energy hierarchy includes consideration of connection to available district heat networks, or the use of on-site heat networks and decentralised energy production such as Combined Heat and Power (CHP) in order to provide energy and reducing consumption from the national grid and gas networks, through the generation of electricity, heating and cooling on-site.



6.1 District/decentralised heat network.

The majority of central London is identified as a Heat Network Priority Area, i.e. area where heat density is sufficient for heat networks to provide a competitive solution for supplying heat to buildings and consumers. It is shown in the London Heat Map that the Proposed Development is located within an area which could provide a suitable future connection (http://www.londonheatmap.org.uk).

However, development of the Shoreditch South Proposed Network is possibly too early stage to be considered for this development currently. Discussions with the local council are ongoing (Appendix B).

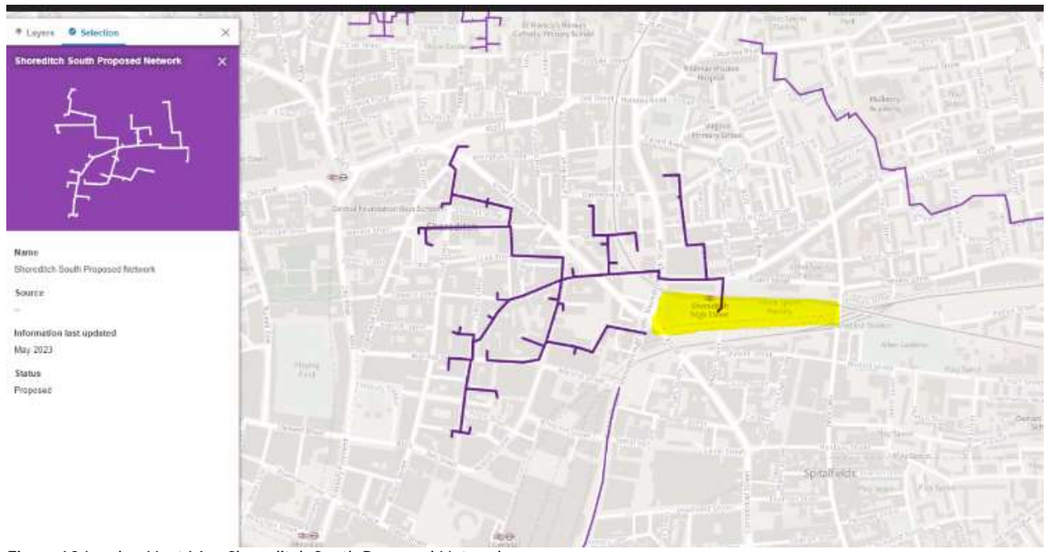


Figure 12 London Heat Map Shoreditch South Proposed Network

In exploring other current opportunities, there are numerous factors that limit the opportunity to connect to a DHN, specifically:

- No DHN existent in feasible proximity to the Bishopsgate Goods Yard Plot 01 site.
- There are two proposed networks (LB Tower Hamlets and Proposed City 2 heat networks), however these are deemed not to be in close enough proximity to the Bishopsgate Goods Yard Plot 01 site.
- No programme for Building of the heat network in close proximity.
- Major infrastructure obstacles between future proposed network and building location, including railway.
- Gas led heat network would have higher carbon intensity than grid electricity and no route to future decarbonisation currently.
- Combustion based heat network would be a detriment local air quality.

This being said, the Proposed Development looks to take advantage of a site-wide community heat network. The loop will connect all plots on the Bishopsgate Goods Yard site, allowing energy to be shared across the building, reducing the primary energy needed to meet the site-wide heating and cooling demands at any given time. This will be discussed further in the Be Green section of the report.

6.2 Combined heat and power (CHP).

Changes to the carbon factor of grid electricity have meant that previously favoured systems such as Combined Heat and Power (CHP) are becoming much less carbon efficient. In fact, CHP systems are now expected to lead to greater carbon emissions than conventional gas-fired boilers due to their lower thermal efficiency.

Due to the decarbonisation of the electricity grid, schemes using CHP engines for the delivery of thermal energy will lead to a net increase carbon emissions (over the gas boiler baseline and certainly when compared to electrically fuelled heat pump systems). Based on indicative calculations on other schemes, if a CHP were to be utilised for the Proposed Development, a regulated CO_2 emission increase of ~10% over the Be Lean stage would be demonstrated and it is for this reason that CHP, or connections to a DHN fed by CHP, are not proposed.

Furthermore, CHP engines are an on-site source of particulate pollutants which will adversely affect local air quality. In light of grid decarbonisation and increased focus on air quality in the London Plan, CHP is therefore not proposed.

Be clean summary.

New build Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).
Non-residential Refurbishment Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).
Residential Refurbishment Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).

7. Be green.

The final step of the energy hierarchy explores the feasibility of Low and Zero Carbon (LZC) technologies to allow for the production of renewable energy onsite in order to deliver further reduction in carbon emissions.

7.1 Low and zero carbon (LZC) technology assessment.

Renewable or zero carbon technologies harness energy from the environment and convert this to a useful form. Many renewable technologies are available, however, not all of these are commercially viable or suitable for city centre locations.

Discounted Technologies

Ground source heat pumps
Ground Source systems would require extensive below ground works to bury and install the system on site. Given the existing building present at the site, which will be retained, Ground Source Heat Pumps are not considered a feasible option and are not proposed.

Solar thermal
Where applicable, the Proposed Development's is connected to the community heat network for domestic hot water generation; furthermore, roof space is prioritised for solar PVs to generate electrical output. Therefore, solar thermal technology is not proposed for this development.

Proposed Technologies

Photovoltaics
Solar irradiance analysis on the site has shown a good opportunity for the deployment of solar Photovoltaic technologies for onsite electricity generation.

Table 16: Solar PV specification

	Rooftop PV system
Panel Area	26.2 m^2 (circa 4panels)
Orientation	180°
Inclination	30°
Module Efficiency	19.2%
Array size	1.52kWp
Predicted Annual output	4.10MWh
Layout drawing	See Appendix C

Air source heat pumps
Due to grid decarbonisation and the updated carbon factors, it is expected that ASHP technology will offer significant carbon emission reductions over the baseline scenario. ASHP can be connected to a local ambient temperature community heat network which is then integrated to deliver space heating and hot water systems (albeit potentially with some degree of ancillary top-up heating to raise water temperatures). Implementing heat-pump technology brings the additional benefit of a shift towards combustion-free building, with the associated benefit to local air quality.

This approach is expected to result in significant regulated CO_2 emission reductions beyond the Building Regulations Part L (2021) 'baseline'.

Table 17: Target air source heat pump specification (district heating led)

	Air source heat pump
District Heating	Carbon Conversion Factor: 0.094kgCO_2/kWh Primary Energy Factor: 1.042 kWh/kWh
SCOP (heat network)	1.8

Full simulation inputs depicting the Proposed Development at the Be Green stage are provided in Appendix A.

