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Building Assessments for a Sustainable Environment

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Energy Statement for Planning

Hampton Hick c/o Kingston Estates
73 Cornhill
London
EC3V 3QQ

New Apartment Building
1 Saint James' Road
Hampton Hill
TW4 6LL

14 May 2020

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Contents:

Report Details:

Prepared by	Checked by	Date	Project	Revision
Allan Jones	Peter Kinsella	14.05.2020	7279	2.0

1 Introduction

This Energy Statement has been prepared in support of the planning application for the proposed development of the site at 1 St James' Road, Hampton Hill. The proposals consist of one new-build, three-storey apartment block comprised of nine apartments, with associated hard and soft landscaping and all other associated works.

Relevant Planning Policy

National Planning Policy Framework (NPPF)

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 development, 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 development; and

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

In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

The Current Adopted London Plan

The London Plan requires an energy assessment for each planning application referable to the Mayor, setting out how the London Plan energy policies currently in force (specifically Policy 5.2) will be met within the development. Applicants are required to set out how the proposals apply the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

The hierarchy provides the mechanism through which the carbon dioxide (CO2) emission reduction targets in Policy 5.2 of the London Plan are achieved.

Policy 5.2 *As outlined in the Housing SPG, from 1 October 2016 the Mayor will apply a zero-carbon standard to new residential development. The Housing SPG defines 'Zero carbon' homes as homes forming part of major development applications where the residential element of the application achieves at least a 35 per cent reduction in regulated carbon dioxide emissions (beyond Part L 2013) on-site. The remaining regulated carbon dioxide emissions, to 100 per cent, are to be off set through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere (in line with policy 5.2E).*

Local Policy – London Borough of Richmond Upon Thames

The London Borough of Richmond Upon Thames Local Plan was adopted in July 2018 and sets out the vision and policy up to 2033.

Policy LP 22

Sustainable Design and Construction
A. Developments will be required to achieve the highest standards of sustainable design and construction to mitigate the likely effects of climate change. Applicants will be required to complete the following:

1. Development of 1 dwelling unit or more, or 100sqm or more of non-residential floor space (including extensions) will be required to complete the Sustainable Construction Checklist SPD. A completed Checklist has to be submitted as part of the planning application.

Reducing Carbon Dioxide Emissions

B. Developers are required to incorporate measures to improve energy conservation and efficiency as well as contributions to renewable and low carbon energy generation. Proposed developments are required to meet the following minimum reductions in carbon dioxide emissions:

1. All new major residential developments (10 units or more) should achieve zero carbon standards in line with London Plan policy.

2. All other new residential buildings should achieve a 35% reduction.

Targets are expressed as a percentage improvement over the target emission rate (TER) based on Part L of the 2013 Building Regulations.

C. This should be achieved by following the Energy Hierarchy:
1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy Targets are expressed as a percentage improvement over the target emission rate (TER) based on Part L of the 2013 Building Regulations.

Decentralised Energy Networks

D. The Council requires developments to contribute towards the Mayor of London target of 25% of heat and power to be generated through localised decentralised energy (DE) systems by 2025. The following will be required:

1. All new development will be required to connect to existing DE networks where feasible. This also applies where a DE network is planned and expected to be operational within 5 years of the development being completed.

Based on the above, the relevant polices require that the proposed development will need to:

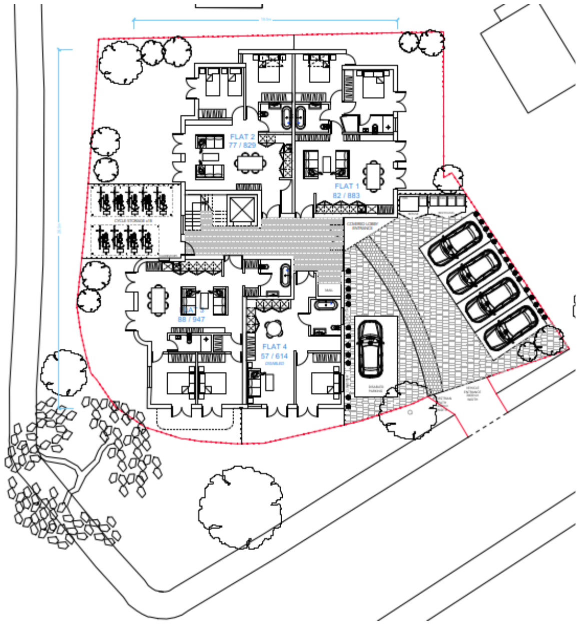
- Apply the ‘be lean, be clean, be green’ energy hierarchy
- Achieve a 35% on-site saving in CO2 emissions through the provision of energy efficiency measures in the design and low carbon and renewable technologies
- Provide a copy of the Richmond sustainability Checklist

