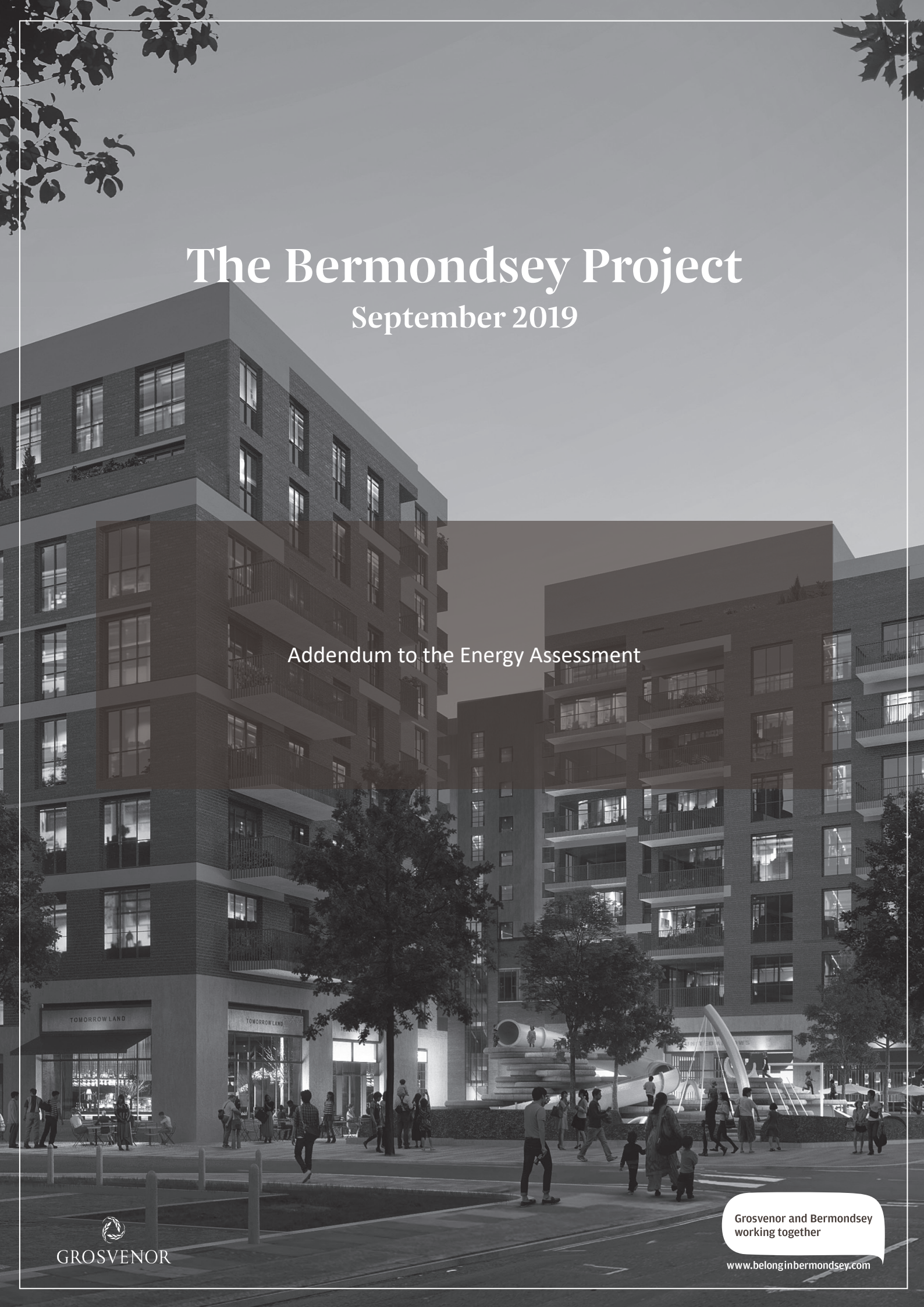
The Bermondsey Project

September 2019

Addendum to the Energy Assessment



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Issue 1

Southwark GP Nominee 1 Ltd. and Southwark GP Nominee 2 Ltd.

The Bermondsey Project

Energy Assessment Addendum

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Executive Summary

This Energy Assessment Addendum Report has been prepared by Ove Arup & Partners Ltd (Arup) to accompany the hybrid planning application being submitted by Southwark GP Nominee 1 Ltd. and Southwark GP Nominee 2 Ltd, hereafter referred to as Grosvenor Britain and Ireland ('Grosvenor').

Approach

This report presents the results of modelled carbon emissions improvements of the 2019 Amended Proposed Development against a defined baseline (Target Emission Rate (TER)) and outlines strategies to mitigate these emissions.

The results from the modelled carbon emissions are compared with the adopted London Plan's policy target for development proposals when using the first three stages of the Mayor's energy hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy
4. Be seen: monitor energy performance post installation

The aim being a 35% reduction, beyond Part L 2013, in regulated carbon emissions.

Additional proposed policies that come under the Draft New London Plan aimed at carbon savings under stage 1 have also been acknowledged within the addendum. The proposed policy would require residential development to achieve 10% reduction and non-residential development to achieve 15% reduction through energy efficiency alone.

Stage 1: Use less energy

The passive demand reduction measures set out in the 2017 EA will be applied to the additional units proposed in the 2019 Amended Proposed Development to reduce energy demand.

There is also a selection of additional passive demand reduction measures (including building orientation, insulation, balconies, air permeability improvements and optimising glazing ratios to reduce the heat entering the building) which were not included in the 2017 EA which are now intended to be implemented following grant of permission for the 2019 Amended Proposed Development. Additionally, better efficient fan coil units and lighting have been used to help improve carbon savings.

These measures are anticipated to provide a net CO_2 emissions improvement of 5.3% on the Part L 2013 baseline which is a significant saving over the previous Masterplan Application improvement (which was 0% improvement on the Part L 2013 baseline for Be Lean for the overall development).

In the 2017 EA, only residential units missed the Be Lean requirements, however the 2019 Amended Proposed Development will comfortably achieve the Adopted London Plan Requirements as set out in the 'Greater London Authority guidance

on preparing energy assessments (2016)' by achieving 2% over Part L 2013 from energy efficiency measure alone. The non-residential exceeded the London Plan requirements in the 2017 EA, and the 2019 Amended Proposed Development significantly beats this by achieving a 17% reduction.

It also is worth noting that the non-residential (comprising office, retail and school space in combination) also comfortably achieves the 15% carbon saving target on Part L 2013 baseline set out in the Draft New London Plan. Meeting the 10% target in the Draft New London Plan for residential units is more challenging, because of the south facing façades which have acoustic considerations given proximity to the railway.

Stage 2: Supply energy efficiently

London Plan Policy 5.6 requires that developers should consider the use of decentralised energy networks and accordingly should select energy systems which firstly prioritise connection to existing (or planned) networks over site-wide Combined Heat and Power (CHP) networks. The current adopted version of the London Plan and the Draft New London Plan Policy SI3 also requires that developers should consider the use of decentralised energy networks and accordingly should select energy systems which firstly prioritise connection to existing (or planned networks) over site-wide Combined Heat and Power (CHP) networks.

Grosvenor's intention remains to seek to connect the Proposed Development to SELCHP (South East London Combined Heat and Power, an energy to waste incineration plant) in accordance with planning policy objectives. In this respect the 2019 Amended Proposed Development meets both Adopted and Draft London Plan requirements for Be Clean.

A connection to SELCHP would result in the Proposed Development achieving a 49% reduction to regulated carbon emissions over the Part L 2013 baseline, a big improvement on the 2017 application (previous carbon emission reduction percent value achieved was 39%). This change is largely attributed to the fact a larger proportion of the site is residential, which uses a significant amount of heat, and the inclusion of SELCHP supply to additional non-residential areas (office space in particular). We have also been provided with a slightly improved carbon performance of the SELCHP heat supply.

Stage 3: Use renewable energy

Given the intended connection to a low carbon heat network at Stage 2 of the hierarchy, only electricity generating renewables were deemed feasible at Stage 3. However, the Variable Refrigerant Flow (VRF) system also acts as a heat pump under certain circumstances, and this contributed 0.2% of renewable energy. Balancing the need for green roofs, amenity space and renewables, a renewable energy contribution of 350m^2 of roof area for solar photovoltaic (PV panels) is feasible and included. The PV panels provide a net CO_2 emissions improvement of 0.5% over the Part L 2013 baseline.

Having followed and employed the GLA's energy hierarchy and the 2016 guidance on preparing energy assessments, the 2019 Amended Proposed Development complies with the Adopted London Plan by including all feasible

renewable energy. It should be noted that the 2019 Amended Proposed Development also meets the Draft New London Plan.

Summary of conclusion

Overall, the 2019 Amended Proposed Development meets and exceeds all current adopted planning policy requirements. It also meets and exceeds the majority of the Draft New London Plan with the Be Lean for non-residential (15% carbon savings from energy efficiency measures). It falls short of the Be Lean for residential (10% carbon savings from energy efficiency measures) but comfortably meets the overall requirement of the Draft New London Plan for reducing emissions by 35% for the entire site. The entire site achieves a carbon saving of 55% over the Part L 2013 baseline. The overall emission reduction requirements under the Draft New London Plan are equivalent to those under the adopted Core Southwark Strategy.

This 2019 Amended Proposed Development therefore addresses the comments set out by the Mayor in his response to the stage 2 comments on Climate Change policy. It complies with London Plan London Policies 5.2 and 5.13 and meets the requirements of the draft London Plan Policies SI2, though it is acknowledged that the 'aim' to achieve 10% energy efficiency on residential has proved challenging due to the conflicting overheating requirements.