Thermal Energy Generation.
The Proposed Development looks to take advantage of a site-wide ambient loop. The loop will connect all plots on site, allowing energy to be shared across the buildings, reducing the primary energy needed to meet the site-wide heating / cooling demand at any given time.

The proposed low carbon community network is a 5th generation ambient temperature loop. It is proposed to be served by air source heat pump technology.

The benefit of an ambient loop on a large scheme such as Bishopsgate Goods Yard is that Plot 05 will have a varying demand profile to other plots on the site. This allows the Sclater Street buildings to inject heat into the loop during the day whilst operating in cooling mode. In this scenario, the ASHP connected to the ambient loop would operate at a much-reduced load to stabilise the temperature in the loop, effectively acting as a top-up, as the energy within the loop is predominantly provided from the balance of demand across the building, providing "free" energy.

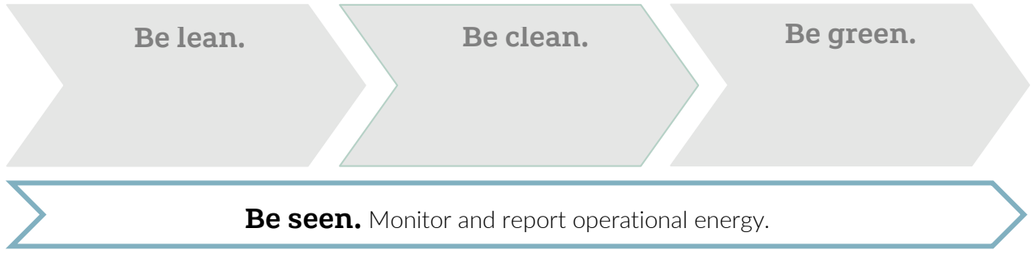
Being such a dynamic and complex system with varying demands and temperatures, it is very difficult to calculate the benefit that this "free" exchange of energy has on the overall system efficiency. Additionally, approved Part L calculation software (used to undertake the calculations in this report) do not include input options to demonstrate the benefits of an ambient loop. However, it should be noted that we envisage the actual on-site energy loop to operate at a much-improved overall efficiency to the figures stated within the software inputs section of this report, which will bring further benefits to the "Be Clean" energy strategy approach to those tabled herein.

Bishopsgate Goods Yard Plot 05 will be connected to the ambient temperature loop via plate heat exchanger. Energy delivered to the building will be used in support of space heating, space cooling, and hot water generation.

Be green summary.

New Build Target: 35% carbon reduction	58.4% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network. 26.2m^2 solar photovoltaic array proposed at roof level.
Non-residential Refurbishment Target: improvement over baseline	69.6% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.
Residential Refurbishment Target: improvement over baseline	57.8% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.
Whole Refurbishment Target: improvement over baseline	66.2% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.

8. Be seen.



8.1 Monitoring and Reporting.

Effective energy metering will be enabled by the provision of suitable infrastructure within the building's services systems.

Sustainability Monitoring and Reporting

The Applicant is committed to reporting sustainability performance, methodology and data every year in a transparent way, following the GRI guidelines. An annual Sustainability Report is published which contains agglomerated data concerning the Energy, Water, Waste and Greenhouse Gases reports of their portfolio.

Development Monitoring and Reporting Plan

The Proposed Development would therefore fall under the Applicant's corporate sustainability monitoring and reporting regime. The developed strategy will allow for an exhaustive metering of all the various energy usage in the facility. This will enable Energy Intensity and Carbon Emissions to be monitored, and the data included within the Annual Sustainability Reports.

Electrical meters will be provided on the main central Air Source Heat Pump(s), providing data on plant energy consumption throughout the year.

Each area of high energy load will be sub-metered in order to monitor energy consumption in greater granularity and facilitate reporting. All the main sub-systems (i.e. small power, lighting etc) will be separately monitored and their energy usage separately accounted. Energy intensity and carbon emissions will be monitored and reported annually.

8.2 Operational cost.

Operational costs for end users are an important consideration when appraising Energy Strategy options. Focussing solely on carbon emissions can lead to unintended consequences in the form of higher-than-expected occupant energy bills if capital and operational expenditure of the energy systems and networks are passed on to end users.

The Proposed Development is anticipated to achieve up to 14.0% reduction in CO_2 emissions for the new build elements and 34.6% for the refurbished elements prior to the consideration of any Low or Zero Carbon (LZC) technologies, i.e. via passive design and energy efficiency measures. The savings achieved through the Be Lean stage demonstrate an energy demand reduction that will result in savings for future occupants.

The savings achieved through the be lean stage demonstrate an energy demand reduction that will result in savings for future occupants.

Additionally, the following measures have been implemented or followed to protect occupants from rising energy costs:

- Followed quality standards to ensure optimum design such as CIBSE Code of Practice
- Inclusion of solar PV to reduce dependence in grid electricity.

The be seen spreadsheet will be updated at each stage of the design, construction and operation in line with GLA guidance.

Unregulated Energy

Unregulated energy includes small power electricity use (computers, plug in devices, washing machines, refrigeration) and catering energy consumption.

It is anticipated that the proportion of unregulated energy would gain in significance when compared to regulated energy as each revision of Building Regulations Part L comes into force and regulated energy is reduced.

It is therefore foreseeable that energy efficiency and the rising cost of energy would play an increasing role when future building users are deciding which appliances to purchase and the frequency of their use. However, it is not possible at present to quantify the extent of this potential reduction.

Given the uncertainty, measures to educate the future building users on how they can reduce their equipment energy use would be encouraged. This can be provided in the form of building user guides fit-out guides. The guidance measures detailed within these types of documents would consider:

- Use of A / A+ rated white goods
- Energy star rated computers and flat screen monitors, and voltage optimization and power factor correction.

Figure 13 Regulated Energy and Unregulated Emissions Summary.

Be seen summary.

Target: disclosure of the development's energy use	The Proposed Development will incorporate effective building monitoring systems to allow energy performance review during operation. This data will be used to report on annual emissions of the Proposed Development throughout its lifetime.

9. Summary.

This strategy has shown that the Proposed Development will result in a highly efficient, low-carbon scheme.

New, high efficiency servicing equipment and efficient façades will minimise the energy usage of the building. Using the Mayor's energy hierarchy, the strategy has been developed to ensure that the Proposed development are efficient and economical.

This strategy has been prepared to demonstrate that at the planning stage, the Applicant and design team have given due consideration to the principles of energy and sustainability, and how these could be implemented for the Proposed Development.

The carbon emissions from regulated energy uses at the proposed development have been compared with the GLA London Plan emissions targets.

9.1 The energy strategy.

The strategy has been developed using the 'be lean, clean and green' energy hierarchy which utilises a fabric first approach to maximise reduction in energy through passive design measures.

Be lean summary.