This report demonstrates how the dwellings will meet current Building Regulation requirements for energy efficiency (baseline scenario) and, through an assessment of energy efficient measures and renewable technologies, how the dwellings can achieve the required 35% saving in CO2 emissions.

For the purpose of this report we have assessed a sample of the dwellings and extrapolated the results based on a floor area weighted average of the assessed units.

2 Proposed Development

As previously detailed, proposals are for the development of a three-storey block of nine apartments on a site at 1 Saint James' Road, Hampton Hill. Access and egress for the development will be provided off Saint James' Road to the south-east. There are substantial areas of flat roof with some space given over to balconies/terraces as well as green sedum roofing. Main living spaces are dual aspect and windows are typically generous.



The scale and nature of the site (e.g. adjacent buildings situated within close proximity to the development) constrains the proposals in terms of the layout, positioning, orientation, and overshading. Subsequently, these constraints will impact on the feasibility of certain renewable technologies (as discussed in Section 4 of this report).

3 SAP 2012 and Building Regulations (2013)

The Standard Assessment Procedure (SAP) 2012 is the UK Government methodology for assessing and calculating the energy performance of dwellings.

The SAP calculation takes into account a range of factors that contribute to energy efficiency, including:

- Materials used for the construction of the dwelling and the thermal insulation of building fabric (u-values[1])
- Ventilation of the dwelling
- Efficiency and control of heating systems
- Fuel used to provide space heating,
- Lighting
- Heat recovery systems
- Renewable technologies

Approved Document Part L of current Building Regulations (2013) addresses the conservation of fuel and power. Part L is divided into four separate documents:

- Part L1A Newly Constructed Dwellings
- Part L1B Existing Dwellings
- Part L2A Newly Constructed Non - Dwellings
- Part L2B Existing Non - Dwellings

Part L1A sets out the minimum energy efficiency requirements for ***new dwellings*** and is based on the SAP methodology.

To comply with Part L1A, the SAP calculation should demonstrate how the dwelling will either meet or achieve a percentage reduction in the Dwelling Emission Rate (DER) under the required Target Emission Rate (TER). Please note the new Part L 2020 and SAP 10 is due end of 2020, therefore the current specification is based on SAP 2012 and a further calculation on SAP 10 maybe required depending on when this development is registered with building control.

[1] U-values (Thermal Transmittance) - the measure of the overall rate of heat transfer by all mechanisms under standard conditions, through a particular section of a construction. Lower u-values mean better thermal insulation

4 Baseline Scenario (Part L1A Compliance; No Renewable Technologies)

SAP modelling has been used to calculate the Building Regulations compliance threshold for the whole building. The Target Emission Rate forms the baseline from which any CO2 emissions reductions can be measured. Simply complying with the minimum standards for building fabric and services would not usually be sufficient to ensure a 'pass' as the limiting values are designed to allow a degree of flexibility in achieving the main CO2 limiting criterion. A sample of units has been modelled in full, representing the various orientations and positions in the block

Table 1: Baseline SAP Calculation Results

Baseline	Flat 1 Ground floor	Flat 4 Ground Floor	Flat 5 Mid Floor	Flat 8 Top Floor
Target Emission Rate (TER) (kg CO2/m^2/year)	20.30	20.51	19.36	19.57
Floor Area (m^2)	82.33	57.35	88.13	112.67
Total Baseline Emissions (kg CO2/year)	1,672	1,176	1,706	2,205