The proposed energy strategy, set out within this report, includes the implementation of passive design measures, an intended connection to SELCHP and the integration of renewable technology. Figure 1 and Table 1 show the application of the energy hierarchy to the Proposed Development and the resulting reductions to regulated carbon emissions.

The current proposals help save 1,169 tCO_2/year as opposed to 735 tCO_2/year (as demonstrated in Table 1 and Table 2) from the 2017 submission.

Figure 1: Energy Hierarchy for the Proposed Development

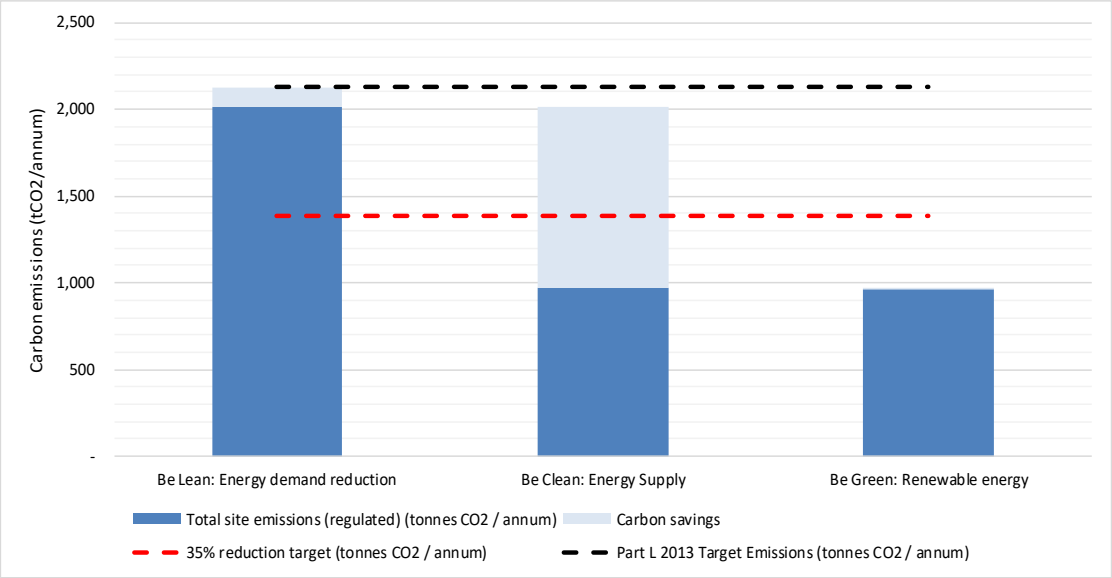


Table 1: Total site savings - 2019

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	2,129		
Demand Reduction (Be Lean)	2,016	114	5.3%
Efficient Supply (Be Clean)	975	1,041	49%
Efficient Supply with Renewables (Be Green)	960	15	0.7%
Total Cumulative Savings		**1,169**	**55%**

Table 2: Total site savings - 2017

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	1,879		
Demand Reduction (Be Lean)	1,879	-	0%
Efficient Supply (Be Clean)	1,154	725	39%
Efficient Supply with Renewables (Be Green)	1,144	10	0.6%
Total Cumulative Savings		**735**	**39%**

An addition to the last stage of the energy hierarchy, part of the Draft New London Plan, is Be Seen: monitor, verify and report on energy performance. This is to track the move towards zero-carbon development and to ensure that carbon emissions planning commitments are being delivered. The development's commitments to Be Seen are described in Section 9 of this report.

Overall the development meets and exceeds its 35% on Part L 2013 (which is the same as 44% on Part L 2010) demand reduction by achieving a 55% reduction. This is also a big improvement on the 2017 submission due to the improved energy performance through the addition of balconies to reduce overheating, improved energy efficiency of non-residential areas and connection of the non-residential to SELCHP. All of this means that the development achieves 59% more CO_2 savings than the 2017 submission.

1 Introduction

Background

The Masterplan Application (Southwark reference 17/AP/4088) was submitted to London Borough of Southwark (LBS) on 23 October 2017 following over a year of detailed pre-application discussions. Further to post- submission discussions with LBS Officers and the Greater London Authority (GLA) during the determination period, amendments to the application were submitted via an addendum on 4 June 2018 to make improvements to private amenity space, playspace provision, trees, highways design and servicing, and a minor adjustment to the unit mix.

The Masterplan Application was subsequently considered at LBS Planning Committee on 6 February 2019 and was recommended for refusal by LBS Officers. The Planning Committee resolved that it was minded to refuse the Masterplan Application in line with Officers' recommendation for the following reasons (in summary):

i. Failure to provide maximum reasonable amount of affordable housing;

ii. Failure to provide exemplary quality of accommodation for its future residents to combat potential negative impacts of high density living;

iii. Pedestrian-vehicle conflicts arising from 'blind-spots' and internal routing through the site; and

iv. Absence of clear agreement with owners of the Railway Arches to secure delivery of the two pedestrian routes through the viaduct.

The Masterplan Application was subsequently referred to the Mayor for 'Stage 2' review. Following a review of the Masterplan Application and the proposed decision of LBS, the Mayor considered that it was of strategic importance and had the potential to make an important contribution to housing and affordable housing supply. On 7 May 2019 the Mayor directed that he would act as the local planning authority for the purpose of determining the Masterplan Application (under GLA reference GLA/3776a).

2019 Amended Proposed Development for the Site

The Mayor's Stage 2 Report identified various areas where further work was anticipated in the event that the Mayor chose to take over the determination of the Masterplan Application. In particular, continued work on affordable housing, urban design and transport strategy was identified. The Applicant is now proposing to make further amendments to the Masterplan Application in order to address the issues raised in the Mayor's Stage 2 Report. These include an increase in the quantum of affordable housing through an increase in density in appropriate locations on the Site and resultant changes to other aspects of the masterplan including residential quality, townscape, landscaping and public realm and transport and servicing. The amended masterplan is referred to within this addendum as the '2019 Amended Proposed Development.'

The 2019 Amended Proposed Development consists of a residential led, mixed use development to deliver approximately 1,548 new homes, a purpose built 600

pupil secondary school, employment spaces, a mix of retail, leisure and community spaces at ground floor as well as a range of high quality public realm and amenity spaces throughout the Site.

The Site is 5.4 hectares comprised of the Former Peek Frean Biscuit Factory site and the former Lewisham and Southwark College site ('Bermondsey Campus') (and land adjoining and beneath the railway viaduct) located in Bermondsey in the LBS.

Purpose of document

This Energy Assessment Addendum has been prepared by Arup to present the relevant scheme amendments, provide an up-to-date assessment of the 2019 Amended Proposed Development against the Development Plan and emerging policy and identify any resultant impacts on the conclusions of the original assessment.

This document is an Addendum to and should therefore be read alongside the original Energy Assessment (entitled 'Bermondsey_Energy Statement_2017_10_19.pdf_') which was submitted alongside the Masterplan Application in October 2017, (the '2017 EA').

Unless otherwise stated in this Addendum, the approach taken and conclusions found in the 2017 EA remain unchanged and valid with regards to the 2019 Amended Proposed Development.

Planning policy context

For the purposes of Section 38(6), the development plan in force for the area comprises the following documents: the Southwark Core Strategy 2011, saved policies of the Southwark Plan 2007 and the London Plan (2016, consolidated with alterations since 2011), against which the Masterplan Application was assessed in the 2017 EA.

Since the submission of the 2017 EA, there have been updates to the following regional and local level planning policy.

- Draft New London Plan, August 2018 (and July 2019 Consolidated Suggested Changes)
- The emerging New Southwark Plan, January 2019

Although neither are yet adopted, consideration has been made to both of these emerging policies, with the weight attached reflecting their stage of preparation.

This Addendum also takes account of guidance on energy assessments published by the Greater London Authority (GLA) and BRE and available evidence on existing and planned low carbon infrastructure in the vicinity of the 2019 Amended Proposed Development. Finally, as acknowledged above, it considers the amendments proposed in the Draft New London Plan.

The assessment is structured according to the Mayor's energy hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