New build Target: 15% carbon reduction	14.0% reduction over baseline Appendix A details the target fabric and system performance parameters.
Non-residential Refurbishment Target: improvement over baseline	34.6% reduction over baseline Appendix A details the target fabric and system performance parameters
Residential Refurbishment Target: improvement over baseline	23.7% reduction over baseline Appendix A details the target fabric and system performance parameters
Whole Refurbishment Target: improvement over baseline	31.4% reduction over baseline Appendix A details the target fabric and system performance parameters

Be clean summary.

New build Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).
Non-residential Refurbishment Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).
Residential Refurbishment Target: DHN Connection	No further reduction over baseline There are no existing district energy networks within feasible vicinity of the site that would enable a connection to the Proposed Development. However, a nearby network is in development. Discussions with the local council regarding this network are ongoing (Appendix B).

Be green summary.

New Build Target: 35% carbon reduction	58.4% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network. 26.2m^2 solar photovoltaic array proposed at roof level.
Non-residential Refurbishment Target: improvement over baseline	69.6% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.
Residential Refurbishment Target: improvement over baseline	57.8% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.
Whole Refurbishment Target: improvement over baseline	66.2% reduction over baseline Air source heat pumps will provide space heating, cooling, and hot water via a district heat network.

Be seen.

Target: disclosure of the development's energy use	The Proposed Development will incorporate effective building monitoring systems to allow energy performance review during operation. This data will be used to report on annual emissions of the Proposed Development throughout its lifetime

Carbon offset payment.

New Build Target: 100% reduction of New Build calculated emissions.	Estimated payment: £3,933
Refurbishment	N/A

9.2 Overall carbon dioxide emissions reduction

New Build

	Site-Wide Regulated Carbon Dioxide Emission Savings (tonnes CO_2/yr.) Regulated	
Baseline: Part L 2021 Building Regs	3.31	
After energy demand reduction (Be Lean)	2.85	
After heat network / CHP (Be Clean)	2.85	
After renewable energy (Be Green)	1.38	
	Site-Wide Regulated domestic carbon dioxide savings	
	(tonnes CO_2/yr.)	(%)
Savings from energy demand reduction	0.46	13.9%
Savings from heat network / CHP	0	0.0%
Savings from renewable energy	1.47	44.4%
Cumulative on-site savings	**1.93**	**58.3%**
Total target savings	3.3	100.0%
Shortfall	**1.4**	**41.7%**
GLA Offset Payment Rate (£/tCO_2)	£2,850	
Total Offset Payment	**£3,933**	

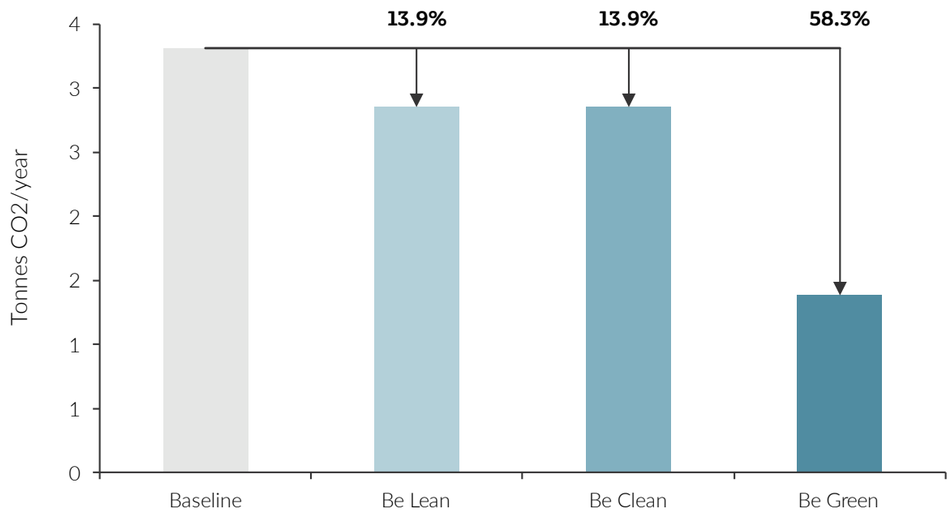


Figure 14: New Build carbon reduction summary

Whole Refurbishment

	Site-Wide Regulated Carbon Dioxide Emission Savings (tonnes CO_2/yr.) Regulated	
Baseline: Part L 2021 Building Regs	25.84	
After energy demand reduction (Be Lean)	17.73	
After heat network / CHP (Be Clean)	17.73	
After renewable energy (Be Green)	6.5	
	Site-Wide Regulated domestic carbon dioxide savings	
	(tonnes CO_2/yr.)	(%)
Savings from energy demand reduction	8.11	31.4%
Savings from heat network / CHP	0	0.0%
Savings from renewable energy	11.23	34.8%
Cumulative on-site savings	**19.34**	**66.2%**

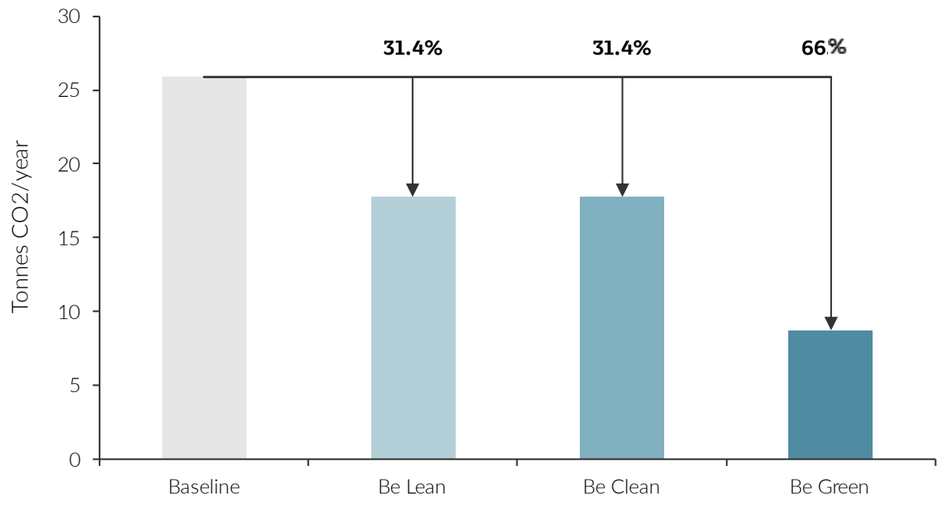


Figure 15: Refurbishment carbon reduction summary

Appendix A: Proposed Building Modelling inputs.

Fabric

Building element	Refurbishment Assumptions	New Build Elemental Values
Air permeability (m3/h.m2 at (50Pa))	25.00###	3..00
External wall U-value (W/m².K)	0.70*	0.13
Windows (W/m².K)	1.20#	1.20
Roof U-value (W/m²K)	0.18## (Mission Hall) 0.35* (Victorian Building and Weavers Cottage)	0.11
Exposed floor U-value (W/m²K)	0.70*	0.15
Door U-value (W/m²K)	1.60#	1.60
Glazing performance		
Vision Glazing g-value	0.40#	0.40
Light Transmittance	71%	71%

*Existing fabric assumed to meet threshold values of Part L2 Table 4.2.