Table 2: Baseline Area Weighted Average

	Calculation
Weighted Average Target Emission Rate (kg CO2/m^2/year)	19.85
Total floor area of all units (m^2)	760
Total Projected Baseline Emissions (kg CO2/year)	**15,086**

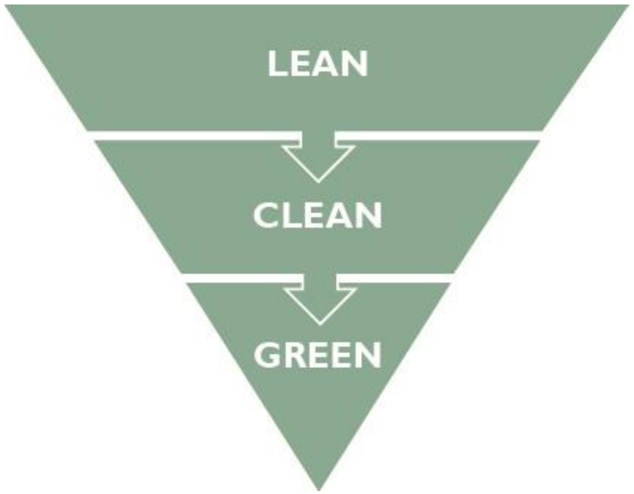
The baseline Target Emission Rate CO2 emissions are shown to be on average 19.85 kg/m^2/year.
The estimated total **baseline CO2 emissions for all dwellings are calculated as 15,086 kg/year**.

Proposed Strategy

- Minimise demand for energy
- Efficiently use energy
- Generate energy

The Energy Hierarchy

Useful improvements can be made at all levels, but maximum benefits will be achieved if the focus is first on minimising total energy requirements – BE LEAN, then look at making better use of the energy and supplying it efficiently - BE CLEAN, then thinking about low and zero carbon technology and energy generation on site - BE GREEN.



5 Energy Efficiency Improvement (Be Lean)

Before considering renewable energy generation, the building has been designed to minimise demand for energy, as well as to supply and use it efficiently, and exceeds the key minimum standards as set out in Part L1A. The following measures are proposed:

- Insulation - good levels of insulation with u-values exceeding Part L1A requirements (see Table 3).

Table 3: Fabric Standards (u-values W/m²K)

	Part L1A Limiting Parameters	Proposed Dwellings	Betterment
Walls	0.30	0.18	40%
Hallway Walls	0.30	0.24	20%
Ground Floor	0.25	0.10	60%
Roof	0.20	0.14	30%
Window/Glazed Doors	2.00	1.30	35%

- Thermal Bridging - Accredited Construction Details provide the continuity of insulation and therefore apply a significant improvement factor on the energy performance of a dwelling, High performance specialist insulated lintels have also been incorporated for the windows.

- Ventilation – a design air permeability (DAP) of 5.00 m^3/hm^2 (@50Pa) is targeted (noting that a DAP of 10 m^3/hm^2 (@50Pa) or lower is the Part L1A minimum standard).

- Heating and Controls – 89.6% efficient ErP Class Combi Boiler (a Baxi 624 has been used for modelling) and radiators with time and temperature zone control, and weather compensator is indicated for each apartment. This offers high performance using up to date technology and individual heating systems don't suffer the distribution losses of communal systems and allow users the freedom to shop around for energy prices.

- Lighting - the design of the dwellings allow for high levels of natural daylight which will reduce the energy use from internal lighting. All internal lighting will be low energy LED fittings.

- Fully filled and edge sealed party wall cavities.

The above specification has been incorporated into the baseline SAP calculation; the results are summarised in Table 5 (with the baseline SAP worksheet provided in Appendix A).