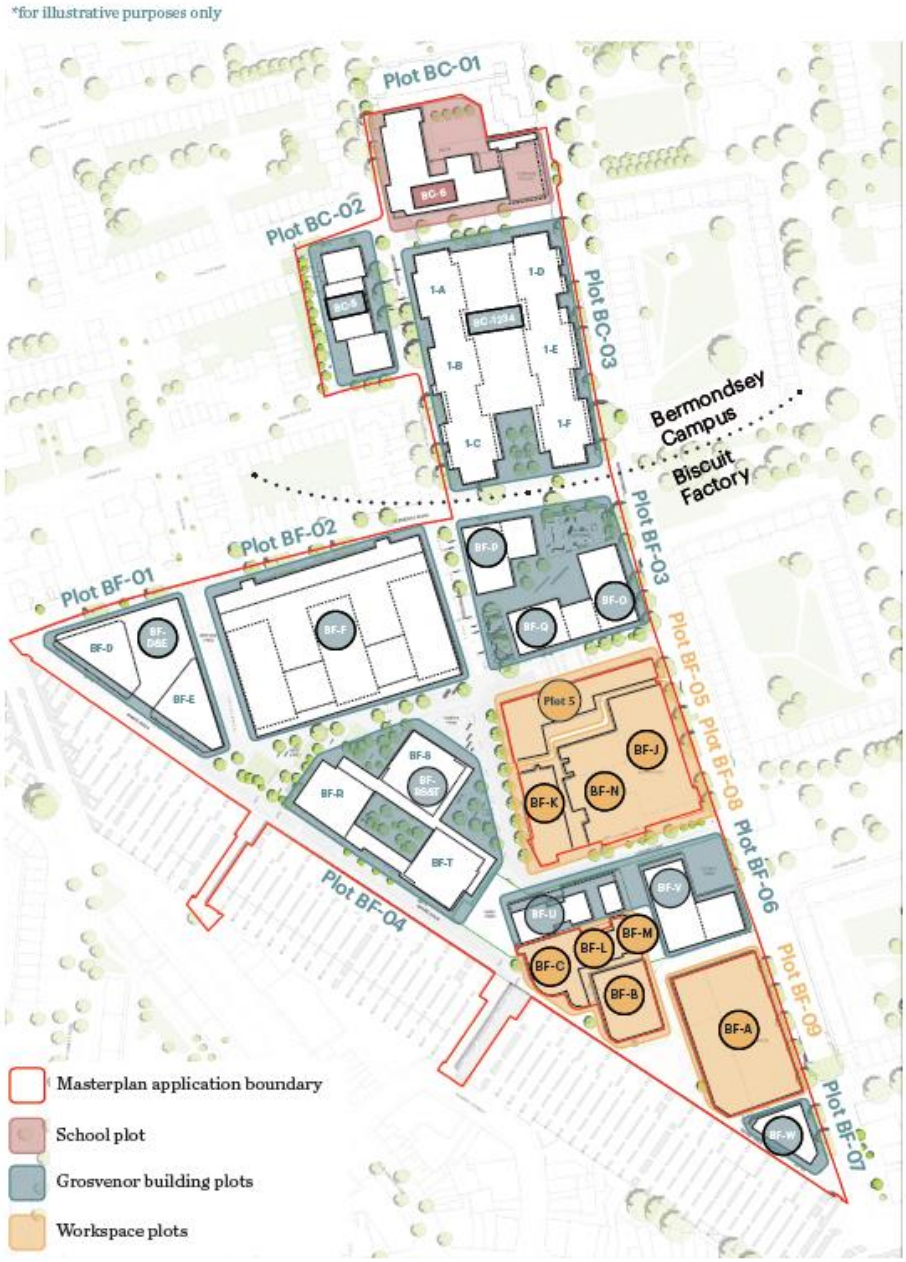
4. Be seen: monitor energy performance post installation

As set out in the 2017 EA, the adopted London Plan's policy target is for development proposals to achieve 35% reduction in regulated carbon emissions (beyond Part L 2013) by using the first three stages in the hierarchy. Within LBS's adopted Core Strategy, the policy target for new development is a 44% reduction in regulated carbon emissions (beyond Part L 2010) using a similar energy hierarchy (which is a similar target to that contained in the London Plan given the different Part L base).

The Draft New London Plan envisages developments being expected to achieve carbon reductions beyond Part L 2013 (10% for residential development and 15% for non-residential development) from energy efficiency measures alone (without relying on payment of a carbon offset fund).

Proposed Development

Figure 2: General arrangement of the Proposed Development



The Proposed Development is for a residential led, mixed use development to deliver approximately 1,548 new homes, a purpose built 600 pupil secondary school, employment spaces, a mix of retail, leisure and community spaces at ground floor, as well as a range of high quality public realm and amenity spaces throughout the masterplan, managed by Grosvenor. Figure 2 shows the general layout of the Proposed Development on the Site.

The Site is approximately 5.4 hectares comprised of the former Peek Frean Biscuit Factory site ('Biscuit Factory') and the former Lewisham and Southwark College site ('Bermondsey Campus') located in Bermondsey in the London Borough of Southwark ('LBS').

The total combined area of all of the Existing Buildings across the Site is 42,518 sqm Gross Internal Area (GIA).

The Former Peek Frean Biscuit Factory is a triangular parcel of land bound by Drummond Road to the east, Clements Road to the north and a railway viaduct along its south-western boundary. The 13 Existing Buildings on the Former Peek Frean Biscuit Factory are predominantly low-density industrial buildings, although a number of these are now used for alternative 'meanwhile' uses. Workspace own and operate eight of the Existing Buildings within the Former Peek Frean Biscuit Factory for a variety of business/commercial uses. The Workspace Buildings are shaded orange on Figure 2 and do not form part of the Proposed Development. They sit outside the redline planning application boundary and on land which is outside the ownership and control of Grosvenor.

The Bermondsey Campus site, which neighbours the The Former Peak Frean Biscuit Factory on the north side of Clements Road, was formerly occupied by Lewisham and Southwark College. There are a total of eight Existing Buildings on Bermondsey Campus, of which four are currently occupied by Compass School Southwark. The other buildings are occupied by a number of meanwhile uses.

Addendum Outline

This Energy Assessment Addendum Report outlines the proposed energy strategy for the Proposed Development and presents the results of modelled carbon emissions improvements against a defined baseline. In addition to setting out the proposed strategy, the report contains information on other options considered.

This addendum provides references to sections in the original Energy Statement submitted on 19th October 2017, where the text has remained the same. Where there were any changes in policy or the development's design and results, we have included the sections in full, even where changes are relatively minor, to provide clarity.

This report is structured as follows:

- Review of relevant regulation, policy, guidance and other reference documents (Section 2).
- Description of the assessment method employed and of the development which has been assessed (Section 3).
- Description of the notional baseline scheme against which the proposed energy strategy has been assessed (Section 4).
- Report on the demand reduction and building energy efficiency measures which have been considered and adopted, with resulting carbon emissions improvements against the baseline (Section 5).
- Report on the efficient supply connection options which have been considered and adopted, with resulting further carbon emissions improvements against the baseline (Section 6).
- Report on the renewable and low carbon supply options which have been considered and adopted, with resulting further carbon emissions improvements against the baseline (Section 7).

- Summary description of the proposed energy strategy and of the final modelled carbon emissions improvements against the baseline (Section 8).
- Description of the BMS and metering strategy outlining how carbon dioxide emissions post construction will be monitored and reported, as required by Draft New London Plan policy, Be Seen (Section 9)

2 Review of updates to regulation, policy and guidance

2.1 Building Regulations

Energy in buildings is regulated by the provisions of Part L of the Building Regulations, the most recent version being Part L 2013 (and associated amendments). The method of assessment used in Part L, including appropriate benchmarks for different building types, is set out in the Standard Assessment Procedure 2012 (SAP 2012). In July 2018 the latest SAP version was published, named SAP 10. However, SAP 10 has not yet been adopted by building regulations and therefore SAP 2012 carbon factors have been used.

The Building Regulations cover energy associated with the *operation* of buildings and include heating, cooling, ventilation, vertical transport and lighting systems. Energy for the use of buildings, including cooking, appliances, IT equipment and small power devices, is unregulated.

2.2 The Draft New London Plan and updated GLA policy guidance

In December 2017, the Draft New London Plan was published for consultation. This has not yet been adopted. Supplementary guidance was also updated, specifically the Energy Assessment Guidance was published in October 2018 and updates a number of elements relating to planning energy statements:

- It is stated within the Greater London Authority (GLA) Energy Assessment Guidance (October 2018) that "for referable developments from January 2019, applicants are encouraged to use the updated SAP 10 emission factors." We have used SAP2012 as outlined above and because SAP 10 is not formally adopted in Building Regulations and this document is an addendum to a 2017 submission, which required the use of SAP2012.
- Table 3: SAP 2012 carbon factors

	SAP 2012 carbon factors ($kgCO_2$//kWh)
Grid electricity	0.519
Grid displaced electricity	0.519
Mains gas	0.216

Following consultation responses, minor suggested changes were made to the Draft New London Plan which were published in August 2018. Following this, in July 2019, a consolidated Draft New London Plan with suggested changes was published. When adopted, the final Draft New London Plan will replace the previous 2011 version. The Draft New London Plan is not yet adopted but consideration has been made to this emerging policy, with the weight attached reflecting the viability of incorporation in this addendum. Where feasible, the 2019 Amended Proposed Development meets the policy requirements of the Draft New London Plan.

The following policies are relevant to the Proposed Development's energy strategy:

- Policy SI1 Improving air quality
- Policy SI2 Minimising greenhouse gas emissions
- Policy SI3 Energy infrastructure
- Policy SI4 Managing heat risk
- The overarching principle for new development is to develop a low carbon energy solution in accordance with the Mayor's energy hierarchy, which meets or exceeds the overall carbon emissions targets defined in Policy SI2 that all major developments should be net-zero carbon. By means of the energy hierarchy, carbon must be cut by a minimum of 35% beyond Building Regulations. Residential development should aim to achieve 10%, and non-residential development should aim to achieve 15% through energy efficiency alone.

  This policy has been adopted and the project made significant improvements in aiming to meet these targets.

- The energy hierarchy is as follows, further details taken from the GLA guidance are included:

  1. Be lean: use less energy
  2. Be clean: supply energy efficiently
  3. Be green: use renewable energy
  4. Be seen: monitor, verify and report on energy performance

  The hierarchy, including the 'Be seen' addition from the Draft New London Plan, has been adopted by the project team.

- The Adopted London Plan states that there is a presumption that development should seek to reduce carbon dioxide emissions by at least 20 per cent through the use of on-site renewable energy generation wherever feasible. The 2016 guidance removed the figure of 20%. The Draft New London Plan states that only states that developments maximise onsite renewable energy generation.
- Where it is clearly demonstrated that a zero-carbon target cannot be met on site, any shortfall should be provided through cash in lieu contribution to the relevant borough's carbon offset fund or off-site generation. £95/tonne price was tested as part of viability assessment for the Draft New London Plan. Boroughs however are free to define their own carbon offset price.

  The price of carbon set by LBS remains at £60/tonne and is therefore the figure assumed to apply.

- In relation to part 2 of the energy hierarchy (be clean), Policy SI3 states that any major development proposal within Heat Network Priorities Areas should have a communal low-temperature heating system. The heat source should be selected following the below heating hierarchy:

  1. Connect to local existing or planned heat network/s

2. Use zero emission or available local secondary heat sources (in conjunction with heat pump, if required, and a lower temperature heating system)
3. Use low emission combined heat and power (CHP) (in areas where legal air quality limits are exceeded all development proposals must provide evidence to show that any emissions related to energy generation will be equivalent or lower than those of an ultra-low NO_x gas boiler)
4. Use ultra-low NO_x gas boilers.