#New glazing, rooflights and doors on The Mission Hall, Victorian Building and Weavers cottages.

##New roof on The Mission Hall only

###Set as per the Non-Domestic EPC Conventions for England & Wales Issue 8 for buildings built pre-1995, repairs outlined in architectural proposals supersede evidence of high air permeability.

◊Please note that thermal bridging calculations will be required at future stages in order to demonstrate that thermal bridging losses are ~10% and comply with the requirements of Part L2a 2021.

Figure 16 Developed proposed upgrades.

Systems, Lighting and Hot Water

New Build and Non-residential Refurbishment inputs

Be Lean	Detail	Units	System 01 – Rad + NV	System 02 Rads +MVHR	System 03 – FCU + MVHR
	System Name/Description	-	Radiators and Natural Vent	Radiators and MVHR	FCU + Balanced MVHR
	UK NCM System Type	-	Central heating using water: radiators	Central heating using water: radiators	Split or Multi-Split
Heating	Heat Source	-	Heat Pump	Heat Pump	Heat Pump
	Fuel Type	-	Electricity	Electricity	Electricity
	Was the System Installed After 1998	Y/N	Y	Y	Y
	Carbon Conversion Factor	-	0.23kgCO_2/kWh	0.23kgCO_2/kWh	0.23kgCO_2/kWh
	Primary Energy Factor		1.05kWh/kWh	1.05kWh/kWh	1.05kWh/kWh
Cooling	Pack Chiller Type	-	-	-	Air Source Heat Pump
	Pack Chiller Power	kW	-	-	-
	Chiller Fuel Type	-	-	-	Electricity
	Generator Seasonal EER (SEER)	%	-	-	5.00 (5.00)
	Does it Qualify for ECAs	Y/N	-	-	Y
Adjustment & Metering	Ductwork Air Leakage CEN Classification	-	-	Class B	Class B
	AHU Air Leakage CEN Classification	-	-	Class L2	Class L2
	System Specific Fan Power (SFP)	W/l/s	-	1.6	1.6
	Pump Type		-	-	-

	Does the System have Provision for Metering	Y/N	-	Y	Y
	Does the Metering Warn "Out of Range" Values?	Y/N	-	Y	Y
Ventilation	Cooling / Ventilation Mechanism	-	Natural Ventilation	Air Conditioning	Air Conditioning
	Air Supply Mechanism	-	-	Balanced supply and extract	Balanced supply and extract
	Heat Recovery Type	-	-	Plate heat exchanger	Plate heat exchanger
	Heat Recovery Seasonal Efficiency	%	-	85	85
	Demand Control Ventilation	-	-	Yes	-
	Mechanical Exhaust Extract Flow Rate	Ac/hr	-	-	-
	Exhaust/Terminal Unit Specific Fan Power	W(l/s)	-	-	0.20 W/l/s
		Room type applied	Circulation and Stairs	WC, Changing	Office, Cafe

Be Green	Detail	Units	System 01 – Rad + NV	System 02 Rads +MVHR	System 03 – FCU + MVHR
	System Name/Description	-	Radiators and Natural Vent	Radiators and MVHR	FCU + Balanced MVHR
	UK NCM System Type	-	Central heating using water: radiators	Central heating using water: radiators	Split or Multi-Split
Heating	Heat Source	-	Heat Pump	Heat Pump	Heat Pump
	Fuel Type	-	Electricity	Electricity	Electricity
	Was the System Installed After 1998	Y/N	Y	Y	Y
	Carbon Conversion Factor	-	0.094kgCO_2/kWh	0.094kgCO_2/kWh	0.094kgCO_2/kWh
	Primary Energy Factor		1.042kWh/kWh	1.042kWh/kWh	1.042kWh/kWh
Cooling	Pack Chiller Type	-	-	-	Air Source Heat Pump
	Pack Chiller Power	kW	-	-	-
	Chiller Fuel Type	-	-	-	Electricity
	Generator Seasonal EER (SEER)	%	-	-	5.00 (5.00)
	Does it Qualify for ECAs	Y/N	-	-	Y
Adjustment & Metering	Ductwork Air Leakage CEN Classification	-	-	Class B	Class B
	AHU Air Leakage CEN Classification	-	-	Class L2	Class L2
	System Specific Fan Power (SFP)	W/l/s	-	1.6	1.6
	Pump Type		-	-	-
	Does the System have Provision for Metering	Y/N	-	Y	Y

	Does the Metering Warn "Out of Range" Values?	Y/N	-	Y	Y
Ventilation	Cooling / Ventilation Mechanism	-	Natural Ventilation	Air Conditioning	Air Conditioning
	Air Supply Mechanism	-	-	Balanced supply and extract	Balanced supply and extract
	Heat Recovery Type	-	-	Plate heat exchanger	Plate heat exchanger
	Heat Recovery Seasonal Efficiency	%	-	85	85
	Demand Control Ventilation	-	-	Yes	-
	Mechanical Exhaust Extract Flow Rate	Ac/hr	-	-	-
	Exhaust/Terminal Unit Specific Fan Power	W(l/s)	-	-	0.20 W/l/s
		Room type applied	Circulation and Stairs	WC, Changing	Office, Cafe

Specific Lighting System/Area			**Main Lighting Gains**		**Display Lighting**		**Main Lighting Controls**									
	Lamp Efficacy (lm/W)	Lighting efficiency (W/m^2/100 lux)		Light Output Ratio	Lamp Efficacy (lm/W)	Time Switch?	Local Manual Switch?	Constant Illuminance Control?	Photoelectric Options					Occupancy Options		
									Photo-electric Options?	Control type	Sensor Type	Time-switch?	Parasitic Power (W/m^2)	Sensing Type*	Parasitic Power (W/m^2)	Time-Switch?
Circulation Areas	110	-		1	-	N	N	N	N	-	-	-	-	AUTO-ON-OFF	0.03	N
Office	-	1.25		1	-	N	N	N	N	Dimming	Standalone	Dimming	Standalone	AUTO-ON-DIMMED	0.03	N
WC / Changing	110	-		1	-	N	N	N	N	-	-	-	-	AUTO-ON-OFF	0.03	N

Hot Water system		
Generator District Heating	At Be Lean: Same as space heating. Carbon Conversion Factor: 0.23kgCO_2/kWh Primary Energy Factor: 1.05kWh/kWh	At Be Green: Same as space heating. Carbon Conversion Factor: 0.094kgCO_2/kWh Primary Energy Factor: 1.042kWh/kWh
Delivery Efficiency	95%	95%

Residential Refurbishment system inputs

Parameter	Be Lean and Clean	Be Green
Ventilation	No mechanical ventilation. Infiltration rate only.	
Heating	Main heating	Community heating: space and water combined
Heating type	SAP 101 - Mains Gas Boiler	Heat Pump
Efficiency	90%	180%
Distribution losses	-	1.50
Controls	2106 – Programmer, room thermostat and TRVs Boiler interlock Delayed Start Stat	2312 - Charging system linked to use of community heating, programmer and at last two room thermostats
Water		
Water heating	Mains Gas Boiler	Community Heating
Showers	Vented	Vented
Hot water Cylinder Controls Insulation Type Cylinder volume Loss (kwh/day) Pipework insulation	Hot Water Cylinder Cylinder Stat Independent Time Control Cylinder in Heated Space Measured Loss 180l 0.05 Fully insulated primary pipework	

Appendix B: Existing Building Baseline Parameters.