Table 4: Energy Efficient Design SAP Calculation Results

Baseline	Flat 1 Ground floor	Flat 4 Ground Floor	Flat 5 Mid Floor	Flat 8 Top Floor
Dwelling Emission Rate (TER) (kg CO_2/m^2/year)	17.96	19.32	18.38	18.83
Floor Area (m^2)	82.33	57.35	88.13	112.67
Total Baseline Emissions (kg CO_2/year)	1,479	1,108	1,620	2,122

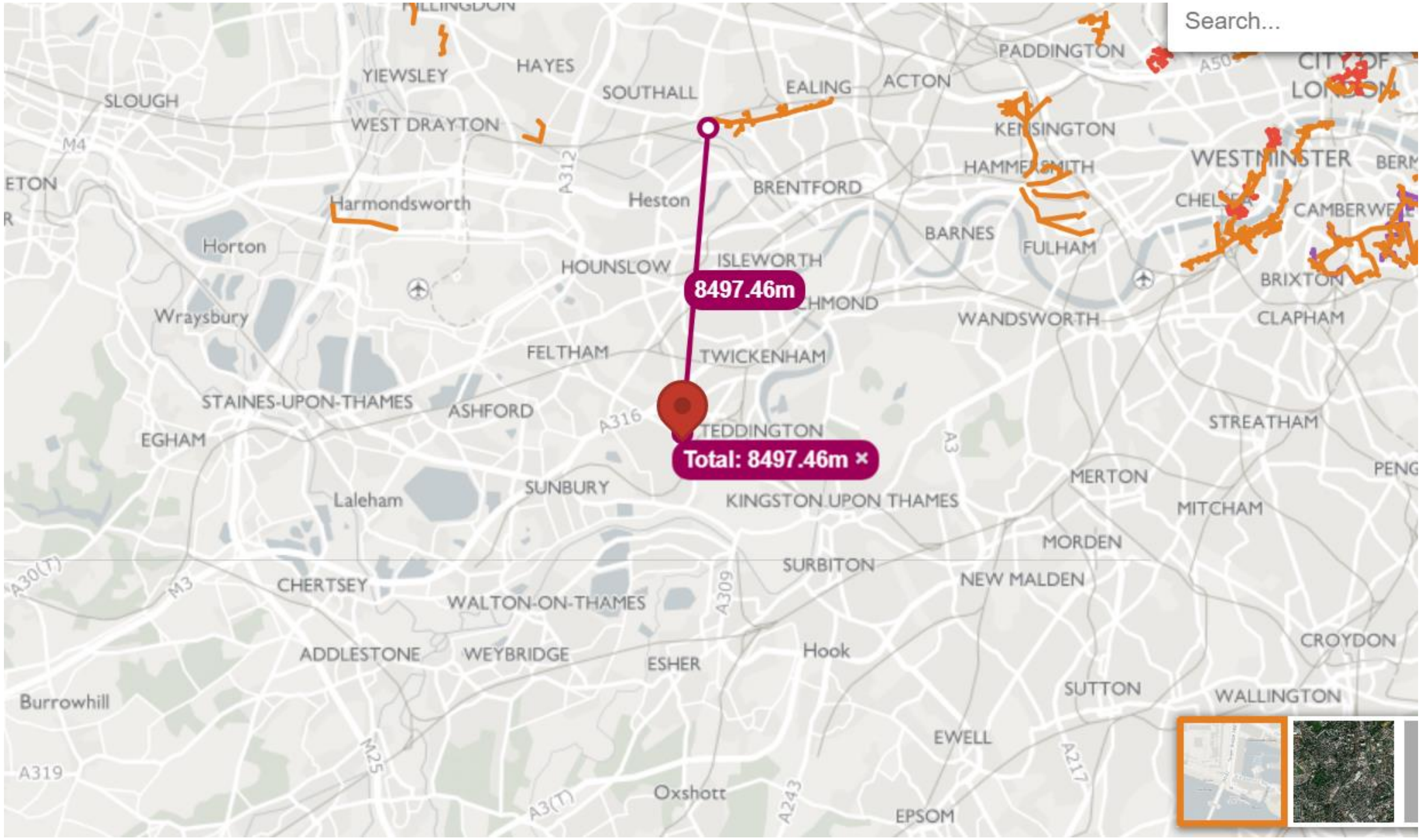
Table 5: Total Estimated Emissions

	Calculation
Area Weighted Dwelling Emission Rate (DER) (kg CO_2/m^2/year)	18.59
Total floor area of all units (m^2)	760
Total Efficient Design Emissions (kg CO_2/year)	**14,128**
Total Baseline Emissions (kg CO_2/year)	15,086
Reduction in emissions over baseline target	**958kg**
Betterment	**6.35%**