- "Carbon emissions through new development" is a KPI under the heading Environment within the statuary Annual Monitoring Report (AMR), published by the Mayor each spring.

KPI	Carbon emissions through new development
Measure	Average on-site carbon emission reductions of at least 35% compared to Building Regulations 2013 for approved referable development applications.

The Draft New London Plan states that the comprehensive monitoring of energy demand and carbon emissions is required to ensure that planning commitments are being delivered. Major developments will be required to:

- monitor and report on energy performance, such as by displaying a Display Energy Certificate (DEC), and
- report to the Mayor for at least five years via an online portal to enable the GLA to identify good practice and report on the operational performance of new development in London.

Development should be fitted with smart infrastructure, such as sensors, to enable better collection and monitoring of operational data. As more and better data is available with better digital connectivity, it will help planning agreements and impact assessments, for example related to urban design. Further guidance will be developed to make London a smarter city.

2.3 Southwark Local Plan

LBS published the emerging New Southwark Plan for consultation in January 2019. If adopted (following public examination), this will replace the saved Southwark Plan policies and the Core Strategy documents. The NSP will be the new borough-wide planning and regeneration strategy up to 2033.

Policies relevant to the energy strategy include:

- SP6: Cleaner, greener, safer
- P12: Design quality
- P14: Tall buildings
- P61: Environmental Standards
- P62: Energy

One of the ways in which LBS intends to make the borough cleaner, greener and safer is by reducing impact on climate change by making new and existing building as energy efficient as possible (as stated in the Strategic Policy). Policy 12 encourages active and sustainable design to reduce building energy consumption and carbon dioxide emissions. As part of Policy 14, tall buildings must maximise energy efficiency and avoid harmful impacts from solar glare, overshadowing and wind share. Policy 61 states that developments must reduce risk of overheating over the building's lifetime (also accounting for climate change predictions) and therefore should follow the cooling hierarchy mentioned below:

1. Minimise internal heat generation through energy efficient design; then
2. Reduce the amount of heat entering a building through the orientation, shading, albedo, fenestration, insulation and green roofs and walls; then
3. Manage the heat within the building through exposed internal thermal mass and high ceilings; then
4. Passive ventilation; then
5. Mechanical ventilation; then
6. Active cooling systems (ensuring they are the lowest carbon options).

Policy 62, Energy states that all developments must follow the GLA's energy hierarchy of be lean, be clean and be green. Carbon dioxide reduction targets for major developments are set as follows:

1. 100% on 2013 Building Regulations Part L standards for residential development; and
2. A minimum of 40% on 2013 Buildings Regulations Part L up to 2019, and zero carbon (100%) from 1 January 2019 onward, for non-residential developments.
3. Any shortfall against carbon emissions reduction requirements must be secured off-site through planning obligations or a financial contribution.

Lastly, Policy 62 also states that all major development must be designed to incorporate decentralised energy in accordance with the following hierarchy:

1. Connect to an existing decentralised energy network; then
2. Be future-proofed to connect to a planned decentralised energy network; or
3. Implement a site-wide low carbon communal heating system; and
4. Explore and evaluate the potential to oversize the communal heating system for connection and supply to adjacent sites and, where feasible be implemented.

The carbon offset price, as outlined in the Draft New London Plan, is not mentioned in the NSP and therefore it is assumed this remains at £60/tonne CO_2.

3 Energy Assessment Method

This section describes the method applied to the energy assessment addendum. It identifies how relevant emerging guidance was applied and highlights the approach taken in relation to key methodological challenges.

3.1 Overall approach

Subheading 3.1 remains valid from the previous submission.

3.2 Modelling Assumptions

The Gross Internal Area (GIA) has increased by 14% when compared to the last submission. The Proposed Development is broken down into the uses shown in Table 4 overleaf.

Table 4: Bermondsey Project floor area split

Area Measurement		Proposed Land Use "up to" sqm									**Total Area of Hybrid Application**
		Residential (Class C3)	**Office (Class B1)**	**Retail (Class A1)**	**Retail (Class A3/A4)**	**Community (D1)**	**School (Class D1)**	**Leisure (Class D2)**	**Sui-Generis**	**Total (each component)**	
GROSS EXTERNAL AREA sqm	Detailed	160,176	14,666	3,330	3,417	204	6,973	665	0	**189,430**	**203,314**
	Outline	13,103	0	105	246	268	0	0	161	**13,884**	
GROSS EXTERNAL AREA sqm total for hybrid application	**Total**	**173,279**	**14,666**	**3,435**	**3,663**	**472**	**6,973**	**665**	**161**	**203,314**	**203,314**
GROSS INTERNAL AREA sqm	Detailed	141,320	14,206	3,132	3,114	180	5,250	636	0	**167,837**	**180,330**
	Outline	11,783	0	94	228	245	0	0	143	**12,493**	
GROSS INTERNAL AREA sqm total for hybrid application	**Total**	**153,103**	**14,206**	**3,226**	**3,341**	**424**	**5,250**	**636**	**143**	**180,330**	**180,330**

3.2.1 Residential

The representative samples of the residential accommodation that were modelled are shown in Appendix A, Residential SAP Reports. In total, 61 sample residential units were modelled including top floor, mid-floor and above commercial, as well as single floor/duplex, single aspect, dual aspect at all orientations. The results from these were then applied to the rest of the development. In the previous submission, 22 sample residential units were modelled. The increased sample size has helped refine the carbon emission calculations for residential units.

The total energy demand from the residential development is determined based on the proposed residential split indicated in Table 5 below: The total number of units has increased from 1,343 units to 1,548 units (an increase of 15%) from the last submission.

Table 5: Residential development schedule

Component	Tenure	Unit Number (by Component / Tenure)					
		Studio	1 bed	2 bed	3 bed	4 bed	Total
Detailed	Private	132	432	412	90	0	1,066
	DMR	0	60	96	56	0	212
	Social Rent Equivalent	0	43	57	36	4	140
	Total	132	535	565	182	4	1,418
Outline	Private	0	0	0	0	0	0
	DMR	0	63	50	17	0	130
	Social Rent Equivalent	0	0	0	0	0	0
	Total	0	63	50	17	0	130
Total by tenure	Private	132	432	412	90	0	1,066
	DMR	0	123	146	73	0	342
	Social Rent Equivalent	0	43	57	36	4	140
Total by unit		**132**	**598**	**615**	**199**	**4**	**1,548**
% by unit		8.5%	38.6%	39.7%	12.9%	0.3%	100%

3.2.2 Non-residential

The non-residential baselines have been developed by modelling the non-residentialfloorspace on TAS software. For retail areas, the TER and BER are

considered as 34.5 $kgCO_2/m^2$. The results of this modelling can be found in Appendix B.

3.3 Energy Assessment Report Limitations

Subheading 3.3 remains valid from the previous submission.

4 Baseline Energy Assessment

The performance of the dwellings in the baseline case was selected in line with the limited U-values and fabric performance outlined in Part L1A 2013.

The resulting performance assumptions for the baseline case are as follows:

Table 6: Dwelling fabric and system efficiencies

Building Element	**Part L1A: 2013 limiting factors, U-value (W/m^2K)**
External wall	0.30
Roof	0.20
Floor	0.20
Party wall	0.20*
Thermal Bridging	n/a

*Party wall refers to walls between the dwelling and another heated space. The applied u-value requires either a solid wall or fully filled cavity with effective sealing at all exposed edges and in line with insulation layers in abutting elements. External wall refers to any exposed wall or wall to an unheated space.

The baseline emissions for the residential parts of the development are 1,624 tCO_2/annum and the baseline for the non-residential parts is 505 tCO_2/annum. The total baseline emissions in the last submission were 1,879 tCO_2/annum. The current baseline emissions have increased by 13% due to an increase in the development area but is less than the percentage area increase (as mentioned in Section 3.2).

5 Stage 1: Use Less Energy 'Be Lean'

This section examines the first step of the Mayor's energy hierarchy for reducing carbon dioxide emissions, which involves reducing energy demand through adopting sustainable design principles.

Energy efficiency measures can be split into the following categories:

- Passive interventions, which involve performance improvements to passive elements such as the walls, glazing, build quality etc.
- Interventions to the building systems, which involve improvements to some of the energy consuming devices (such as low energy lighting). .

Stage 1 has been undertaken by Hilson Moran, mechanical and electrical building engineers for the Proposed Development.

5.1 Passive interventions

Most of subheading 5.1 remains valid from the previous submission.

Table 7 and Table 8 below detail the energy efficiency measures that have been applied to the scheme design for residential and non-residential buildings.