Existing Building notional baseline inputs as per GLA Energy Assessment Guidance (June 2022) Appendix 3.

Element	Unit	Specification[1]	Non-residential Input	Residential Input	Comment
External Wall	(W/m².K)	0.55	0.7	0.7	Existing fabric assumed to meet threshhold values of Part L2 Table 4.2.
Roof (pitched)	(W/m².K)	0.16	0.35	0.35	Existing fabric assumed to meet threshhold values of Part L2 Table 4.2.
Floor	(W/m².K)	0.25	0.7	0.7	Existing fabric assumed to meet threshhold values of Part L2 Table 4.2.
Glazing	(W/m².K)	1.4	Glazing: 4.80 Rooflight: 5.10	Glazing: 4.80 Rooflight: 5.10	Set to represent single glazing and door based on eras of build (1720-1870), Table S1 of RdSAP 2012 version 9.94.
Vision Element	g-value	0.4	Glazing: 0.85 Rooflight: 0.85	Glazing: 0.85 Rooflight: 0.85	Set to represent single glazing and door based on eras of build (1720-1870), Table S1 of RdSAP 2012 version 9.94.
Air permeability	(m^3/h.m^2 at (50Pa))	1. Less than 10 - only with an accredited air pressure result 2. 10 - buildings > 500m2 built to 2002 Building Regulations (or later) 3. 15 - buildings <-500m2 built to 2002 Building Regulations (or later) 4. 15 - buildings to 1995 Building Regulations 5. 25 - buildings to Building Regulations pre 1995	35	35	Set as per the Non-Domestic EPC Conventions for England & Wales Issue 8 for buildings built pre-1995 where there is suitable evidence of high air permeability.
Thermal Bridging	(W/m².K)	Default	Default	Default	
HVAC System	Type	As per final building specification	As per final building specification	As per final building specification	
Heating and Hot Water		Efficiencies to match the applicable notional values for existing buildings	Carbon Conversion Factor: 0.23kgCO_2/kWh Primary Energy Factor: 1.05kWh/kWh	Mains Gas boiler: 90% efficiency	Non-Residential: Notional values for district heating used. Residential: Values for existing residential building using gas boiler used.
Cooling (air-condition)	SEER	As per final building specification. Seasonal energy efficiency ratio to match the applicable notional values for existing buildings.	5	-	SEER for final building specification used.
Central ventilation SFP	W/(l/s)	Specific fan power to match the applicable notional values for existing buildings	Central Balanced mechanical ventilation system with heating and cooling: 2.6 All other central balanced mechanical ventilation systems: 2.0	-	Maximum specific fan power (SFP) in air distribution systems in existing buildings, Part L2 Table 6.9.
Terminal Unit SFP	W/(l/s)	Specific fan power to match the applicable notional values for existing buildings	0.5	-	Maximum specific fan power (SFP) in air distribution systems in existing buildings, Part L2 Table 6.9.
Heat recovery	Per cent	70%	70%	-	
Lighting	Lm/Watt	60	60	60	

1. For instances where the existing condition of the building is of a higher performance, the actual energy performance of the building element should be used rather than the Notional Specification for Existing Buildings

Appendix B: Correspondence with Local Authority regarding proposed District Heating Network

23/24734 Bishopsgate Goods Yard - Shoreditch South Proposed District Heat Network query

MacGillivray, Callum
To janet.laban@cityoflondon.gov.uk; james.rooke@cityoflondon.gov.uk; mark.donaldson@cityoflondon.gov.uk
Cc Hickinbottom, Sam; Bone, Thom; Palmer, Rowan

Response COL - City2 DEN.pdf
184 KB

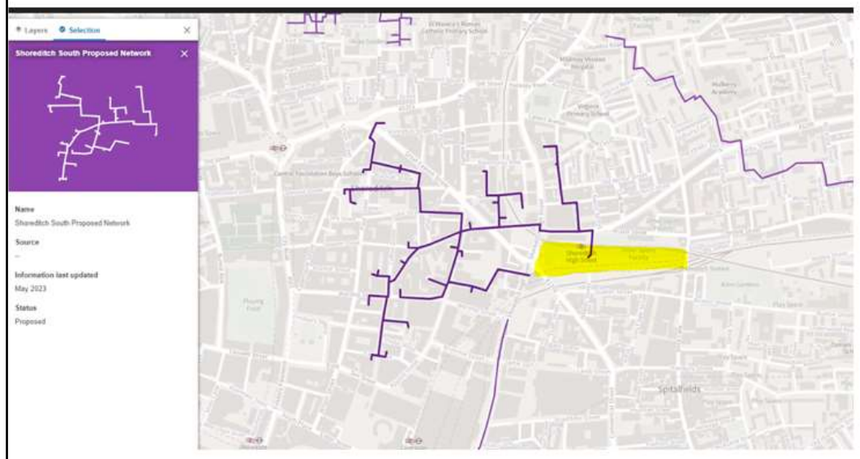
Dear James, Mark, and Janet

I hope you're well?

I am following up on a query by my colleague Tom Spurrier (14/02/2020 email attached) regarding the proposed energy strategy for the development at Bishopsgate Goods Yard (BGY).

In that exchange, it was confirmed that no progress had been made on the proposed City 2 heat network since the initial feasibility study.

We have since noticed that the Shoreditch South Proposed Network has been added to the London Heat Map, with a proposed connection to the BGY site.



Would you be able to provide an update on this proposed network and confirm whether BGY could indeed connect to this?

It would also be helpful to know when this network becomes live and available, as well as the temperature the network will operate at.

I appreciate your help on this.

Kind regards,
Callum MacGillivray
Graduate Sustainability Consultant

Email callummacgillivray@hoarelea.com

23/24734 Bishopsgate Goods Yard - Heat Network query

AC Aaron Caffrey <acaffrey@ballymoregroup.com>
To: MacGillivray, Callum; Luke Dalton; Nicola Zech-Behrens
Cc: Bone, Thom; Brown, Richard3; Hickinbottom, Sam; Palmer, Rowan; Smith, Tom

You don't often get email from acaffrey@ballymoregroup.com. Learn why this is important

Callum,

I am not aware of discussions about connection to this development from this newly proposed DHN, although Nicola is best placed to advise as she has the long history on this project.