The Dwelling Emission Rate CO_2 emissions following energy efficiency improvements are shown to be on average 18.59 kg/m^2/year. The resulting estimated total CO_2 emissions for all dwellings are calculated as 23,965 kg/year, an **6.35% improvement.**

6 Energy Supply (Be Clean)

The London Heat Map was consulted in case any practical opportunities to take advantage of district heating were present. The site (indicated by red pin) is not located in range of any existing or proposed schemes (indicated in red and purple/orange respectively).



7 Renewable Technology Impact (Be Green)

As previously detailed, in order to meet the requirements of Policy 5.2 of the London Plan, the proposed dwellings will need to achieve a 35% saving in CO_2 emissions through the provision of energy efficient measures and if needed, on-site renewable technologies. This is to meet the councils minimum target of 35% improvement in CO_2 emissions.

The baseline calculation indicates that the total average CO_2 emissions are 9973 kg/year. It has been shown that through the incorporation of energy efficient measures (detailed in Section 5 of this report) there can be an average reduction of 11% in CO_2 emissions. As such, a further minimum 24% saving in CO_2 emissions is to be provided through renewable technologies to account for the overall 35%.

RENEWABLE 7 LOW CARBON TECHNOLOGIES

The Carbon Trust defines renewable energy as '*energy that occurs naturally and repeatedly in the environment. Therefore, it does not release any net greenhouse gases into the atmosphere*'.

There are a range of renewable and low carbon technologies - some which generate electricity (such as photovoltaic (PV) panels, wind turbines), some which generate heat (such as ground source heat pumps, solar thermal panels for water heating), and some which generate both electricity and heat (Micro Combined Heat and Power). All can afford different benefits in reducing CO_2 emissions from a dwelling. However, their feasibility depends on a number of factors including:

- Orientation
- Space (inside and outside of the dwelling)
- Surrounding topography
- Wind speed (for wind turbines)

In determining the feasibility of renewable technologies for the dwelling, the following have been reviewed:

- Wind turbines
- Ground Source Heat Pumps
- Air Source Heat Pumps
- Biomass
- Micro Combined Heat and Power
- Photovoltaic Panels
- Solar water heating

WIND TURBINES

Wind turbines are used to produce electricity. They can be either pole mounted (in a suitably exposed position) or building mounted; building mounted systems need a suitable wind resource, and subsequently both a structural survey and planning permission.

The immediate surrounding area is comprised of residential dwellings and some tree cover, with the topography relatively flat.

When considering the space needed, cost and maintenance for wind turbines, and the likely low wind velocities in this type of setting, it is determined that wind turbines are not considered to be a suitable or feasible renewable technology for this particular development.

GROUND SOURCE HEAT PUMP (GSHP)

GSHPs use naturally occurring underground low-level heat in areas with appropriate geological features.

Heat is transferred from the ground by either extracting and discharging (re-charging) water from/to the ground directly (open loop) or circulating water through pipes buried within the ground, (closed loop). The water is passed through a heat pump in order to transfer the heat from this water into a higher temperature water circuit used for heating purposes. The loop can be fitted horizontally (laid in a shallow trench) or vertically (in a borehole).

It is important to note that GSHPs require electricity to drive the pump and is therefore not considered a completely 'renewable' technology.

For a GSHP to be installed, there needs to be suitable outdoor space for digging a trench or borehole (and the associated digging machinery) to install the ground loop.

Based on the proposed site layout plan, there could be sufficient space for the installation of a horizontal vertical GSHP system. A vertical installation may also be feasible. However, GSHPs are not considered completely renewable (or zero carbon) as they use grid generated eletrictyand they are not as cost effective as other renewable technologies considered in the report. Degradation of the heat store can also occur and lead to a declining system efficiency. As such a GSHP is not considered a preferred solution when compared to other technologies.