Table 7: Dwelling fabric and system efficiencies

Building Element	**Part L1A:2013 limiting factors**	**SAP 2012 Reference Values (W/m^{2}K)**	**Proposed performance (W/m^{2}K)**
[1]External wall adjacent to commercial premises	0.30	0.18	0.30
[2]Roof	0.20	0.13	0.13
[3]Floor	0.20	0.13	0.13
[4]Party wall	0.20	0.00	0.00
Curtain wall	2.00	-	0.90
Thermal Bridging	n/a	As per Appendix R of SAP 2012 document	See point 5 below
Frame Percentage (window performance)	-	30%	0% (See Appendix 2.5 of SAP 2012 Conventions 01

Building Element	Part L1A:2013 limiting factors	SAP 2012 Reference Values (W/m^2K)	Proposed performance (W/m^2K)
			September 2018 (v 8.0))
Solar transmittance, (g-value) (window performance)[6]	-	0.63	0.43
Thermal mass		Medium – 250 kJ/m^2K	Low – 100 kJ/m^2K

[1]External wall refers to any exposed wall or wall to an unheated space (e.g. wall between the flat, cycling stores, lift core, etc.).
[2]Roof refers to the top roof of the building and any terrace/exposed ceiling.
[3]Floor refers to any ground/exposed floor or any floor above an unheated space (e.g. bicycle store, bin store etc).
[4]Party wall refers to walls between the dwelling and another heated space. The applied U-value requires either a solid wall or fully filled cavity with effective sealing at all exposed edges and in line with insulation layers in abutting elements.
The stair core doors have smoke seals and the lift doors have no draught proofing. Therefore, these areas (both stair core and lifts) should be classed as heated since the communal area is heated. All common areas to be heated with fixed heaters (staircases/lift lobbies/entrance lobbies).
[5] The following measures were carried out to adjudge the thermal bridging performance:

- Thermal bridging convention for curtain walls has been applied
- Curtain wall U-value above includes improvement in thermal bridging performance
- Default Psi values were applied for junctions outside curtain wall system
- Assumed Psi values for balcony junction (E23) is 0.3

[6] The performance of the glass will be investigated further during the next design stage based on the CIBSE TM59 overheating analysis.

Table 8: Non-residential residential building fabric performance

Building Element (W/m2K)	Part L1A:2013 limiting factors (W/m2K)	School (W/m2K)	Office (W/m2K)	Retail (W/m2K)
External wall	0.35	0.23	0.35	0.21
Floor	0.25	0.2	0.13	0.19
Roof	0.25	0.18	0.13	0.13
Windows	2.2	1.49	1.38	1.68
Personnel doors	2.2	1.27		

Table 9: Non-residential air permeability performance for offices

Air Permeability	Worst acceptable standard	Air permeability for value for the development
$m^3/(h.m^2)$ at 50 Pa	10	3

The fabric performance for the roof has improved for offices from 0.25 W/m^2K (2017 submission) to 0.13 W/m^2K.

Air permeability has improved from 5 $m^3/(h.m^2)$ at 50 Pa (for all non-residential in the 2017 submission) to 3 $m^3/(h.m^2)$ at 50 Pa (for offices in this submission).

5.2 Energy Efficient Building Systems

Introduction to subheading 5.2 remains valid from the previous submission.

Improvements have been made in lighting and fan coil units when compared to the 2017 submission. The fan coil terminal units' specific fan power performance has been improved to energy efficiency values that are more representative in the current workspace market (0.15W/ls). The same improvement was applied to office floor lighting efficiencies, where it is more typical that $6W/m^2$ is achieved in delivered commercial space fit-outs.

5.2.1 Refurbished buildings

Building BF-F is proposed to be retained and refurbished and the energy efficiency results are presented separately. The full BRUKL (Building Regulation UK Part L) report for building BF-F can be found in Appendix B. The results show that an emission saving of 39% is achieved through the implementation of energy efficiency measures such as better insulated floor, roof and windows. Previously, this was only saving 3.5% of the notional carbon emissions.

Table 10: Building BF-F energy efficiency results

BF-F	Actual	Notional
Total emissions ($kgCO_2/m^2$)	15	24.7

5.3 Cooling strategy

In accordance with the GLA's Energy Assessment guidance, the cooling strategy for the Proposed Development is set out below.

Minimisation of internal heat generation through energy efficient design

- Heat gain from lighting inside dwellings is kept to a minimum as a result of a 100% energy-efficient lighting design solution.
- Reduced glazing areas have been reviewed by GLA so that sufficient daylight is still provided in the revised design

- Insulation levels are specified in line with the London Heat Network Manual and provided to all heat distribution pipework within and outside the dwellings
- Heat gains from residential appliances and equipment can be limited through low energy recommendations provided in a Home User Guide for residents. The Home User Guide helps residents understand the ways by which they can run their homes efficiently.

Reduction of the amount of heat entering the building in summer

- Early design stage workshop and overheating assessments were carried out to determine effective mitigation measures to limit solar gain. The following measures were adopted:
  - The shading effect of the trees on lower floors of the proposed development are not included in the dynamic thermal model, however these could help reduce internal temperatures in practice.
  - Balconies are provided across most facades to provide external shading from higher solar altitudes. In individual cases on west and east-facing facades, balconies were offset towards the south to provide better shading and to increase the view of the sky. Balconies have been used as the primary method of shading, now to be delivered to 89% of the new units within the detailed portion of the masterplan
  - The glass solar transmittance (g-value) is limited to 0.43. A lower g-value will have a detrimental effect on the glass light transmittance, and therefore on daylight levels.

Management of the heat within the building through exposed thermal mass and high ceilings

- A medium level of internal thermal mass surfaces was assumed for the residential element of the proposed development. This will be integrated at detailed design stage.

Passive ventilation

- The parts of windows that open, and therefore the free ventilation areas, were optimised over the course of the previous design development to the current range of circa 30 – 60% of the proposed window areas.
- Balcony doors offer a larger free ventilation area of up to 96% of the window/door areas.
- Natural background trickle ventilation is provided.
- It should be noted that the potential conflict of natural ventilation and achieving noise criteria for apartments that are affected by the railway line that runs along the south west boundary of the Proposed Development, was discussed in detail with LBS at a pre-application meeting in July 2017. LBS advised that it was acceptable to calculate overheating assessments with openable windows, whilst ensuring that adverse effects from noise are mitigated and minimised by design.
- All units across the site have been modelled for overheating using TM59 (apart from apartments provided with comfort cooling). The scheme as

previously submitted included mechanical cooling to units where deemed necessary.

Mechanical cooling

- Mechanical ventilation with heat recovery is specified for the residential accommodation, with summer bypass. This is a purge system to minimise energy demand and include heat recovery (MVHR). Details of the MVHR are stated below:
  - Kitchen + 1 wet room: SFP: 0.42, Heat recovery efficiency: 91%
  - Kitchen + 2 wet rooms: SFP: 0.44, Heat Recovery efficiency: 91%
  - Kitchen + 3 wet rooms: SFP: 0.52, Heat Recovery Efficiency: 90%
- All efforts were made to avoid the use of comfort cooling in apartments, as outlined above.
- Comfort cooling is proposed (25% of apartments across the site) for acoustic reasons. Room air conditioners (Energy Label Class: A) and EER of 3.75 are to be used.

Table 8 on the following page is intended to highlight the trade-offs considered while proposing several building performance measures. The Red, Amber, Green convention describes the negative, neutral and positive impacts respectively across a number of indicators, importantly overheating, energy and carbon targets. The table shows that where one measure might have a negative effect, another will help counter the impacts. For example, energy saving measures that have a potential to increase overheating are integrated with measures such as shading, comfort cooling and ventilation.

The non-residential mechanical systems will maximise the use, where practical, of Variable Refrigerant Flow (VRF) system for the 2019 Amended Proposed Development. The VRF system suits the proposed non-residential units well as it has an inherent modularity that aligns with the multi-tenant flexible offer required by Grosvenor. The distribution risers between the internal and external plant tend to be smaller and more flexible than traditional pipework. The modular nature of the external units is advantageous for their roof mounting on a number of the buildings compared to a larger single item of plant.

Table 11 Traffic light indication describing trade-off of proposed building performance measures

Considerations	Design measures proposed	Fabric efficiency target	Energy	Carbon targets	Daylight	Acoustic	Overheating	Air quality	Embodied carbon
BE LEAN									
Fabric performance	Roof, floor, curtain wall insulated								
Thermal bridging	Ability of materials to conduct heat, i.e. high thermal conductivity				n/a	n/a		n/a	n/a
Window sizes	The window to wall ratio is limited to 40:60. Can increased in case by case basis							n/a	
Natural ventilation	Balanced with heat recovery – Vent Axia - Sentinel Kinetic Plus BS				n/a				
Solar control glass	Solar transmittance of 0.43								
Internal blinds	Shading installed internally within units					n/a		n/a	
External shading	Shading installed to external facades					n/a		n/a	
Balconies	Balconies provide shading to units located on lower floors (comprise 89% of the new units).					n/a		n/a	
Thermal mass	Ability of materials to absorb and store heat, i.e. low thermal conductivity				n/a	n/a		n/a	n/a

Considerations	Design measures proposed	Fabric efficiency target	Energy	Carbon targets	Daylight	Acoustic	Overheating	Air quality	Embodied carbon
MVHR	This is a purge system to minimise energy demand and include heat recovery (MVHR).				n/a			n/a	
Comfort cooling	System Type: Split/multiple system Energy Label Class: A EER (measured in accordance with BS EN 14511): 3.75				n/a			n/a	
Efficient lighting	100% Low Energy Lights The luminous efficacy is greater than 45 lamp lumens per circuit –Watt with a total output greater than 400 lamp lumens					n/a	n/a	n/a	

5.3.1 Cooling and overheating summary

The full overheating assessment report is shown in Appendix C.

There is a significant improvement in the mitigation of overheating risk between the 2017 Masterplan Application and the 2019 Amended Proposed Development. The majority of apartments in the 2019 Amended Proposed Development comply with the overheating risk criteria as defined by CIBSE TM59.

For the apartments which do not comply with the CIBSE TM59 criteria, opportunities for further passive mitigation are being considered and continue to be incorporated into the building design discussions as the design evolves. The limited number of instances where high efficiency comfort cooling is proposed is to address high acoustics impact issues.

Comfort cooling is proposed for 25% of apartments across the site.

Table 9 shows the weighted average cooling demand for the non-residential residential buildings of the Proposed Development. The results show that the actual cooling demand is lower than the notional demand (as calculated using the SBEM (Simplified Building Energy Model), developed by BRE (Building Research Establishment).