We are open to discussions on any future DHN connections, although these are often very complex and difficult to achieve in practice it's something we regularly do so no objection from here.

Kind Regards

Aaron Caffrey
Technical Director

+44 (0)77 6676 2347

ballymore.

Ballymore Group
161 Marsh Wall
London E14 9SJ

+44 (0)20 7510 9100
www.ballymoregroup.com

RE: 23/24734 Bishopsgate Goods Yard - Shoreditch South Proposed District Heat Network query

DM Donaldson, Mark <Mark.Donaldson@cityoflondon.gov.uk>
To: MacGillivray, Callum
Cc: Hickinbottom, Sam; Bone, Thom; Palmer, Rowan; Kane, Kerstin; Archer, Lyall; Kirkbright, Arran; Jeremy Martin

Reply | Reply All | Forward
Mon 04/09/2023 17:49

Response COL - City2 DEN.pdf
181 KB

Hi Callum,

Thank you for your email. Please note, Janet and James Rooke are no longer at City Corporation.
I've CC'd: Lyall and Arran who work with City Corporation on our heat network developments, Kerstin Kane who is City Corporation sustainability officer in planning, and Jeremy Martin from Hackney's energy team.

Can you confirm the planning application reference number please.

I believe it is: Hackney | Council Direct | Application | 46874
Energy strategy: https://developmentandhousing.hackney.gov.uk/planning/?fa=downloadDocument&id=102208&public_record_id=46874
The strategy states "It is proposed that ASHP technology will be utilised on a plot-by-plot basis to provide space heating and a proportion of domestic hot water" "Future-proofing measures will be implemented to enable connection to any future low carbon district heating network" "Future-proofing for an energy sharing network, linking ASHP across the site, has been enabled within the Proposed Amendments. This would facilitate the interconnection of plots to simultaneously share heating and cooling loads generated across the site".
I note the Energy Strategy MWh Demands: Heating = 779, Hot Water = 663, Cooling = 480
Can you confirm this is still the proposed strategy?

Since your last communication with us (attached) in 2020 there has been some recent development. As you have highlighted below, the Shoreditch South area has been included for a proposed heat network, which is within LB Hackney and Jeremy is leading on its further development – of which a more detailed study is likely to commence shortly.
The City Corporation, in collaboration with Hackney, are shortly to develop a feasibility study, building on the previous City 2 proposal, in partnership with E.On and the GLA.
This study will focus on the North East of the Square Mile, but also encompass the boundary area of Hackney, close to the BGY development area and aligning with their South Shoreditch study. Our study will be engaging with local data centres and other waste heat sources, modelling heat sharing between the City and Hackney, and establishing the network infrastructure (pipe routes and energy centres).

I think it would be best to engage directly with Jeremy to participate in the South Shoreditch study.

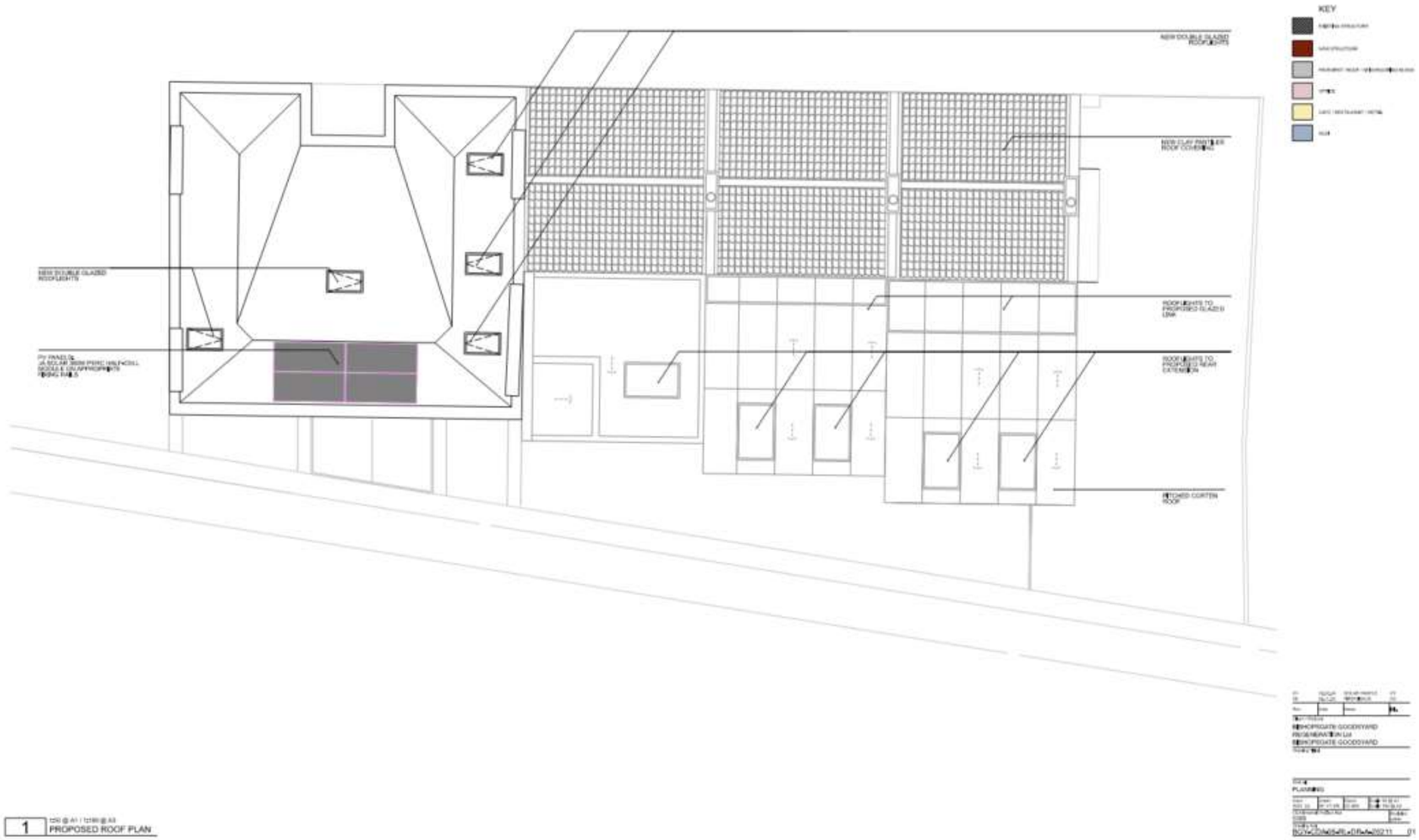
Thanks,

Mark

Mark Donaldson MSc BEng,
Senior Energy Engineer, Corporate Energy Team
City of London Corporation | City Surveyor's department
North Wing, Guildhall, Aldermanbury, London, EC2V 7HH
Tel: 0780 8844409
mark.donaldson@cityoflondon.gov.uk | www.Cityoflondon.gov.uk

Appendix C: Solar photovoltaic layout.