AIR SOURCE HEAT PUMP (ASHP)

ASHP systems absorbs heat from outside air at a low temperature into a fluid which is then passed through a compressor where its temperature is increased. There are two main types of ASHP systems:

- Air to Water - distributes heat through the wet central heating
- Air to Air - produces warm air which is circulated by fans

Like GSHPs, ASHPs require electricity to drive the pump and therefore is not a completely 'renewable' system.

For an ASHP system to be installed, there needs to be ample outdoor space for the external condensing unit; these units can also be noisy and blow out colder air to the neighbouring environment.

Based on the proposed site layout plan, there would be sufficient space for the installation of an ASHP system. However, ASHPs are not considered completely renewable nor a true form of on-site generation as they consume grid electricity. They can merit consideration in the energy efficiency stage but unless development designs prohibit or limit other forms of low carbon technology which do generate renewable energy on-site ASHPs are not a preferred priority option.

BIOMASS

Biomass systems burn wood pellets, chips or logs to provide heat in a single room, or to power central heating and hot water boilers.

There needs to be ample space available for both the boiler and the storage of fuel. There will also be regular deliveries of fuel and therefore adequate site access is required.

In light of the small scale and nature of the development, as well as the location, biomass is not considered an appropriate technology for this site. Furthermore, biomass is now understood to have higher carbon footprints than first thought and is a source of particulate air pollution and is not recommended for urban areas when other technologies are feasible and cleaner.

COMBINED HEAT AND POWER (CHP)

CHP generates both heat and electricity from a single source. Large scale CHP has been available for commercial use for many years, with micro-CHP for the home being a relatively new technology.

Given the scale and nature of the development, and that micro-CHP is a relatively unproven and costly technology at this stage, CHP has been discounted as other cleaner options are feasible. Communal CHP is better suited to more dense developments and where energy demand is more consistent throughout the day in order to keep the system working in the optimum state.

SOLAR PHOTOVOLTAIC (PV)

Solar PV cells (which are mounted together in panels or tiles on the roof) convert sunlight into electricity. The cells are made from layers of semi-conducting material; when the light shines on the cell, an electric field is created across the layers. Although PV cells are most effective in bright sunlight, they can still generate electricity on a cloudy day. The power of a PV cell is measured in kilowatts peak (kWp).

In general, PV cells should be installed so that they are orientated in a southerly direction (to face between south-east and south-west), in an un-shaded area. However ythey can still make a significant contribution to generating energy on-site and lowering CO_2 emissions.

Based on the proposed development layout and that there is no known significant over-shading of main roof spaces from adjacent structures, PV is considered a feasible solution to assess its potential saving in CO_2 emissions from the dwellings.

SOLAR HOT WATER

Solar hot water systems absorb energy from the sun and transfer this energy using heat exchangers to heat water. Systems should be roof mounted and oriented to face between a south-east and south-west direction.

There are three main types of solar heating (as defined by the Carbon Trust):

- Flat Plate Collectors - a sheet of black metal that absorbs the sun's energy encases the collector system. Water is fed through the system in pipes which conduct the heat to the water
- Evacuated Tubes - a series of parallel glass heat tubes grouped together, with each tube containing an absorber tube. Sunlight passes through the outer glass tube to heat the absorber tube which in doing so, the heat is transferred to water flowing through the tube
- Solar Matting - a range of extruded hollow sections of flexible black material that can be used for solar collection. Water passes through the hollow tubes absorbing the heat from the sun

Based on the proposed layout of the dwellings and that there is no significant over-shading, solar thermal would be a feasible option for installation. Typical solar thermal yields tend to be limited as system size increases plateau in CO_2 emission reduction with systems above more than a few metres squared per dwelling. Solar thermal is more affected than PV by cloudy days and lack of direct sunlight. More maintenance is also typically required. As such solar PV is deemed a preferred option for analysis

Renewable Technology Summary

The renewable technology review indicates that the 3 most feasible technologies for installation would be air source heat pumps, solar PV or solar thermal water heating. Of the three, solar PV is the preferred option due to its relatively low maintenance, operational simplicity, availability, reliability, truly renewable on-site energy generation, and typical cost per kg of CO_2 saved.