Table 12: Area weighted average building cooling demand (MJ/m^2)

	School	**Office**	**Retail**
Actual	1,040	149.65	167
Notional	1,182	194.3	173

5.4 Results of Stage 1: Use Less Energy

There are a number of challenging site issues, such as south facing facades overlooking the railway needing good acoustic performance. This has meant that some of the residential accommodation has an overheating risk and active cooling is required (see section 6.2). Nonetheless, the 2019 Amended Proposed Development comfortably meets the Adopted London Plan requirement to meet Part L 2013 with Be Lean measure alone (it achieves 5.3%, 2% residential and 17% non-residential).

However, the above mentioned challenges have meant that it has not been feasible to achieve the Draft New London Plan for energy efficiency on residential buildings, and as a result the residential properties do not achieve the proposed new efficiency targets (residential developments should achieve at least a 10 % improvement on Building Regulations from energy efficiency measures). The non-residential aim in the Draft New London Plan for 15% energy efficiency is met and exceeded. The total energy demand following the implementation of the energy reduction measures is outlined in the tables below.

Table 13: Be lean residential carbon reduction

Model	Regulated CO_2 Emissions (tCO_2/year)	Regulated CO_2 Savings (tCO_2/year)	Regulated CO_2 Savings (%)
Baseline: Part L 2013	1,624		
After energy demand reduction	1,597	27	2%

The current set of passive measures do not result in every residential dwelling in the Proposed Development improving on Part L from energy efficiency alone, however overall the residential meets and exceeds the adopted London Plan targets.

Table 14: Be lean non-residential residential carbon reduction

Model	Regulated CO_2 Emissions (tCO_2/year)	Regulated CO_2 Savings (tCO_2/year)	Regulated CO_2 Savings (%)
Baseline: Part L 2013	505		
After energy demand reduction	418	87	17%

Non-residential residential emissions reduced by 17% after energy efficiency measures were implemented. The non-residential properties achieve the new efficiency targets (non-residential developments should achieve at least a 15% improvement on Building Regulations from energy efficiency measures).

The emissions for the whole development reduced by 5.3% from the baseline emissions as a result of energy efficiency measures, which meets requirements of the current adopted London Plan.

Figure 3: Be lean residential carbon savings

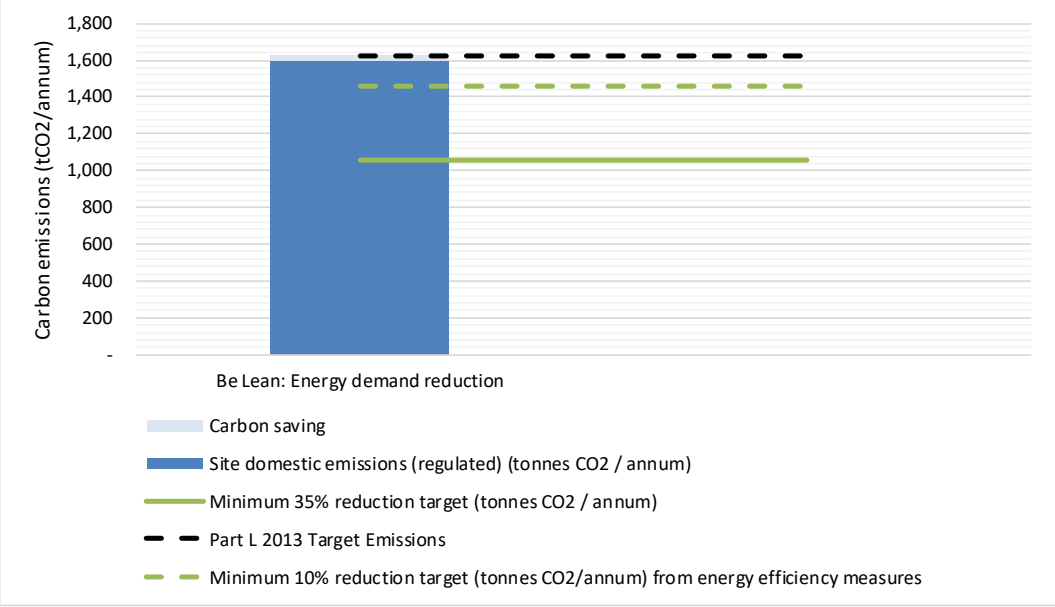
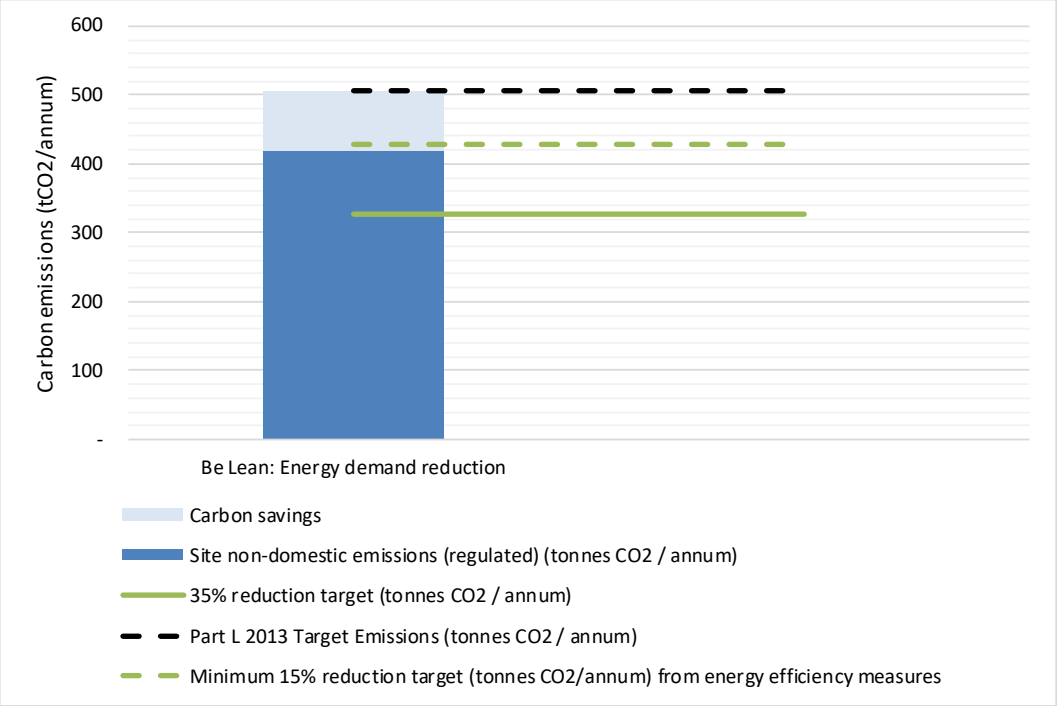


Figure 4: Be lean non-residential residential carbon savings



6 Stage 2: Supply Energy Efficiently 'Be Clean'

This section examines the second tier of the Mayor's energy hierarchy. It considers specifically the opportunity for connection of the Proposed Development to a nearby low carbon district heating or cooling network.

6.1 Heat networks

6.1.1 Existing heat networks

Subheading 6.1.1 remains valid from the previous submission

6.1.2 Heat Network Carbon Factor

The updated heat network carbon factor provided by Veolia (the SELCHP operator) and used in the energy assessment addendum is 0.053 $kgCO_2/kWh$. The carbon factor previously used (as agreed with the GLA in 2017) was $0.058kgCO_2/kWh$. The new figure of 0.053 $kgCO_2/kWh$ is only -0.005 (5/1000) below the previous figure. This number was updated by SELCHP after SAP updates were adopted by Veolia for calculating heat carbon intensity.

During the design evolution of the Proposed Development, BRE (who administer the Standard Assessment Procedure (SAP)) confirmed that because SELCHP is not registered with them, the default approach would be to model the system as a CHP. This would require a default carbon factor to be used for waste fuel, which results in a negative dwelling emission rate.

6.1.3 Planned future heat networks

Subheading 6.1.3 remains valid from the previous submission

6.1.4 On-site combined heat and power (CHP)

Subheading 6.1.4 remains valid from the previous submission

6.1.5 On-site secondary heat sources

Subheading 6.1.5 remains valid from the previous submission

6.1.6 Proposed heat strategy

Subheading 6.1.6 remains valid from the previous submission

6.2 Cooling and Overheating

6.2.1 Existing cooling networks

Subheading 6.2.1 remains valid from the previous submission.

6.2.2 Planned future cooling networks

Subheading 6.2.2 remains valid from the previous submission.

6.2.3 On-site combined cooling, heat and power network

Subheading 6.2.3 remains valid from the previous submission.

6.3 Results for Stage 2: Supply energy efficiently

A connection to SELCHP would result in the Proposed Development achieving a 49% reduction to regulated carbon emissions over the Part L 2013 baseline. The results show that a 61% reduction is achieved on the residential emissions and a 11% reduction is achieved for the non-residential buildings because they now connect in part to SELCHP. In the previous submission, residential emissions were reduced by 57% and the non-residential emissions were reduced by 1%.