Initial indication of rooftop solar PV provision shown below. Full coordinated PV layout to be produced as design develops.



Appendix D: BRUKLS

Contents
D.1 New Build Be Lean/Be Clean

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

BGY Sclater Street_New Build_Be Lean — As designed

Date: Thu Feb 22 16:59:51 2024

Administrative information

Building Details
Address: Sclater St, London, E1 6HR

Certifier details
Name: Hoare Lea
Telephone number: +44 1454 201020
Address: 155 Aztec West Almondsbury, Bristol, BS32 4UB

Certification tool
Calculation engine: Apache
Calculation engine version: 7.0.18
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.18
BRUKL compliance module version: v6.1.d.0

Foundation area [m²]: 95.51

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$annum	10.08	
Building CO_2 emission rate (BER), $kgCO_2/m^2$annum	9.95	
Target primary energy rate (TPER), kWh/m^2annum	53.61	
Building primary energy rate (BPER), kWh/m^2annum	64.44	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.13	0.13	B1000008:Surf[1]
Floors	0.18	0.11	0.11	B1000007:Surf[0]
Pitched roofs	0.16	0.11	0.11	B2000013:Surf[2]
Flat roofs	0.18	0.11	0.11	B100000D:Surf[0]
Windows** and roof windows	1.6	1.2	1.2	B1000005:Surf[1]
Rooflights***	2.2	1.28	1.3	B2000013:Surf[0]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] — $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	286.5	286.5
External area [m²]	627.7	627.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	217.86	258.67
Average U-value [W/m²K]	0.35	0.41
Alpha value* [%]	10.52	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	20.09	27.22
Cooling	5.81	3.17
Auxiliary	10.72	8.93
Lighting	5.53	8.01
Hot water	10.65	11.18
Equipment*	35.92	35.92
TOTAL**	**52.8**	**58.51**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	10.97
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*10.97*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	150.71	141.57
Primary energy [kWh/m^2]	64.44	53.61
Total emissions [kg/m^2]	9.95	10.08

*Please note that the notional building makes an allowance for PV due to software limitations. This has been accounted for in the New Build calculations.

D.2 New Build Be Green

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

BGY Sclater Street_New Build_Be Green As designed

Date: Thu Feb 22 16:55:21 2024

Administrative information

Building Details
Address: Sclater St, London, E1 6HR

Certification tool
Calculation engine: Apache
Calculation engine version: 7.0.18
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.18
BRUKL compliance module version: v6.1.d.0

Certifier details
Name: Hoare Lea
Telephone number: +44 1454 201020
Address: 155 Aztec West Almondsbury, Bristol, BS32 4UB

Foundation area [m²]: 95.51

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	10.08	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	4.81	
Target primary energy rate (TPER), kWh/m^2annum	53.61	
Building primary energy rate (BPER), kWh/m^2annum	53.19	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{i\text{-Limit}}$	$U_{i\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.13	0.13	B1000008:Surf[1]
Floors	0.18	0.11	0.11	B1000007:Surf[0]
Pitched roofs	0.16	0.11	0.11	B2000013:Surf[2]
Flat roofs	0.18	0.11	0.11	B100000D:Surf[0]
Windows** and roof windows	1.6	1.2	1.2	B1000005:Surf[1]
Rooflights***	2.2	1.28	1.3	B2000013:Surf[0]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{i\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{i\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	286.5	286.5
External area [m²]	627.7	627.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	217.86	258.67
Average U-value [W/m²K]	0.35	0.41
Alpha value* [%]	10.52	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	20.09	27.22
Cooling	5.81	3.17
Auxiliary	10.72	8.93
Lighting	5.53	8.01
Hot water	10.65	11.18
Equipment*	35.92	35.92
TOTAL**	**52.8**	**58.51**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	7.46	10.97
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*7.46*	*10.97*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	150.71	141.57
Primary energy [kWh/m²]	53.19	53.61
Total emissions [kg/m²]	4.81	10.08

D.3 Refurbishment Baseline

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

BGY Sclater Street_Refurb Baseline — As designed

Date: Thu Feb 22 09:15:15 2024

Administrative information

Building Details

Address: Sclater St, London, E1 6HR

Certification tool

Calculation engine: Apache
Calculation engine version: 7.0.18
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.18
BRUKL compliance module version: v6.1.d.0

Certifier details

Name: Hoare Lea
Telephone number: +44 1454 201020
Address: 155 Aztec West Almondsbury, Bristol, BS32 4UB

Foundation area [m²]: 132.56

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	10.11	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	33.24	
Target primary energy rate (TPER), $kWh/m^2.annum$	50.33	
Building primary energy rate (BPER), $kWh/m^2.annum$	171.69	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{k\text{-}Limit}$	$U_{k\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.7	0.7	B2000000:Surf[2]
Floors	0.18	0.7	0.7	B1000013:Surf[0]
Pitched roofs	0.16	0.35	0.35	B200001E:Surf[0]
Flat roofs	0.18	0.35	0.35	B2000001:Surf[3]
Windows** and roof windows	1.6	4.8	4.8	B2000000:Surf[1]
Rooflights***	2.2	5.19	5.2	B3000003:Surf[0]
Personnel doors^	1.6	3	3	B2000000:Surf[0]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	4.8	4.8	B2000000:Surf[1]

$U_{k\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] — $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{k\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	35

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	550	550
External area [m²]	983.1	983.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	35	3
Average conductance [W/K]	960.05	374.55
Average U-value [W/m²K]	0.98	0.38
Alpha value* [%]	25.25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	112.61	22.63
Cooling	0.63	0.78
Auxiliary	11.66	4.76
Lighting	10.97	7.52
Hot water	18.25	18.15
Equipment*	29.34	29.34
TOTAL**	**154.11**	**53.83**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	7.93
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*7.93*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	388.42	86.7
Primary energy [kWh/m^2]	171.69	50.33
Total emissions [kg/m^2]	33.24	10.11

D.4 Refurbishment Be Lean/Be Clean

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

BGY Sclater Street_Existing_Be Lean — As designed

Date: Thu Feb 22 16:44:52 2024

Administrative information

Building Details

Address: Sclater St, London, E1 6HR

Certifier details

Name: Hoare Lea
Telephone number: +44 1454 201020
Address: 155 Aztec West Almondsbury, Bristol, BS32 4UB

Certification tool

Calculation engine: Apache
Calculation engine version: 7.0.18
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.18
BRUKL compliance module version: v6.1.d.0

Foundation area [m^2]: 132.56

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	9.14	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	21.75	
Target primary energy rate (TPER), $kWh/m^2.annum$	45.47	
Building primary energy rate (BPER), $kWh/m^2.annum$	106.67	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{k\text{-Limit}}$	$U_{k\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.7	0.7	B2000000:Surf[2]
Floors	0.18	0.7	0.7	B1000013:Surf[0]
Pitched roofs	0.16	0.28	0.35	B200001E:Surf[0]
Flat roofs	0.18	0.35	0.35	B2000001:Surf[3]
Windows** and roof windows	1.6	1.2	1.2	B2000000:Surf[1]
Rooflights***	2.2	1.29	1.3	B3000003:Surf[0]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1.6	1.6	B2000000:Surf[0]