The final step is to consider on-site renewable energy generation. As such the feasibility of solar PV has been investigated as one of the most practical and feasible technologies that can be applied. It offers significant benefits over other technologies

In order to demonstrate how the development can achieve a further saving in CO2 emissions through renewable energy generation on-site, the energy calculation (as detailed in Section 5 of this report) has been rerun with solar PV technology as the preferred renewable energy solution. This would involve an approximately 11.4 kilowatt-peak PV array to generate electricity on site. The results are summarised in Table 6.

Approximately 11.4 kWp of horizontally oriented panels could be accommodated on flat roof spaces with relatively low overshading.

A comparison of the baseline calculation results, and the total savings from energy efficiency and the proposed Solar PV included is shown in Table 6 below.

Table 6: Total Estimated Emissions

	Calculation
Grid electricity displaced by PV generation on site (kWh)	8,669
Kg CO2 saving (kWh x carbon factor of grid elec)	4,499
Total efficient design emissions (kg CO2/year)	14,128
Total emissions with on-site generation (kg CO2/year)	**9,629**
Original Baseline Emissions (kg CO2/year)	15,086
Total reduction in emissions over baseline target	5,457
Betterment	**36.17%**

As required by the local council, a minimum 35% saving in CO2 emissions on-site is to be provided through energy efficient measures and renewable technologies. By including a PV system equivalent to the above specifications, the development can therefore feasibly achieve the targets set by the Council.

A more in-depth analysis of feasible system design will be required at detailed design stage.

8 Water Efficiency

From 6th April 2010 Part G of the building regulations came into force. The document has been set out to recognise the requirements for Sanitation, Hot water and water efficiency. Where this report concentrates on Water Efficiency of dwellings based on section 17.K.

Richmond Council require a water efficiency target of 110L/person/day, where building regulations requires 125 L/person/day. The below is an example of indoor water figurers to comply with the requirement of 110L/person/day. These figures can vary when installed, but the water calculation should be carried out before installed of the fittings to make sure the target of 110L/person/day is still achievable.

Taps	Litres
Basin Taps	5
Kitchen tap	6

	Flow rate (Litres)
House shower	6

	Capacity to over flow (Litres)
Bath	125

	Flush (Litres)
WC	4 to 2

Dishwasher	1.00 Litres / place setting
Washing machine	7.9 Litres / Kg of dry load

9 Conclusion

An analysis of the proposed development at 1 Saint James' Road, Hampton Hill has been carried out using SAP and following the London Plan energy hierarchy: Be lean, be Clean, be Green.

Energy efficient design proposals have been made which would secure an estimated 6% reduction in CO_2 over Building Regulation Part L1A 2013 requirements. These include improved insulation, limiting air permeability and thermal bridging, and incorporating efficient heating, lighting and controls.

Solar PV has been assessed as a feasible technology to further reduce CO_2 emissions through on-site generation to achieve an overall **36% reduction**.

Summary of Carbon Dioxide Emissions

Stage	Regulated emissions (tonnes CO2 per annum)
Baseline (A)	15.08
Be Lean (B)	14.13
Be Clean (C)	14.13
Be Green (D)	9.63

	Tonnes CO2 per annum	Reduction
Savings from Be Lean	0.95	6%
Savings from Be Clean	-	-
Savings from Be Green	4.50	30%
Cumulative	5.45	36%