Table 15: Results for be clean residential emissions

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	1,624		
Be Lean - Proposed scheme – Demand Reduction	1,597	27	2%
Be Clean - Efficient Supply – SELCHP Connection	614	983	61%

Table 16: Results for be clean non-residential emissions

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	505		
Be Lean - Proposed scheme – Demand Reduction	418	87	17%
Be Clean - Efficient Supply – SELCHP Connection	361	57	11%

Figure 5: Be clean residential carbon savings

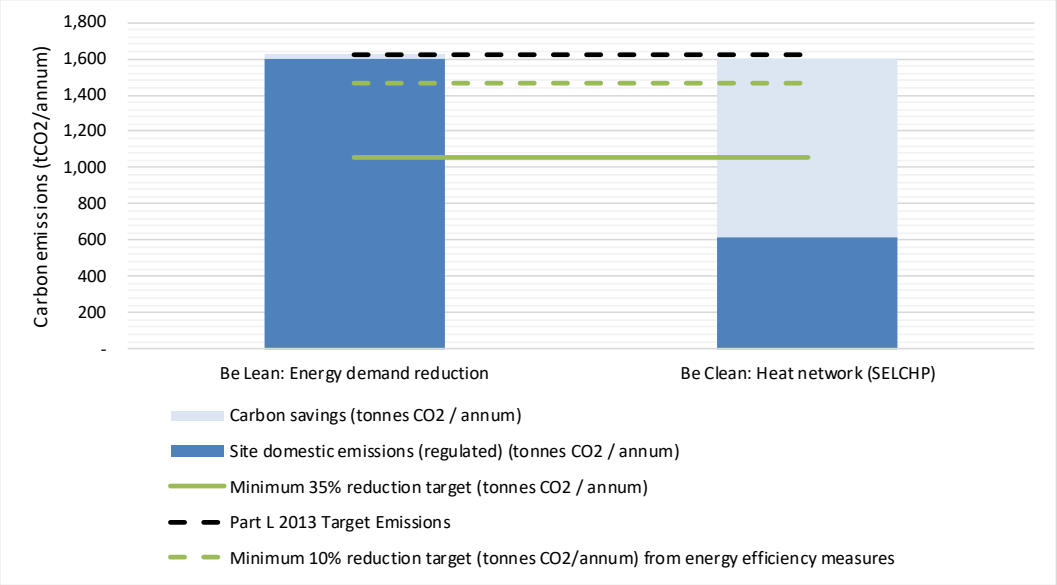
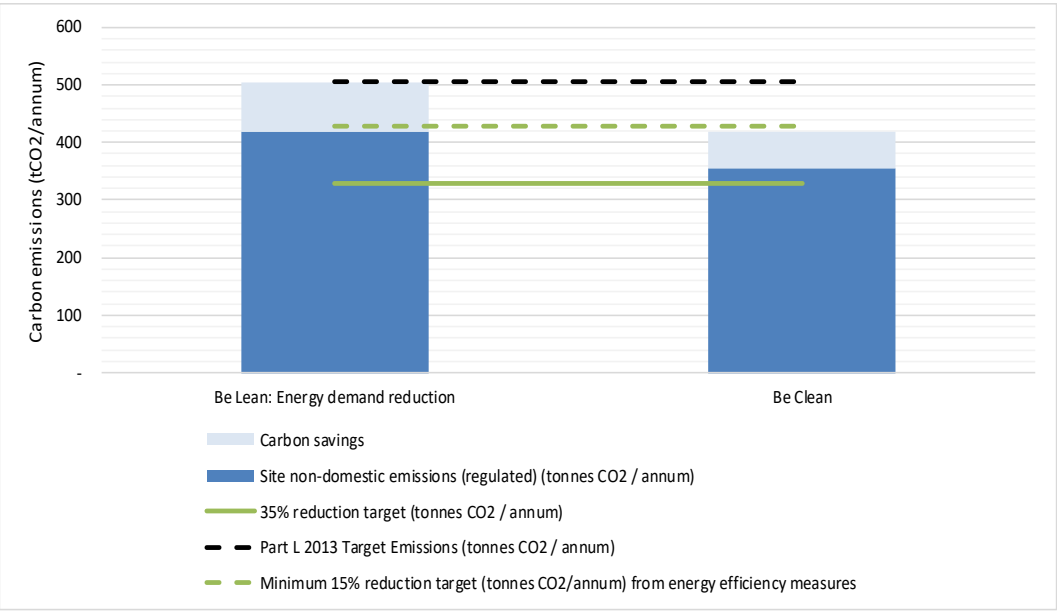


Figure 6: Be clean non-residential carbon savings



7 Stage 3: Use Renewable Energy (Be Green)

Heading introduction for heading 7 remains valid from the previous submission.

7.1 Solar technologies

7.1.1 Solar thermal

Subheading 7.1.1 remains valid from the previous submission.

7.1.2 Photovoltaic Panels

Solar PV modules are an established technology with the capability of integrating readily into a number of different site-wide energy strategies regardless of the heating or cooling strategy chosen. However, this system requires significant equipment investment but has relatively low efficiencies.

Further considerations regarding PV are:

- The mean time to failure for inverters is 10-15 years. As these represent up to 25% of installed cost, the owner of the building would need to set aside monies to cover replacement costs of this equipment.
- PV panels need to be cleaned periodically and therefore staff and resources would need to be made available over the lifetime of the installation.
- Approximately 350m^2 of roof has been specifically identified for PV on the Proposed Development. The roof area is limited to 350m^2 to balance space planned for green roofs, amenity areas and plant services.

Secondary heat sources are likely to be restricted as a result of the intended connection to SELCHP and therefore only solar PV panels are considered feasible and suitable for the Proposed Development.

It is proposed that 350m^2 of PV could feasibly be provided on the Proposed Development.

7.2 Heat pumps

7.2.1 Ground source heating and cooling

Subheading 7.2.1 remains valid from the previous submission.

7.2.2 Air Source Heating and Cooling

Subheading 7.2.2 remains valid from the previous submission.

Variable Refrigerant Flow (VRF) systems generally have a high seasonal cooling efficiency and will operate simultaneously as heat pumps at certain times. Heat pumps are classed as Renewable Energy, and therefore the VRF system makes a contribution towards the Be Green targets. In offices there is often a simultaneous heating and cooling demand and VRF systems are able to respond to this in an

energy efficient manner by internally re-cycling heat. Only the differences between heating and cooling demands is either rejected to atmosphere or extracted from it.

7.2.3 Water Source Heating and Cooling

Subheading 7.2.3 remains valid from the previous submission.

7.2.4 Conclusion on heat pumps

Subheading 7.2.4 remains valid from the previous submission.

7.3 Biomass and energy from waste

7.3.1 Biomass heating

Subheading 7.3.1 remains valid from the previous submission.

7.3.2 Anaerobic Digestion

Subheading 7.3.2 remains valid from the previous submission

7.3.3 Biomass Combined Heat and Power

Subheading 7.3.3 remains valid from the previous submission

7.3.4 Conclusion on biomass and waste

Subheading 7.3.4 remains valid from the previous submission.

7.4 Wind

The review of wind turbines in 7.4 remains valid from the previous submission.

7.4.1 Conclusions on wind

Subheading 7.3.4 remains valid from the previous submission.

7.5 Renewable Technology Integration

Subheading 7.5 remains valid from the previous submission

7.6 Results for Stage 3: Using Renewable Energy

The carbon dioxide emission reduction from implementing the proposed energy strategy option using the VRF system and roof mounted photovoltaic panels is illustrated below in tables 17 to 19, a saving of 0.7%.

The result of combining the previous savings with the renewable energy technologies in Stage 3 results in cumulative savings of 55%. This exceeds the current London Plan target for reducing CO_2 emissions beyond a Part L 2013 compliant baseline.

Table 19 shows the additional carbon savings that could be achieved by installation of PV panels on the available roof space.

Table 17: Be green residential carbon savings

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	1,624		
Be Lean - Proposed scheme – Demand Reduction	1,597	27	2%
Be Clean - Efficient Supply	614	983	61%
Be Green - Efficient Supply with Renewables	610	4	0%
Total Cumulative Savings		1,014	62%
Annual savings from off-set payment		610	
Cumulative savings for offset payment[1]		18,297[1].	

[1]Annual savings from off-set payment for 30 years

Table 18: Be green non-residential carbon savings

Model	**Regulated CO_2 Emissions (tCO_2/year)**	**Regulated CO_2 Savings (tCO_2/year)**	**Regulated CO_2 Savings (%)**
Baseline scheme	505		
Be Lean - Proposed scheme – Demand Reduction	418	87	17%
Be Clean - Efficient Supply	361	57	11%
Be Green - Efficient Supply with Renewables	350	11	2%
Total Cumulative Savings		155	31%
Annual savings from off-set payment		350	

Model	Regulated CO_2 Emissions (tCO_2/year)	Regulated CO_2 Savings (tCO_2/year)	Regulated CO_2 Savings (%)
Cumulative savings for offset payment[1]		10,492[1]	

Table 19: Carbon savings for all stages (including Be green) for all site

Model	Regulated CO_2 Emissions (tCO_2/year)	Regulated CO_2 Savings (tCO_2/year)	Regulated CO_2 Savings (%)
Baseline scheme	2,129		
Be Lean – Demand Reduction	2,016	114	5.3%
Be Clean - Efficient Supply	975	1,041	49%
Be Green - Efficient Supply with Renewables	960	15	0.7%
Total Cumulative Savings		**1,169[1]**	**55%**