$U_{k\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{k\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	25

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	550	550
External area [m^2]	983.1	983.1
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	655.84	334.77
Average U-value [W/m^2K]	0.67	0.34
Alpha value* [%]	10.49	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	72.08	18.77
Cooling	0.4	1.06
Auxiliary	6.83	4.92
Lighting	5.36	6.54
Hot water	17.29	18.15
Equipment*	29.34	29.34
TOTAL**	**101.97**	**49.43**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	3.89	7.93
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*3.89*	*7.93*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	247.19	78.85
Primary energy [kWh/m^2]	106.67	45.47
Total emissions [kg/m^2]	21.75	9.14

D.5 Refurbishment Be Green

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

BGY Sclater Street_Existing Refurb_Be Green — As designed

Date: Fri Feb 23 12:14:01 2024

Administrative information

Building Details

Address: Sclater St, London, E1 6HR

Certifier details

Name: Hoare Lea
Telephone number: +44 1454 201020
Address: 155 Aztec West Almondsbury, Bristol, BS32 4UB

Certification tool

Calculation engine: Apache
Calculation engine version: 7.0.18
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.18
BRUKL compliance module version: v6.1.d.0

Foundation area [m²]: 132.56

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), kgCO_2/m².annum	9.14	
Building CO_2 emission rate (BER), kgCO_2/m².annum	10.1	
Target primary energy rate (TPER), kWh/m².annum	45.47	
Building primary energy rate (BPER), kWh/m².annum	111.69	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.7	0.7	B2000000:Surf[2]
Floors	0.18	0.7	0.7	B1000013:Surf[0]
Pitched roofs	0.16	0.28	0.35	B200001E:Surf[0]
Flat roofs	0.18	0.35	0.35	B2000001:Surf[3]
Windows** and roof windows	1.6	1.2	1.2	B2000000:Surf[1]
Rooflights***	2.2	1.29	1.3	B3000003:Surf[0]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1.6	1.6	B2000000:Surf[0]

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] — $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	25

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	550	550
External area [m²]	983.1	983.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	655.84	334.77
Average U-value [W/m²K]	0.67	0.34
Alpha value* [%]	10.49	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	72.08	18.77
Cooling	0.4	1.06
Auxiliary	6.83	4.92
Lighting	5.36	6.54
Hot water	17.29	18.15
Equipment*	29.34	29.34
TOTAL**	**101.97**	**49.43**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	7.93
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*7.93*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	247.19	78.85
Primary energy [kWh/m²]	111.69	45.47
Total emissions [kg/m²]	10.1	9.14

D.6 Residential Refurbishment Baseline

Summary for Input Data

elmhurst energy

Property Reference	Unit 01			Issued on Date	15/03/2024
Assessment Reference	00001			Prop Type Ref	01.01
Property					
SAP Rating	63 D	DER		TER	
Environmental	59 D	% DER < TER			N/A
CO_2 Emissions (t/year)	2.74	DFEE		TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER		TPER	
Assessor Details	Mr. Callum MacGillivray			Assessor ID	U682-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Detached
Position of Flat	Mid-floor flat
Which Floor	1
2.0 Number of Storeys	1
3.0 Date Built	2024
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	50.71 m	59.57 m²	2.62 m

8.0 Living Area 41.12 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Fac	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	63.93	51.73	0.00	None	12.20	Enter Gross Area
External Wall 2	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	68.93	67.00	0.70	Stairwell Access Corridor 3	1.93	Enter Gross Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Dense block, dense plaster	100.00	18.30

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Concrete floor slab, carpeted	100.00	59.57

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.70	None	0.00	0.00	59.57

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
External Door	Manufacturer	Solid Door							3.00
Window	Manufacturer	Window	Double glazed			0.85		0.70	4.80
Rooflight	Manufacturer	Roof Light	Double glazed			0.85		0.70	5.10

D.7 Residential Refurbishment Be Lean

Summary for Input Data

elmhurst energy

Property Reference	Unit 01			Issued on Date	15/03/2024
Assessment Reference	00001_Copy			Prop Type Ref	01.01
Property					
SAP Rating	68 D	DER		TER	
Environmental	66 D	% DER < TER			N/A
CO_2 Emissions (t/year)	2.3	DFEE		TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER		TPER	
Assessor Details	Mr. Callum MacGillivray			Assessor ID	U682-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Detached
Position of Flat	Mid-floor flat
Which Floor	1
2.0 Number of Storeys	1
3.0 Date Built	2024
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	50.71 m	59.57 m²	2.62 m

8.0 Living Area 41.12 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Fac	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	63.93	51.73	0.00	None	12.20	Enter Gross Area
External Wall 2	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	68.93	67.00	0.70	Stairwell Access Corridor 3	1.93	Enter Gross Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Dense block, dense plaster	100.00	18.30

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Concrete floor slab, carpeted	100.00	59.57

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.70	None	0.00	0.00	59.57

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
External Door	Manufacturer	Solid Door							1.60
Window	Manufacturer	Window	Double glazed			0.40		0.70	1.20
Rooflight	Manufacturer	Roof Light	Double glazed			0.40		0.70	1.20

D.8 Residential Refurbishment Be Green

Summary for Input Data

elmhurst energy

Property Reference	Unit 01			Issued on Date	15/03/2024
Assessment Reference	00001_Copy_Copy			Prop Type Ref	01.01
Property					
SAP Rating	52 E	DER		TER	
Environmental	82 B	% DER < TER			N/A
CO2 Emissions (t/year)	1.26	DFEE		TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER		TPER	
Assessor Details	Mr. Callum MacGillivray			Assessor ID	UB82-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Detached
Position of Flat	Mid-floor flat
Which Floor	1
2.0 Number of Storeys	1
3.0 Date Built	2024
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	50.71 m	59.57 m²	2.62 m

8.0 Living Area 41.12 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Fac	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	63.93	51.73	0.00	None	12.20	Enter Gross Area
External Wall 2	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.70	17.00	68.93	67.00	0.70	Stairwell Access Corridor 3	1.93	Enter Gross Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Dense block, dense plaster	100.00	18.30

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Concrete floor slab, carpeted	100.00	59.57

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.70	None	0.00	0.00	59.57

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
External Door	Manufacturer	Solid Door							1.60
Window	Manufacturer	Window	Double glazed			0.40		0.70	1.20
Rooflight	Manufacturer	Roof Light	Double glazed			0.40		0.70	1.20

SAP 10 Online 2.13.5 Page 1 of 3

HOARE LEA

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GRADUATE SUSTAINABILITY CONSULTANT

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