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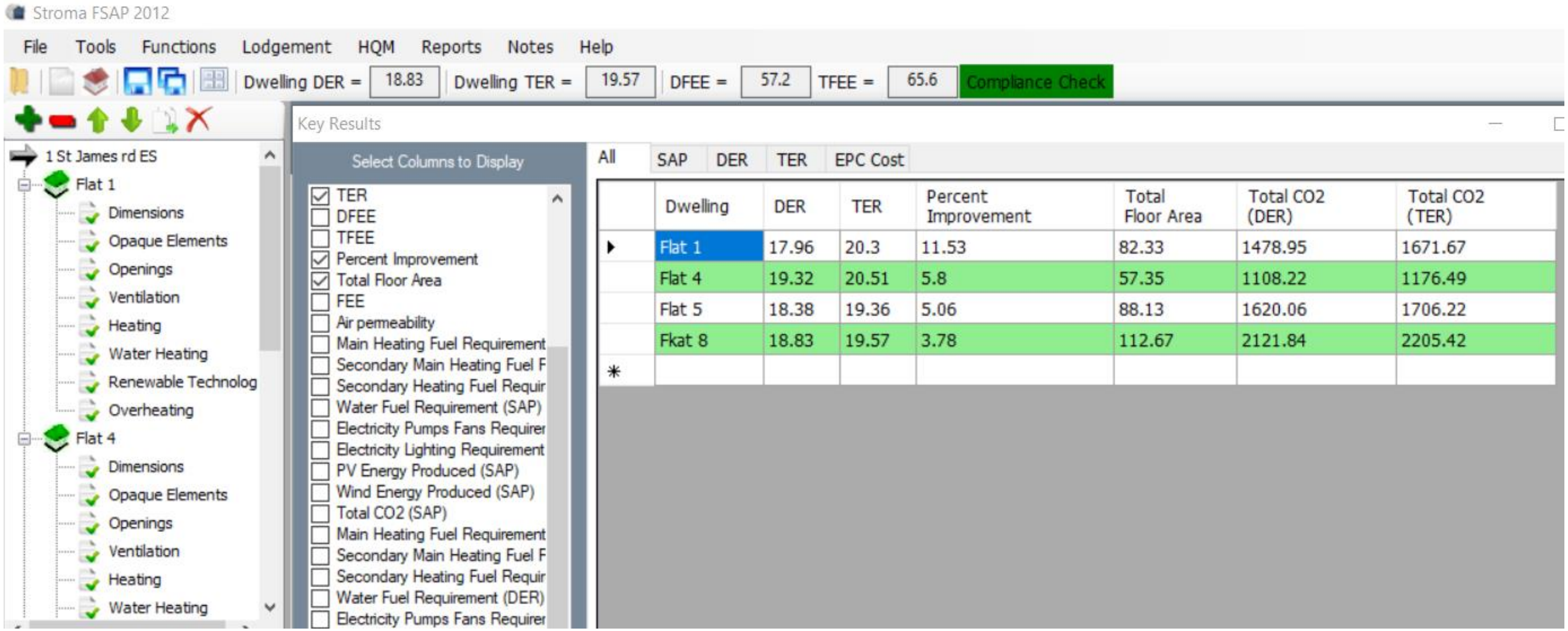
Appendices

Appendix A Key results SAP outputs for TER (baseline), DER (energy efficient design), and PV output



Dwelling	DER	TER	Percent Improvement	Total Floor Area	Total CO2 (DER)	Total CO2 (TER)
Flat 1	17.96	20.3	11.53	82.33	1478.95	1671.67
Flat 4	19.32	20.51	5.8	57.35	1108.22	1176.49
Flat 5	18.38	19.36	5.06	88.13	1620.06	1706.22
Fkat 8	18.83	19.57	3.78	112.67	2121.84	2205.42

Energy saving/generation technologies
Item 1 0.519 = -4499.53 (269)

Appendix B: Sample SAP Compliance Report – Baseline (TER) & Energy Efficient Measures (DER)

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 23 April 2020 at 14:50:54

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 57.35m²
Site Reference : 1 St James rd ES **Plot Reference:** Flat 4
Address : Flat 4, 1 St James Road, Hampton Hill

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas
Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)	20.51 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.32 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.0 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	45.5 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.22 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	OK
Roof	(no roof)		
Openings	1.30 (max. 2.00)	1.30 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Database: (rev 459, product index 018251):
Boiler systems with radiators or underfloor heating - mains gas
Brand name: Baxi
Model: 624 Combi
Model qualifier:
(Combi)
Efficiency 89.0 % SEDBUK2009
Minimum 88.0 % OK

Secondary heating system: None

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Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	TTZC by plumbing and electrical services	OK
Hot water controls:	No cylinder thermostat No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK

Based on:

Overshading:	Average or unknown
Windows facing: East	1.12m²
Windows facing: East	7.65m²
Ventilation rate:	3.00

10 Key features

Party Walls U-value	0 W/m²K
Floors U-value	0.1 W/m²K

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