Figure 7: All stages (including Be green) residential carbon savings

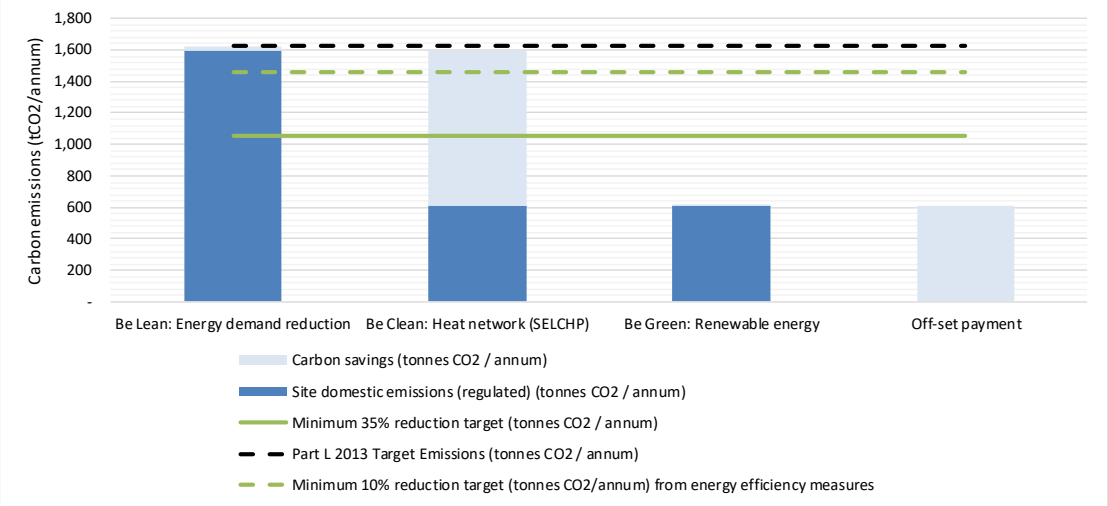


Figure 8: All stages (including Be green) non-residential carbon savings

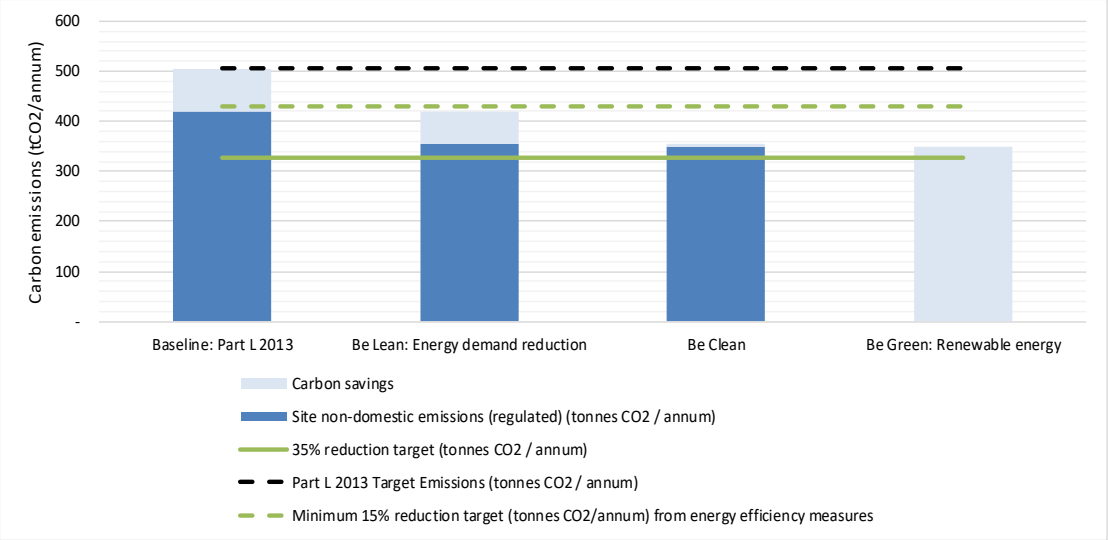
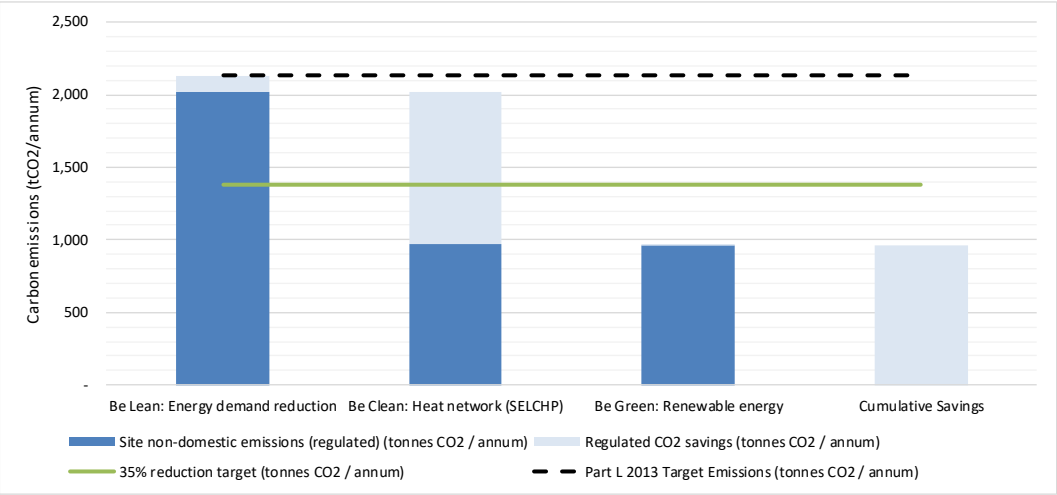


Figure 9: Carbon savings including all stages for all proposed site



8 Energy Strategy Conclusion

8.1 Proposed Energy Strategy

Overall, **the 2019 Amended Proposed Development meets and exceeds all current adopted planning policy**. It also meets and exceeds the majority of the Draft New London Plan with the Be Lean for non-residential (15% carbon savings from energy efficiency measures) and overall requirement of the Draft New London Plan for reducing emissions by 35% for the entire site. The entire site achieves a carbon saving of 55% over the Part L 2013 baseline.

The energy strategy for the Proposed Development is comprised of three main elements: **energy saving measures**; an intended connection of a site-wide heating network to **SELCHP;** and the integration of **renewable PV technology**. This results in significant carbon savings of 1,169 tonnes, a **55% reduction, compared to the Part L 2013 baseline**.

The 2019 Amended Proposed Development also meets the majority of the requirements set out in the Draft New London Plan.

It is intended that the heating demands for all residential floorspace, the school and office will be provided by connection to the existing SELCHP district heat network subject to a reasonable agreement as to that connection being reached.

An overheating assessment has been carried out that determined 25% of the residential dwellings required active cooling due to acoustic and daylighting requirements. The cooling demand for the remainder of the residential accommodation is met through natural ventilation.

Photovoltaic panels will be installed contributing to a small percentage of the total electricity consumption of the proposed development along with the heat pumps in the VRF system. A total of 350m^2 of roof space is available, and when combined with the VRF system savings results in a 0.7% emissions reduction.

In comparison, the current Energy Strategy helps save 59% more carbon than the 2017 submission (1,169 tCO_2/year as opposed to 735 tCO_2/year) even with the increase in residential properties from 1,342 units to 1,548 units.

8.2 Offset payment

The remaining residential regulated carbon emissions from the development are 610 tonnes / annum when calculated using the GLA's preferred methodology (to meet the zero-carbon target). As previously mentioned, LBS calculates contributions to its carbon offset fund by applying £60/tonne for 30 years. This would result in a total of 18,300 tonnes that would require an offset payment of £1.098m based on the calculation methodology proposed by the GLA. However, as mentioned in section 6.1.1 of this report, if the BRE SAP methodology is applied a negative residential emissions rate results. Application of the BRE SAP methodology would mean that no contribution to the LBS carbon offset fund would be required or payable.

If the Proposed Development is required to make carbon offset contribution following the determination of the planning application, it is proposed that the total amount due across the whole development is fixed (with payment on a phased basis) within the section 106 agreement that would precede the grant of full planning permission.

9 Energy monitoring

An addition, the last stage of the energy hierarchy is Be Seen: monitor, verify and report on energy performance. This is to track the move towards zero-carbon development and to ensure that carbon emissions planning commitments are being delivered, closing what is often referred to as the 'performance gap'.

As part of the Draft New London Plan it is anticipated that all major development will be required to upload their operational data on a GLA online portal.

The GLA is currently developing a post construction monitoring platform. Under these proposals, developers will be required to upload their energy data onto this platform. The platform will be publicly available to help raise awareness both for developers and occupants on actual energy performance and enable a comparison to design standards. This information will be used to validate developments' performance against their projected performance and understand possible improvements in design methods and GLA policies.

The following areas shall incorporate a Building Management System (BMS) :

- Buildings 01, 05, D, E, F, O, P, Q, R, S, T, V & W (Residential)
- Buildings F & D/E (Commercial).
- Building U (Residential)

It is intended that the BMS will comprise a network of BMS controllers performing control and monitoring functions for the electrical and mechanical plant serving the campus. The PC based BMS operator interface in the management suite will be the tool used to provide reporting of services and supervisory functions. The BMS is linked to occupancy to minimise unnecessary operations. The alarms are routed to a maintenance team via SMS and emails to inform the team of possible failures before it begins to affect the comfort levels of the occupants. The BMS can provide stand-alone control in case of any communication failures. The BMS system can integrate with multiple industry standard protocols and is built using a modular system which future proofs the control system for any potential expansion.

The monitoring systems can be divided into:

- HVAC Plant Control & Monitoring
- Public Health Services
- Electrical Monitoring System
- Miscellaneous Monitoring
- Secondary meters (will comply with Part L1A and L2A)
  - Residential properties (water and smart meter for electric and heat/energy meters). Smart meters will facilitate remote metering access to the supplier and energy display for the occupier)
  - Commercial offices (each office floor within Building F and Building DE metered through utility meters)

– All proposed retail/amenity units will be metered by tenants' selected energy supplier for direct billing. The supply for each unit will be derived from the BNO distribution, with the meter located within the retail/amenity unit.

10 References

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GLA 2016. Energy Planning: GLA Guidance on preparing energy assessments. Greater London Authority, April 2015.

GLA 2019. Draft New London Plan consolidated suggested changes (clean). Greater London Authority, July 2019

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Southwark Council 2017. New Southwark Plan Proposed Submission Version. Southwark Council, December 2017.

Appendix A

Residential SAP Reports

A1

Appendix B

Non-residential BRUKL reports

B1

Appendix C

Overheating Assessment

C1